

The Role of Physical Attractiveness in Adolescent Social Development

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Abstract

The well-supported physical attractiveness hypothesis states that positive characteristics (e.g., social competence, intelligence) are associated with physical attractiveness. The current study investigates this phenomenon from a developmental perspective, utilizing individual growth patterns to examine the ways in which physical attractiveness is associated with social functioning over time.

This multi-method longitudinal study followed a sample of 184 adolescents, their closest friends, and their romantic partners from age 13 to 23. Observed physical attractiveness was measured annually from age 13 to 19 and again at age 21. Repeated measures of friend reported sociability, and self-reported self-worth and alcohol use were collected annually from age 13 to 23. Observed and partner reported romantic relationship quality measures were collected at ages 18, 21, and 23. Self-reported social anxiety was collected at ages 18, 19, 20, 22, and 23. Self-reported extroversion, agreeableness, coping strategies, and self-perceptions of attractiveness were collected at age 23.

Latent growth curve modeling was used to assess variation in physical attractiveness over time, and then to predict social functioning at age 23. Growth in physical attractiveness predicted higher friend-reported sociability and romantic relationships with less conflict and more observed positive behaviors at age 23. Higher baseline physical attractiveness predicted more frequently using substances to cope, drinking alcohol, and binge drinking at age 23.

Additionally, growth in physical attractiveness predicted relative decreases over time in conflict and relative increases in positive behaviors in romantic relationships.

Higher baseline physical attractiveness predicted higher baseline sociability, increases in observed positive behaviors in romantic relationships, relative increases in social anxiety, and increases in frequency of alcohol use over time.

Self-perceptions of attractiveness, as opposed to observer ratings, were predictive of fewer positive behaviors in romantic relationships, reduced social anxiety, and greater extroversion and self-worth.

Finally, results provided some support for the existence of a sensitive period for physical attractiveness in early adolescence, with high *early adolescent* attractiveness predicting higher early adult self-perceptions of attractiveness even after accounting for overall attractiveness.

Gender was found to moderate only one model: Women whose physical attractiveness increased over time also reported more steep increases in alcohol use over time.

These results suggest that physical attractiveness remains an important predictor of behavior into early adulthood, and that variation in physical attractiveness over time is predictive of variation in social functioning. Overall, the influence physical attractiveness seems to be similar across genders. Finally, there may be evidence that early adolescent attractiveness has a lingering effect such that it remains an important predictor of early adult functioning even when accounting for current levels of attractiveness. Results are further discussed in terms of social learning theory and implicit personality theory.

The Role of Physical Attractiveness in Adolescent Social Development

Physical attractiveness has been associated with social development as early as preschool. The effects for higher attractiveness are generally positive, but those who are less attractive experience more depression and anxiety, fewer friends, and poorer quality relationships (see Langlois et al, 2000 for review). Furthermore, attractive people are perceived as more intelligent by teachers, given higher salaries, and for females, evaluated less harshly in trial situations (Ahola, Hellstrom, & Christianson, 2010; Gordon, Crosnoe, & Wang, 2013, Hudosa, Stone-Romero & Coats, 2003; Jacobson, 1981). A good deal of evidence shows that an individual's attractiveness influences others' behavior towards them across their lifespan; however, less research focuses on the influence of attractiveness on an individual's *own* behavior. To increase our understanding of the influence of attractiveness on social dynamics, it is essential that we understand its role in long-term social development. This study investigates the role of attractiveness as it pertains to the development of interpersonal processes during adolescence and the transition into adulthood.

Specifically, the proposed study relies on social learning theory and the physical attractiveness phenomenon (Bandura, 1977; Dion, Berscheid, & Walster, 1972). The physical attractiveness phenomenon is the hypothesis that good things are associated with attractive people. The interplay of these theories can be illustrated with a three-part example: (1) someone *expects* an attractive adolescent to be more socially competent than an average-looking peer; (2) this leads them to *treat* said adolescent as if they are more socially competent than is merited; (3) over time, the adolescent in question *learns* to be more socially competent as a result of this treatment. Unfortunately, this process does not

occur for less attractive adolescents, creating a dichotomy likely to lead to different trajectories of social competence (e.g., the rich get richer while the poor get poorer). Simply put, attractive adolescents learn to be more socially competent as a result of others' high expectations; less attractive adolescents learn to be less competent (e.g., more aggressive) as a result of others' low expectations. In light of this, it seems prudent to investigate the role of attractiveness in the formation and maintenance of the self, coping styles, and peer and romantic relationships. The current study uses a longitudinal, multiple-reporter design to measure attractiveness and its influence on social competence from adolescence to adulthood.

The goals of this research are to: (1) identify the impact of adolescent attractiveness on early adulthood relationship quality, personality development, and psychosocial functioning; (2) assess whether the overall level of physical attractiveness or a sensitive period for attractiveness in adolescence is most predictive of functioning in early adulthood; and (3) determine if and how different "attractiveness paths" (e.g., an unattractive 13 year-old becomes an attractive 20 year-old) impact early adult social functioning. Any discoveries here will extend current social theories and add to existing developmental theories, thereby advancing research with theoretical and clinical relevance.

Overview of Existing Literature

Physical attractiveness has undergone extensive examination as a factor in social functioning. As a result (and perhaps not surprisingly), a given individual's level of physical attractiveness has been linked to many behaviors displayed by others towards that individual. For example, attractiveness has been shown to elicit preferential

treatment in both elementary school systems and adult professional environments (Jawahar & Mattsson, 2005; Parks & Kennedy, 2007). In adulthood, more attractive female defendants receive shorter prison sentences from evaluators in mock trials (Ahola, et al, 2010). With respect to social skills, attractive individuals are perceived to be more likable, more socially skilled, and less anxious during conversations (Goldman & Lewis, 1977; Langlois et al, 2000). Additional (albeit limited) research has investigated how physically attractive people act toward others (Kahn, Hottes, & Davis, 1971); for instance, more physically attractive elementary school students use less aggressive persuasion techniques (Dion & Stein, 1978). Throughout, the evidence overwhelmingly indicates that less attractive individuals are treated and treat others worse than their more attractive peers.

It has been suggested that physical attractiveness is an information cue, which evokes stereotypes, expectations, and assumptions in others, irrespective of the cue being consciously recognized (Patzer, 1985). Authors of a meta-analysis argue that the physical attractiveness phenomenon is a result of inferences made when we rely on schemas to identify and understand others (Eagly, Ashmore, Makhijani, & Longo, 1991). Similarly, the implicit personality theory has been applied to the physical attractiveness phenomenon (Ashmore, & DelBoca, 1979): that is, because attractiveness is part of knowledge structures used to understand others' behaviors, a given individual's personality is at least partially based on physical attractiveness.

Since attractiveness can function as an unconscious stimulus, some research suggests that it may play an undetected role in personality development, interpersonal skill development, and confidence (Patzer, 1985). Although physical attractiveness has

been shown to be associated with behaviors across the lifespan, there is little longitudinal research examining how this process unfolds. The need for longitudinal research has been highlighted by Reis et al (1982), who suggested that “differential levels of social competence are acquired... as a result of a person’s physical attractiveness...[and that this] in turn affects social participation (p. 992).” This study aims to fill portions of the stated research gap by investigating various facets of adolescent attractiveness over an extended time period.

Attractiveness and Adolescence

The transition from adolescence to adulthood is a formative period of development, making this period an especially rich time to explore physical attractiveness. Many physical changes occur during adolescence, such as muscle growth, breast development, incidence of acne, and vocal changes. As such, we can expect physical attractiveness to vary dramatically across adolescence, primarily due to the differing rates at which individuals move through puberty. These (seemingly) minor differences in attractiveness may play a large role in social development.

As physical changes occur, adolescents become more concerned about their appearance. Not surprisingly, adolescents are more self-conscious about their appearance than adults (Elkind, 1967; Emmons, 1996), and their attitude about attractiveness is more predictive of self-worth than other attitudes (e.g., general effectiveness) (Lerner & Karabenick, 1974; Lerner, Orlos, & Knapp, 1976). Seeing that adolescents undergo high rates of physical change and that their self-worth is highly contingent on their appearance, the current study investigates whether adolescent attractiveness has a lingering influence through later stages of development.

Furthermore, since others' expectations of physical attractiveness have been shown to elicit changes in an individual's behavior, it follows that physical attractiveness can influence social behavior. For example, in a telephone conversation between a man and a woman, the woman's behavior changed based on the man's belief that she was (or was not) physically attractive (Snyder, Tanke, & Berscheid, 1977). Though the women were ignorant of the men being told whether they were (or were not) physically attractive, their behaviors were more friendly, likable, and socially desirable in the instances where the men believed they were attractive. This implies that the women changed their behavior to fit with the expectations of others.

Based on the above, if we accept the premises that (1) people change their behavior to fit expectations based on the physical attractiveness phenomenon, and (2) adolescence sees greater changes in physical attractiveness than other developmental periods, it seems reasonable to expect adolescent attractiveness to have a greater influence on social competence than any other life stage. More specifically, attractiveness during early adolescence may impact social competence in adulthood as much as (if not more than) attractiveness *in* adulthood. If these hypotheses are correct, the results may imply a time point for peer and teacher interventions regarding physical attractiveness biases.

In addition, while virtually all research agrees that adolescence is a formative period with respect to social skills, it has often overlooked how these skills may be affected by physical attractiveness. During adolescence, teenagers spend less time at home and more time developing relationships with peers that become increasingly intimate over time (Buhrmester & Furman, 1987; Larson & Richards, 1991). This change

coincides with another developmental task of adolescence: creating intimate relationships while also becoming independent of others – that is, being able to develop autonomy while maintaining relatedness (Allen, Aber, & Leadbeater, 1990, Allen, Weissberg, Hawkins, 1989; Sullivan, 1953). The development of autonomy and relatedness has been linked to a wide range of social relationship factors such as using less relational aggression in friendships and romantic relationships, increased peer popularity, and better social problem solving (Allen et al, 2002; Kuperminc, Allen, & Arthur, 1996; Schad, Szewedo, Antonishak, Allen, 2008). Despite this, there is little research on how social changes in peer relationships, as well as the beginnings of romantic relationships, may be affected by physical attractiveness.

Attractiveness and Psychosocial Functioning

Moving beyond adolescent development, attractiveness continues to impact a wide variety of areas; in particular, previous research supports a strong link between physical attractiveness and psychosocial functioning. For instance, research shows that higher levels of physical attractiveness in early adolescence are associated with higher levels of peer-rated social acceptance (Vanatta, Garstein, Zeller, & Noll, 2009). Another investigation of early adolescent physical attractiveness and social functioning indicates that more attractive adolescents are rated by their parents, peers, and themselves as more socially competent (Lerner et al, 1991). While this research clearly points to a link between attractiveness and social functioning, it can also be used to suggest that physical attractiveness can influence anyone who is in a relationship with an adolescent, regardless of age or relationship. The impact of these effects on a specific adolescent may create a basis of learned interpersonal behavior on which they can rely in adulthood.

Along these lines, previous research shows that physical attractiveness influences specific behaviors and general social competence ratings, both for the individual and the people who interact with them. Evidence shows that physical attractiveness predicts *changes* in interpersonal behavior, specifically the development of autonomy processes. As an example, mothers of attractive adolescents (age 15) used fewer autonomy promoting behaviors and fewer autonomy undermining behaviors (as compared to mothers of less attractive adolescents) one year later, even after controlling for baseline levels. That is, mothers displayed fewer behaviors in general, regardless of whether those behaviors would have been autonomy undermining or autonomy promoting in nature. It seems that mothers of attractive teens become more agreeable over time. Similarly, mothers of more attractive adolescents reported making fewer final decisions following an argument than mothers of less attractive adolescents, again controlling for baseline levels. In turn, adolescents with higher levels of physical attractiveness at age 15 exhibited fewer autonomy promoting behaviors and fewer autonomy undermining behaviors toward their friends two years later even after controlling for baseline levels. Similar to their mothers, target adolescents became more agreeable with their friends over time (Schad, Allen, Szewdo, & Chango, 2012). Together these findings highlight the potential influence of physical attractiveness on different types of relationships.

Although generally related to positive outcomes, one clear instance where attractiveness is related to negative outcomes is alcohol and drug use. There is extensive research showing that popularity in adolescence is associated with higher levels of alcohol and drug use (e.g. Allen & Antonishak, 2008; Allen, Porter, McFarland, Marsh, & McElhaney, 2005). However, physical attractiveness has been related to higher

likelihood of drug use within adolescent friendships, *even after controlling for* popularity (Schad, Szwedlo, Chango, Miga, & Allen, 2010). It seems likely, then, that higher physical attractiveness will be associated with higher alcohol use during adolescence and into early adulthood.

Since much research indicates that physical attractiveness is associated with social functioning, an obvious implication is that it is also related to social development. Further research is needed to investigate this implied influence, especially when one considers the possible consequences. For instance, highly attractive individuals experience dramatically improved outcomes as compared to their less attractive peers (e.g., better paying jobs, higher expectations from teachers, shorter prison sentences, less anxiety, etc.). The substantial nature of these impacts combined with a poor understanding of their origins suggests the need for longitudinal investigation. Moreover, since the transition from adolescence to adulthood has been shown to be an important formative period, it is essential that we understand how adolescent physical attractiveness leads to the growth, development, and occurrence of future outcomes.

Attractiveness and Personality Development

Since the associations with attractiveness are seen across the course of adolescence, it seems likely that physical attractiveness would influence personality development as well. For instance, it has been suggested that the process of receiving negative feedback from others can have a dramatic impact on self-concept: specifically, that the impact of this interactive process would influence not only self-confidence, but personality as well (Gergen, 1972). Additional research has shown that people lower in physical attractiveness tended to have more external control orientations, more

emotionality, and more anxiety (Adams, 1977). Conversely, females high in physical attractiveness have reported higher levels of self-esteem and happiness, and lower levels of neuroticism compared to their less attractive peers (Mathes & Kane, 1975).

Outside of the studies just mentioned, very few specifically address the effect of physical attractiveness on major personality traits such as extroversion and agreeableness, and none do so with longitudinal data. However, previous research on personality evidences the importance of examining it as a stable indicator of functioning (Hill, Turiano, Hurd, Mroczek, & Roberts, 2011; Rosellini & Brown, 2011), a dynamic the current study investigates.

If we accept the construct that personality development is a result of social interaction – a process involving the communication of attitudes, expectations, and behaviors – investigation into personality development will necessitate investigation into social interaction. Since physical attractiveness has been shown to be associated with both social functioning and personality, it is likely that the role of physical attractiveness in these domains begins long before the time periods which previous research has investigated. Longitudinal investigation focused on the links between early adolescent physical attractiveness and (i) social functioning and (ii) personality structure in early adulthood is needed to understand the full impact of physical attractiveness on the development of the self. Since adolescence contains many physical changes while also being a formative time for social development, it is a rich period to investigate the long-term effects of physical attractiveness.

Gender Differences and Physical Attractiveness

Although much of the literature on physical attractiveness shows no differences between men and women (see Langlois, 2000), there is still some research indicating that the effects of physical attractiveness differ by gender. Generally, adolescent girls tend to be more dissatisfied with their physical appearance than adolescent boys, and this dissatisfaction explains more variance in their self-esteem than other measures of psychological well-being (Delfabbro, Winefield, Anderson Hammarstrom, & Winefield, 2011). Additionally, although being attractive is usually a positive attribute, attractiveness negatively affects the selection of female leaders (Braun, & Peus, 2012). It seems that for women, being physically attractiveness can be negative, depending on the context.

However, women are also considered more socially competent than men across cultures and as young as preschool (Mpofu, Thomas, & Chan, 2004; Walker, 2005). Therefore, it may be that in a purely social context, there may be a positive additive effect of attractiveness and being female such that attractive women are seen as more socially competent than attractive men. However, for less directly social activities, or activities that do not fit female gender stereotypes (such as career promotions or alcohol use), being attractive and female may still be an additive effect, but with a less desirable outcome. For instance, in the same way that leadership roles are perceived to be stereotypically male roles (Braun, & Peus, 2012), alcohol use is also perceived to be more of a male activity. Although both men and women report using alcohol, men often perceive that they drink more than others whereas women perceive that they drink the same as or less than others (see Borsari & Carey, 2001 for review).

Therefore, in terms of relationship quality and psychosocial functioning, the influence of attractiveness may be more pronounced for women than for men, since they are generally seen as more socially competent regardless of attractiveness. In contrast, in areas considered as primarily male activities (such as alcohol use), the effects of attractiveness may be more pronounced for men than for women.

Self-perceptions of Attractiveness versus Observed Attractiveness

Self-perceptions of attractiveness have been investigated in depth (see Harter, 2012 for a review), and have been shown to be related to positive outcomes such as self-esteem (Bale & Archer, 2013), and negative outcomes such as bullying in early adolescence (Cunningham, Taylor, Whitten, Hardesty, Eder, & Delaney, 2010). Generally, though, as with observed attractiveness, higher self-perceptions of attractiveness are associated with positive outcomes (Harter, 2012). Still, some researchers have stated that self-judgments of attractiveness “do not work” (pg. 24, Patzer, 1985). This is based on research indicating that self-perceptions of attractiveness are not correlated with others’ judgments of attractiveness, leading to the conclusion that self-perceptions are often inaccurate. Although this may be true, self-perceptions of attractiveness still offer additional information and a unique lens into self-concept.

There is a great deal of literature investigating the impacts of both self-perceptions of attractiveness and observed attractiveness. However, there is a dearth of literature investigating these two constructs together. If self-perceptions of attractiveness are inaccurate, but have been found to be useful predictors, then testing observed attractiveness and self-perceptions of attractiveness as simultaneous predictors would begin to separate the predictive validity of these two constructs. It seems possible that

observed attractiveness might be related to relationship quality and social functioning, whereas self-perceptions of attractiveness, if thought of as a manifestation of self-concept, might be predictive of outcomes measuring the development of the self, such as personality characteristics or self-worth.

Patterns of Change

The implications of research in this field are profound. If physical attractiveness has positive long-term effects on more physically attractive people, as has been indicated in recent longitudinal research showing that adolescent attractiveness is associated not only with financial capital in early adulthood, but also social capital (i.e., a more extensive social support network; Gordon, Crosnoe, & Wang, 2013), the negative effects of physical attractiveness may be drastic, even if they go unnoticed. For instance, adolescents who become less socially competent over time (partially as a result of low physical attractiveness) may show deleterious effects for many years after adolescence. As negative outcomes compound over time, less attractive adolescents may become more anxious, and have difficulty forming and maintaining relationships in adulthood. To understand potential linkages here, the current study investigates anxiety symptoms as long-term outcomes of lower levels of physical attractiveness.

It is important to note that heretofore the focus of this review has been primarily on how differing levels of physical attractiveness may induce changes in personality, social behaviors, etc., primarily as a result of treatment from others. However, attractiveness is not a static construct; rather, any individual's level of attractiveness can wax or wane over time in response to exogenous factors. The impact of changes in attractiveness is poorly understood; for instance, it seems reasonable to expect individuals

who follow the same developmental patterns of attractiveness but who start from different points to differ, but little to no relevant research exists. Similarly, we could also expect differences in individuals who end adolescence at the same levels of attractiveness, yet arrive through dramatically different “attractiveness paths” (e.g., an unattractive and average-looking adolescent both become extremely attractive in adulthood). The current study investigates patterns of changes in attractiveness with the hope of shedding light on this facet of attractiveness and social development.

While attractiveness may stabilize during early adulthood (since individuals have completed puberty and are going through fewer physical changes), young adults may continue to be affected by their adolescent experiences – that is, there may be a lingering effect of adolescent attractiveness. If this is the case, there may be a sensitive period in adolescence during which attractiveness matters as much as adult levels of attractiveness for early adulthood outcomes. This lingering effect may be best understood with the example of the attractive, successful young adult who acts and thinks as if they are “still the fat kid in gym class.” The current study investigates the possible existence of this phenomenon, with the goal of identifying potential periods with strong predictions to adult outcomes.

Hypotheses

It is hypothesized that adolescents with higher levels of physical attractiveness will have better social and psychological functioning in early adulthood (with the exception of increased alcohol use) than those with lower levels of physical attractiveness, and that patterns of change in physical attractiveness will offer a better understanding of adult

functioning than recent levels of attractiveness alone. The current study will investigate six specific hypotheses to shed light on these themes.

- 1) There will be significant change among individuals over time in physical attractiveness.
- 2) Individual variation in adolescent physical attractiveness will predict more positive adult functioning, with the exception of negative functioning in terms of more alcohol use. In particular, growth and/or higher levels of adolescent attractiveness will predict positive outcomes including: (i) better social functioning (social competence), (ii) better romantic relationship quality (less conflict in relationships, and more observable behaviors such as use of reasons, collaboration, engagement, and warmth in relationship), (iii) fewer social anxiety symptoms, (iv) higher self-concept (e.g., higher levels of self-worth, self-perceptions of attractiveness), and (v) higher levels of personality traits (agreeableness and extroversion). Growth and/or higher levels of adolescent attractiveness will predict negative outcomes including: (i) more frequent drinking behaviors, and more frequent use of substances for coping. In short, does attractiveness predict future functioning, and if so, to what extent?
- 3) Variation in physical attractiveness will predict individual variation in functioning from adolescence into early adulthood. Specifically, growth and/or higher levels of physical attractiveness from adolescence into early adulthood will be associated with growth in social functioning (i.e., social competence), romantic relationship quality (i.e., declines in conflict in relationships, and growth in observable behaviors in relationship), declines in social anxiety symptoms,

- growth in self-concept (i.e., higher levels of self-worth), and growth in drinking behaviors.
- 4) The effects of physical attractiveness will be more pronounced for women than for men with the exception of areas considered primarily male activities (such as alcohol use), where the effects of attractiveness may be more pronounced for men than for women.
 - 5) Self-perceptions of physical attractiveness will predict early adult functioning after accounting for overall observed physical attractiveness with particularly high predictions hypothesized for personality measures and self-concept (i.e., self-worth and self-perceptions of attractiveness).
 - 6) There will be a residual effect of levels of adolescent attractiveness on adult functioning (even after accounting for overall levels of attractiveness).

Specifically, a developmentally sensitive period in early adolescence, during which attractiveness is lower than average, will predict lower self-perceptions of attractiveness than will overall levels of attractiveness.

Method

Participants

The proposed study analyzed data obtained from a multi-method, multi-reporter sample of 184 adolescents, close friends, and romantic partners, followed annually from ages 13 to 23. Participants were recruited from three successive classes entering a seventh and eighth grade public middle school that served the entire population of the city of Charlottesville, Virginia (mean age = 13.4 years). Students were approached to serve as either primary participants (i.e. target teens) or as collateral participants (e.g.

close peers of target teens). There was a 63% acceptance rate from adolescents approached to participate. Although this is a community sample, the population from which the participants were recruited was quite heterogeneous in terms of socioeconomic status and racial/ethnic identity of participants, including 30% African-American, 8% Mixed-race, and 2% Hispanic-American participants. Sixty-one youths (33%) came from families living at less than 200% of the poverty line.

Close friends. At each annual data collection, target adolescents were also asked to nominate their “closest friend” of the same gender to be included in the study. This gives the clearest possible picture of the adolescent’s recent close peer interactions, and eliminates the problem of repeatedly assessing a peer who may no longer be close to the target teen, perhaps due to circumstances that have nothing to do with the friendship (e.g., geographic moves). For the current study, the close peer nominated annually (ages 13-23) completed measures about their relationship with the target adolescent.

Romantic partners. Beginning at age 17, target participants were asked to come in with a romantic partner if they were in a relationship for two months or longer. Since only a certain percentage of participants were in a relationship of that length in one year, target participants were asked to participate with their partner once over the course of three years (ages 17-19). This process was repeated for ages 20-22 and 23-25 so that there are three data collections for targets and their romantic partners. For the current study, the romantic partners who participated at all ages completed measures about their relationship with the target teen, and engaged in interaction tasks with the target teen.

Measures

Physical attractiveness. Beginning at age 13 and assessed annually until age 19 and again at age 21, the attractiveness of the target adolescent was coded using the first 10 seconds of the target interaction recording (Schad & Allen, 2009). The confound of dyadic physical attractiveness was controlled for by covering the portion of the screen that had another person on screen other than the target. Similarly, while coding physical attractiveness, the audio was kept on mute, therefore controlling for any effect content of discussion or choice of language may have on physical attractiveness. Physical attractiveness was reliably coded from videotape using a naïve rater strategy (Anderson, John, Keltner, & Kring, 2001; Kopera, Maier, & Johnson, 1971; Patzer, 1985). In a naïve coding system, the construct (in this case, physical attractiveness) is coded without having received specific instruction regarding what to look for. As a result, coders' personal ideas about physical attractiveness were used as the basis of coding. The coding team included both males and females, and coders were ethnically diverse. Reliability among coders was excellent for all time points (age 13 ICC = .85; age 14 ICC = .86; age 15 ICC = .93; age 16 ICC = .89; age 17 ICC = .89; age 18 ICC = .87; age 19 ICC = .81; age 21 ICC = .90).

Judgments of physical attractiveness have been shown to be remarkably reliable between judges and across gender and culture (Patzer, 1985). Judges of physical attractiveness have been shown to rate attractiveness reliably even when the judges themselves differ on demographic variables (Patzer, 1985). To assure that this was the case in the current study, mixed effects models were used to determine if male coders consistently coded attractiveness differently than female coders. Results indicate that

there were no differences in rated attractiveness based on coder gender (see Appendix A for statistics).

In other studies, this measure of attractiveness has been linked to changes in autonomy inhibiting behaviors in maternal relationships and friendships in the current sample (Schad, et al, 2012). See Appendix A for protocol.

Sociability. Annually from age 13 to 23, close friends nominated by the target participants completed the Self-Perception Profile, reporting about the target participant (adolescent version: Harter, 1988; adult version: Messer & Harter, 1986). The Adult Self-Perception scale has been modified in the Adolescent Self-Perception Scale (Harter, 1988). From ages 13 to 22, close friends reported on the adolescent version and at ages 23, close friends reported on the adult version.

On both versions, close friends were asked to choose between two contrasting stem items, and then rate that item as either “sort of true” or “really true” of the target participant. On the adult version, the 4-item sociability scale was used for the current study with higher scores indicating more sociability (sample item: “some adults feel at ease with other people BUT other adults are quite shy”). Messer & Harter (1986) demonstrated acceptable internal reliability and validity for this measure. In the current sample, this scale demonstrated good internal reliability ($\alpha = .66$ at age 23); in other studies, it has been linked to negative social expectations of peers in early adolescence, rejection sensitivity, and dominance (Loeb, 2012).

The parallel scale on the adolescent version (social acceptance) has excellent internal reliability (age 13 $\alpha = .77$; age 14 $\alpha = .79$; age 15 $\alpha = .83$; age 16 $\alpha = .74$; age 17 $\alpha = .75$; age 18 $\alpha = .79$; age 19 $\alpha = .79$; age 20 $\alpha = .80$; age 21 $\alpha = .72$; age 22 $\alpha = .75$) and

has been linked to withdrawal, depression, and anxiety symptoms in the current sample (Schad, Mikami, Teachman, Allen, & Chango, 2012).

Romantic relationship quality.

Relationship conflict. At ages 18, 21, and 23, romantic partners completed the Network of Relationships Inventory (Furman, 1996). This 45-item measure assesses qualities of relationships in terms of companionship, conflict, intimacy, affection, support, criticism, and punishment. These scales have been linked with romantic relationship conflict and interparental conflict, and communication skills (Shomaker & Furman, 2009; Simon & Furman, 2010). For the current study, the conflict scale was used as a measure of relationship quality. This 3-item scale demonstrated excellent internal consistency (age 18 $\alpha = .81$; age 21 $\alpha = .86$; age 23 $\alpha = .93$).

Observed behavior in romantic relationships. At ages 18, 21, and 23, target participants and their romantic partners participated in an 8-minute video-taped interaction task. The Autonomy-Relatedness Coding System (Allen et al, 1994) was used to code interactions between target adolescents and their romantic partner in which the dyad was having a disagreement. The coding system employed yields ratings for the target participants' overall behavior toward their partners in the interaction, as well as for their partners' overall behavior toward them. Ratings are molar in nature, yielding overall scores for targets' and partners' behaviors across the entire interaction; however, these molar scores are derived from an anchored coding system that considers both the frequency and intensity of each speech relevant to that behavior during the interaction in assigning the overall molar score. Specific interactive behaviors were first coded, then summed together on *a priori* grounds. For this study, information from the *autonomy and*

relatedness scales will be used, which captures both behaviors about reasoning/argument style, as well as warmth and engagement during the disagreement. Each interaction was coded as an average of the scores obtained by two trained raters unaware of other data from the study (age 18 *intraclass* $r = .80$ for target's behaviors and $.87$ for partner's behaviors; age 21 *intraclass* $r = .64$ for target's behaviors and $.60$ for partner's behaviors; age 23, *intraclass* $r = .72$ for target's behaviors and $.63$ for partner's behaviors, all considered in the 'good' range for this statistic according to Cicchetti & Sparrow, 1981).

Social anxiety. Target participants completed the Social Anxiety Scale (LaGreca, 1998) at ages 18, 19, 20, 22 and 23. This 22-item measure is comprised of three scales: (i) fear of negative evaluation, (ii) social avoidance and distress in new situations, and (iii) general social avoidance and distress. This measure has demonstrated reasonable psychometric properties in previous research (LaGreca & Lopez, 1998). For the current study, the 8-item fear of negative evaluation subscale was used, which demonstrated excellent reliability in the current sample (age 18 $\alpha = .90$; age 19 $\alpha = .91$; age 20 $\alpha = .90$; age 22 $\alpha = .90$; age 23 $\alpha = .91$). This scale has also been related to withdrawal symptoms and perceived social acceptance (Teachman & Allen, 2007) in the current sample.

Self-concept.

Self-worth. Annually from age 13 through 23, target participants completed the Self-Perception Profile (adolescent version: Harter, 1988; adult version: Messer & Harter, 1986). The Adult Self-Perception scale has been modified in the Adolescent Self-Perception Scale (Harter, 1988). From ages 13 to 22, target participants reported on the adolescent version. Additionally, at age 18 a previously excluded item was added to this scale. At age 23, target participants reported on the adult version.

Target participants were asked to choose between two contrasting stem items, and then rate that item as either “sort of true” or “really true” of themselves. The 6-item self-worth scale was used for the current study with higher scores indicating more self-worth (sample item: “some adults are very happy being the way they are BUT other adults would like to be different”). Messer & Harter (1986) demonstrated acceptable internal reliability and validity for this measure. In the current sample, this scale demonstrated excellent internal reliability ($\alpha = .88$ at age 23).

The parallel scale on the adolescent version has demonstrated good internal consistency (age 13 $\alpha = .76$; age 14 $\alpha = .81$; age 15 $\alpha = .83$; age 16 $\alpha = .85$; age 17 $\alpha = .86$; age 18 $\alpha = .87$; age 19 $\alpha = .85$; age 20 $\alpha = .84$; age 21 $\alpha = .85$; age 22 $\alpha = .83$) and has been linked to less instability in peer group, less jealousy, and higher ethnic identity affirmation in the current sample (Antonishak, J., Schlatter, A. K. W., Allen, J. P., 2005; Miga, E. M., Allen, J. P., & Hare, A., 2008; Smith, F.D., 2003).

Self-perceptions of physical attractiveness. At age 23, target participants completed the Self-Perception Profile (adult version: Messer & Harter, 1986), which measures self-perceptions of attractiveness.

Target participants were asked to choose between two contrasting stem items, and then rate that item as either “sort of true” or “really true” of themselves. The 4-item physical appearance scale was used for the current study with higher scores indicating higher satisfaction with their attractiveness (sample item: “some adults think they are not very attractive or good looking BUT other adults think they are attractive or good looking”). Messer & Harter (1986) demonstrated acceptable internal reliability and

validity for this measure. In the current sample, this scale demonstrated excellent internal reliability ($\alpha = .82$ at age 23).

Alcohol Use.

Frequency of drinking and binge drinking. Annually from age 13 through age 23, target participants completed a 36-item measure about their alcohol and drug use. This measure was adapted from the Alcohol and Drug Use Questionnaire used in the Monitoring the Future surveys (Johnston et al., 1987; Johnston et al., 2006). Drinking behaviors were assessed by asking participants to report about the average number of alcoholic drinks they typically consume per week, and how many times they participated in binge drinking (defined as “drinking enough to get really drunk”) in the past month. This measure has been linked to relational aggression and autonomy behaviors in the current sample (Schad et al, 2008).

Coping by using substances. At age 23, target participants completed the Brief COPE, a shortened 28-item version of the original 60-item COPE (Carver, Scheier, & Weinstraub, 1989), which assesses participants’ different adaptive and dysfunctional responses to stress. The dysfunctional reactions to stress scale used in the current study is coping using substances. This scale is 4-items and demonstrates excellent reliability in the current sample ($\alpha = .95$), in addition to being associated with friendship competence and aggression between parents of adolescents in other studies (Oudekerk, Brown, Szwedo, & Allen , 2012).

Personality. At age 23, target participants completed the 30-item Personality Inventory Pool (Goldberg, 1992) with scales regarding extroversion and agreeableness. This measure has been developed to match the constructs of the NEO-PI-R and reliably

measures the big five personality constructs (Goldberg et al, 2006). Previous research has demonstrated the reliability and validity of self-report personality inventories (Kurtz & Parrish, 2001). In the current sample, reliability was excellent ($\alpha = .84$ for extroversion, $\alpha = .74$ for agreeableness). In the current sample, agreeableness has been linked to physical attractiveness (Schad et al, 2012a).

Procedure

Participants were recruited via an initial mailing describing the study, co-signed by their school principal and followed by a brief phone call. Collateral peers and romantic partners were contacted by phone. All participants were fully debriefed and written procedures for handling unusual problems (e.g., responding to seriously depressed or suicidal participants) were established and tested. In the first eight years of the study (e.g. ages 13 -20) there was an attrition rate of 3%. The study has taken proactive measures to minimize attrition by compensating the subjects well, making interviews relaxed, having interviewers establish rapport with the participants and obtaining extensive tracking information.

Statistical Analysis

Individual Variation in Physical Attractiveness. To assess growth of physical attractiveness from age 13 to 19 and again at age 21, an unconditional latent growth model was fit to repeated measures of physical attractiveness using MPlus 7.0 (see Figure 1). Latent growth models first estimate an intercept and slope for each individual in the sample. Then, an intercept and slope are estimated from the aggregated intercepts and slopes of the individuals, creating an average intercept and slope for the sample, as well

as variation around those means. Allowing the parameters of the slope¹ to be estimated (as opposed to specifying, for example, a linear trend) allows non-linear patterns to emerge. For example, a freely estimated growth model could show decreases in physical attractiveness in early adolescence as well as increases in attractiveness in later adolescence, whereas a linear growth model would show either increases or decreases in attractiveness, but not both. This process of estimating the slope parameters as opposed to specifying a pattern also optimally fits the latent change factor to the data of the sample (Kline, 2005). Free estimation seems most appropriate given that a non-linear pattern of change in adolescent attractiveness, specifically a decline in physical attractiveness during puberty and an incline after puberty is complete, has been shown in previous research (Mathes, Brennan, Haugen, & Rice, 1985). For all analyses, fit to data will be assessed using RMSEA (below .08), χ^2_m , and CFI (above .90; see Brown & Cudeck, 1993, Hu & Bentler, 1999, and Kline, 2005 for review of fit indices).

¹ Please note that the term “slope” will be used to indicate any change in variables over time for the purposes of this study (i.e., it will not be ascribed only to linear patterns).

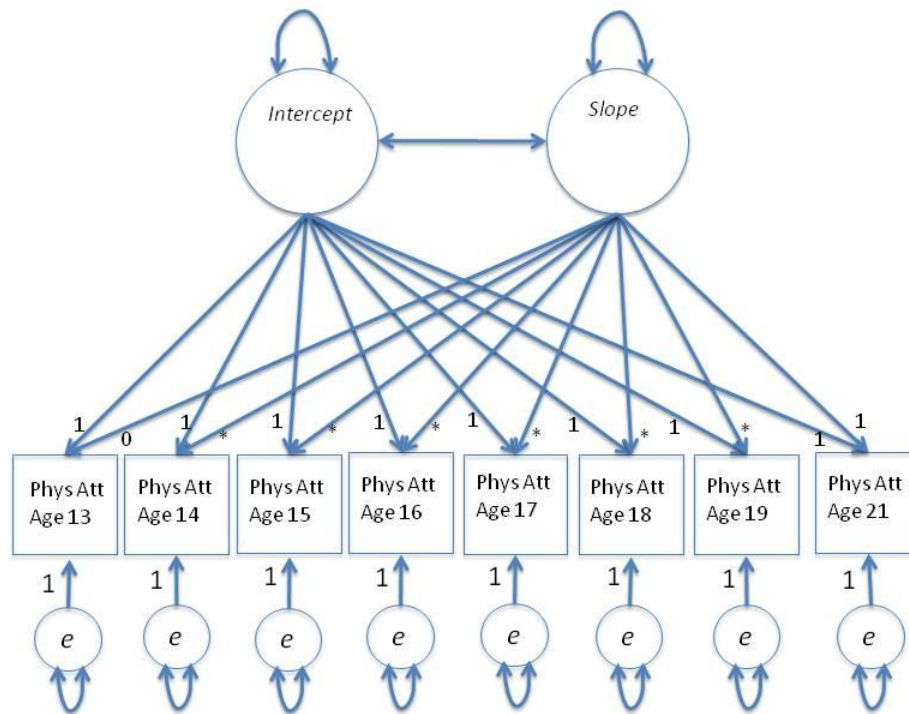


Figure 1. Path diagram for latent growth model of physical attractiveness.

Individual Variation in Physical Attractiveness Predicts Early Adult Functioning.

The resultant intercept and slope of physical attractiveness were used as predictors for criterion variables measuring functioning outcomes in early adulthood. Hierarchical modeling was used. The early adult functioning variables were first regressed on demographic variables (gender and minority status), while constraining all paths from intercept and slope of physical attractiveness to be zero. A second model then assessed the latent intercept and slope of physical attractiveness as predictors of the early adult functioning variables (see Figure 2). A chi-square difference test (χ^2_D test) (see Kline, 2005) was used to compare the goodness of fit between these hierarchically nested models. Additionally, because the scales are different for predictor and outcome

variables, all reported estimates are standardized.

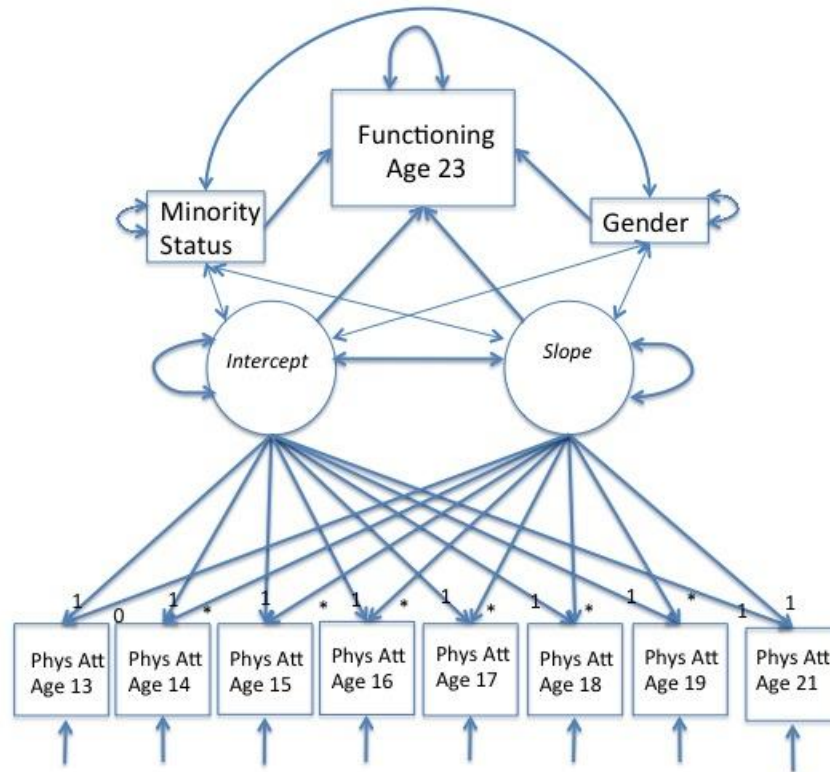


Figure 2. Path diagram for latent growth model of physical attractiveness predicting age 23 functioning.

Assessing Change Over Time in Functioning Outcomes. Significant variation in intercept and slope of the outcome variables was established using the same unconditional growth models discussed for physical attractiveness. See Figure 3 for path diagram.

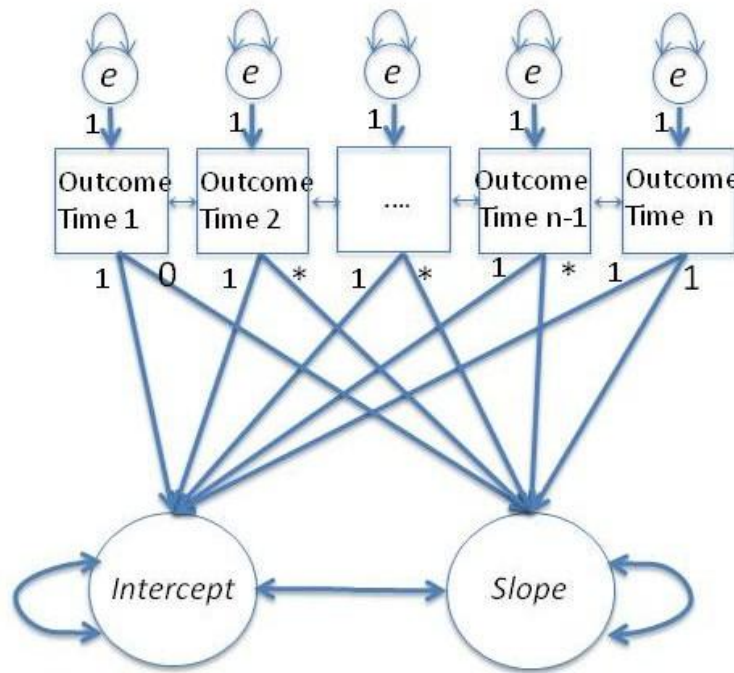


Figure 3. Path diagram for latent growth model of outcomes.

Variation in Physical Attractiveness Predicting Variation in Functioning from Adolescence into Early Adulthood

Individual variation in physical attractiveness intercept and slope were used as predictors of individual variation in functioning over time. Hierarchical modeling was used. The intercept and slope of functioning variables was first regressed on gender and minority status, while constraining paths from intercept and slope of physical attractiveness to be zero. A second model then estimated the latent intercept and slope of physical attractiveness as predictors of the early adult functioning variables (see Figure 4). A chi-square difference test (χ^2_D) was used to compare these hierarchical models. As above, because the scales are different for predictor and outcome variables, all reported estimates are standardized.

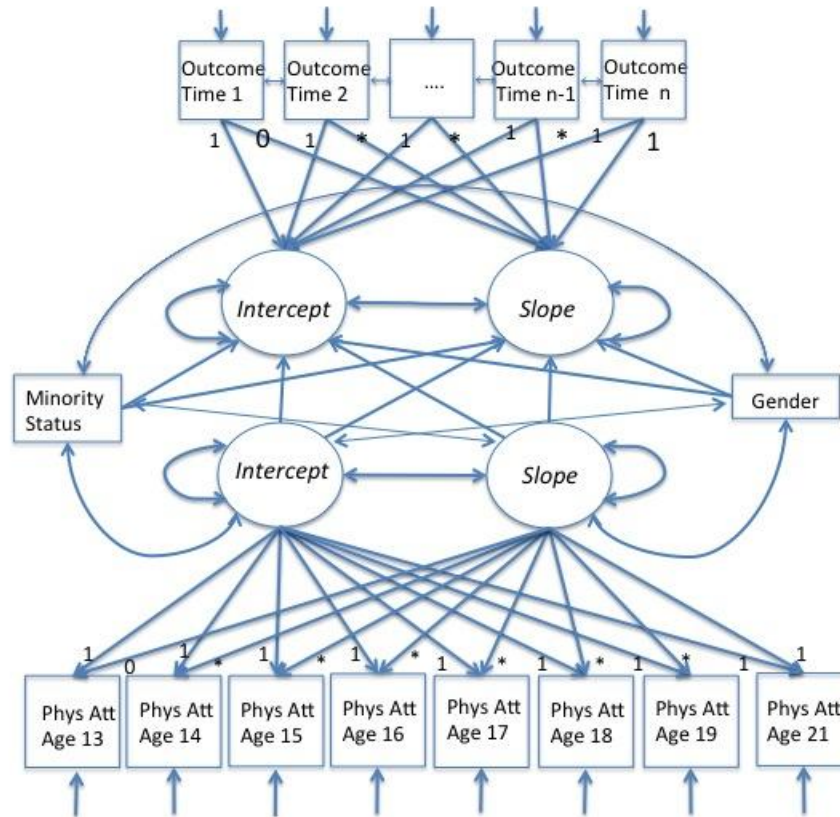


Figure 4. Path diagram for latent growth model of physical attractiveness predicting growth in functioning outcomes.

Gender Moderators of Variation in Attractiveness Predicting Change in Functioning

Multiple group analysis was used to examine whether the relation between change in attractiveness and change in functioning was different for men and women. First, an unconstrained multiple group model, was fit to the data (model 1). If this model fit the data well ($RMSEA \leq .08$; $CFI \geq .90$), follow-up analyses were performed to locate significant differences between men and women. These follow-up analyses first fit a multiple group model in which all paths were constrained to be equal between men and women (model 2). The model then tested (χ^2_D) against models that freed one parameter to be estimated as different between men and women (model 3). These freed parameters

will be those shown to be significant for one group but not the other in the unconstrained model (model 1). For example, if the slope of physical attractiveness significantly predicted the slope of frequency of alcohol use for women but not men in the unconstrained model (model 1), then that one path would be freed to be estimated differently for men and women in model 3. If this model 3, with the one parameter being estimated differently between men and women, fit the data significantly better than model 2 (the fully constrained model), as determined by χ^2_D , then this indicates that there was a significant difference between men and women in the way that their change in physical attractiveness predicted their change in frequency of alcohol use. The pattern of this difference will be reported from the unconstrained model.

If the unconstrained multiple group model was a poor fit to the data, then no follow-up analyses were conducted.

Self-Perceptions of Attractiveness and Observed Physical Attractiveness as Predictors of Early Adult Functioning

Multiple regression analyses were used to test whether self-perceptions of attractiveness predict early adult functioning after accounting for overall observed attractiveness. To assess the overall average level of observed attractiveness (as opposed to its decomposed slope and intercept parameters), an exploratory factor analysis was applied to physical attractiveness measurements from age 13 to 19 and 21 to determine whether a single overall attractiveness factor can be obtained from the data. Factor analyses help account for measurement error by creating a latent variable (i.e., a factor) from multiple-indicators of a construct. See Figure 5 for example of a one factor model of physical attractiveness.

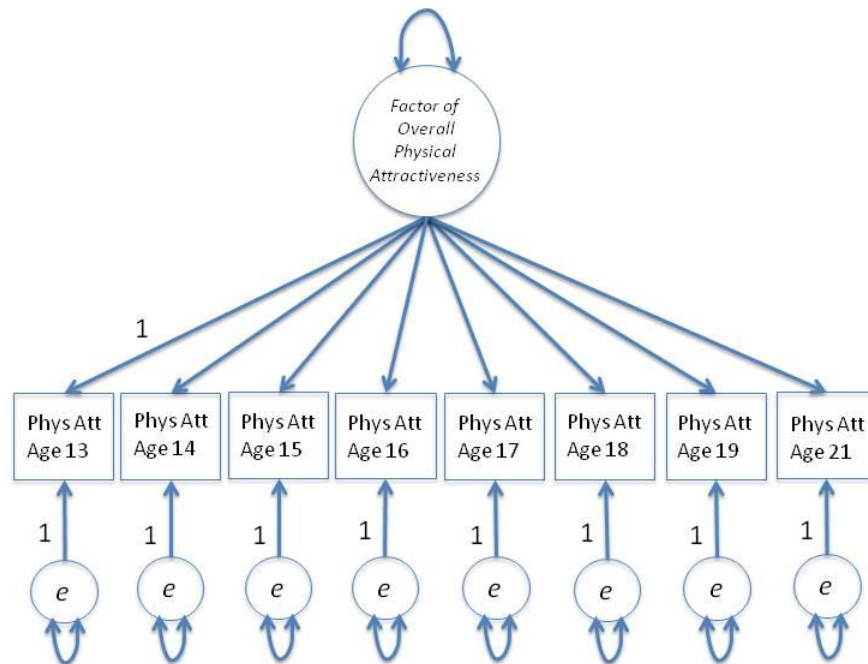


Figure 5. Path diagram of a one-factor model of physical attractiveness.

Eigenvalues from the exploratory factor analysis were used to indicate the number of factors for a confirmatory factor analysis. Next, regression analyses were used to predict each outcome from demographic control variables (gender and minority status), the factor of physical attractiveness, and self-perceptions of attractiveness (see Figure 6 for path diagram).

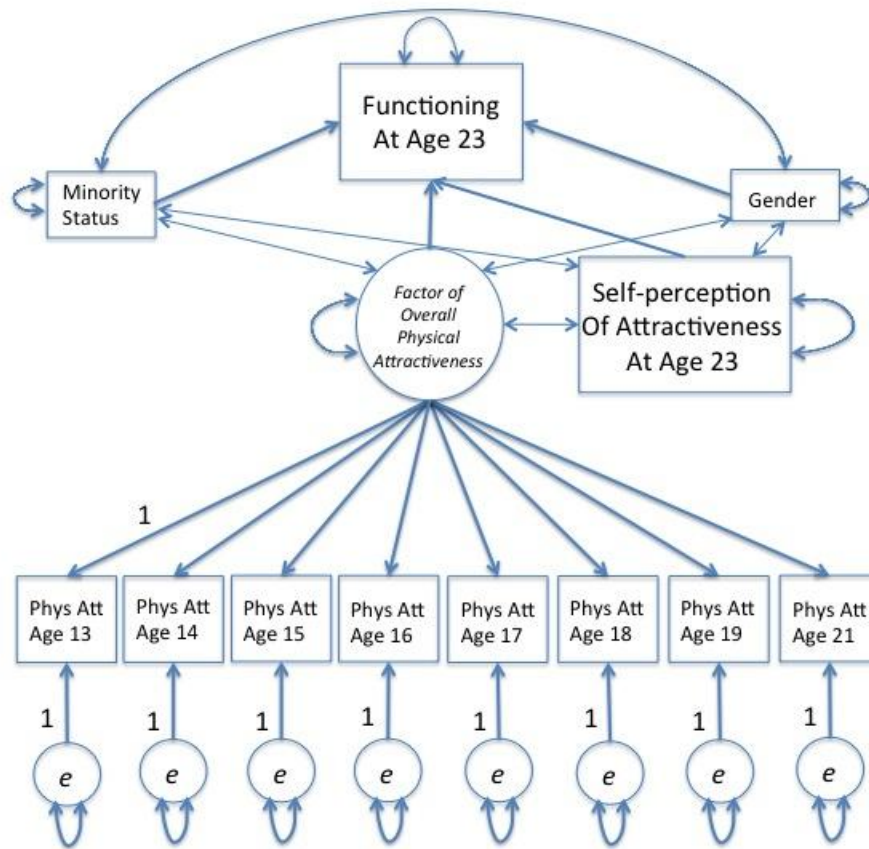


Figure 6. Path diagram of physical attractiveness factor and self-perceptions of attractiveness predicting functioning at age 23.

Developmentally Sensitive Period

Regression was used to test whether a particular year of early adolescent attractiveness predicts early adult self-perceptions of attractiveness after accounting for overall observed attractiveness. The factor discussed above was used as a predictor in the regression analyses. These analyses were used to predict self-perceptions of attractiveness from demographic control variables (gender and minority status), the factor of physical attractiveness, and a particular year of early adolescent attractiveness (see Figure 7 for path diagram).

Choosing the developmentally sensitive period. Based on the freely estimated latent slope estimates described above, the age prior to age 18 in which attractiveness

decreases most from the prior year, or has the least amount of positive change, was considered as the developmentally sensitive period.

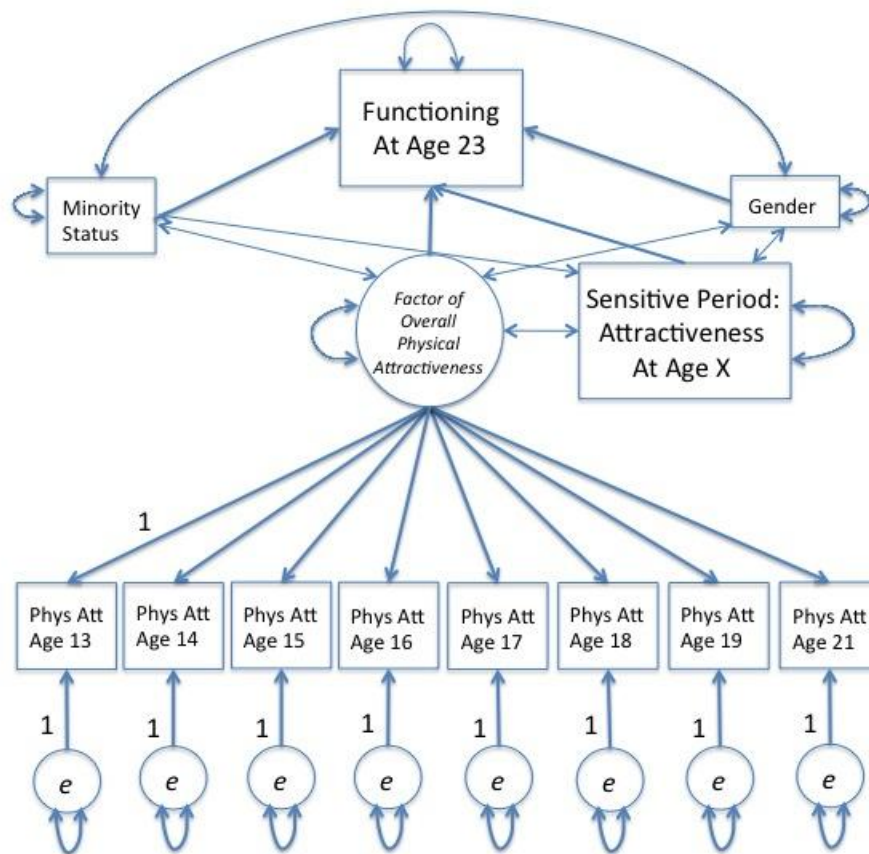


Figure 7. Path diagram of physical attractiveness factor and self-perceptions of attractiveness predicting functioning at age 23.

Results

Preliminary Data Analysis

Means, standard deviations, and correlations between each repeated measurement of physical attractiveness are presented in Table 1. Physical attractiveness at one assessment point was correlated with each subsequent assessment. Means, standard deviations, and correlations between outcomes at age 23 and (i) physical attractiveness at each age and (ii) overall average physical attractiveness are presented in Table 2. Means, standard deviations and correlations between outcomes at first measurement (i.e., age 13

or age 18 depending on variable) and physical attractiveness at age 13 are presented in Table 3. Overall, physical attractiveness was related to outcomes both in early adolescence and early adulthood. See Appendix B for means, standard deviations, and correlations of repeated measures of outcome variables.

Table 1. Means, standard deviations, and correlations between repeated assessments of physical attractiveness.

	Physical Attractiveness								
	M(SD)	1.	2.	3.	4.	5.	6.	7.	8.
1.Age 13	3.68(.76)	-	56***	44***	59***	59***	54***	56***	54***
2.Age 14	3.75(.89)		-	44***	55***	53***	49***	54***	51***
3.Age 15	3.67(.98)			-	62***	54***	53***	52***	54***
4.Age 16	3.65(.92)				-	71***	69***	66***	66***
5.Age 17	3.63(1.09)					-	70***	75***	69***
6.Age 18	3.57(.88)						-	81***	70***
7.Age 19	3.59(.94)							-	74***
8.Age 21	3.57(.94)								-

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. All correlations are multiplied by 100.

Table 2. Means, standard deviations, and correlations between outcomes at age 23, and physical attractiveness at each age, and average physical attractiveness.

	Outcomes Age 23												
	M(SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Sociability (F)	13.25(2.44)	-	-12	15	41**	14	01	22*	10	22**	20*	06	-05
2. Conflict (P)	7.10(2.61)		-	-36**	-43***	00	24*	02	15	02	-17	-10	02
3. Pos Beh w/ P (O)	2.34(0.46)			-	65***	-10	-02	18	19	25*	43***	15	10
4. P's Pos Beh (O)	2.39(0.45)				-	14	07	14	04	15	34**	06	-17
5. Social Anxiety	14.01(5.82)					-	33***	30***	28***	-26**	07	-34***	-33***
6. Coping: substances	2.99(1.57)						-	48***	54***	05	-07	-19*	-07
7. Freq Alcohol	1.62(1.04)							-	70***	22**	11	-00	-06
8. Freq Binge	0.74(0.95)								-	18*	-03	-12	-04
9. Extroversion	35.00(7.46)									-	31***	40***	36***
10. Agreeableness	39.81(5.54)										-	28***	08
11. Self-worth	19.61(3.38)											-	69***
12. PA Self-perceptions	12.66(2.31)												-
13. Avg PA (O)	3.64(0.76)	28**	-31**	26**	47***	19*	18*	30***	22**	19*	15	08	15
14. PA age 13 (O)	3.68(0.76)	09	-08	31**	35**	19*	26**	22**	16*	11	09	07	20*
15. PA age 14 (O)	3.75(0.89)	20*	-09	33**	27*	20*	18*	20*	23**	15	00	10	23**
16. PA age 15 (O)	3.67(0.98)	17	-12	49***	30*	30***	11	13	18*	-03	13	03	15
17. PA age 16 (O)	3.65(0.92)	25**	-29**	39**	49***	15	05	17*	10	13	13	02	08
18. PA age 17 (O)	3.63(1.09)	37***	-33**	46***	50***	17*	12	29***	11	17*	14	08	09
19. PA age 18 (O)	3.57(0.88)	17	-38***	46***	41**	06	17	26**	20*	27**	20*	13	19*
20. PA age 19 (O)	3.59(0.94)	21*	-23*	45***	36**	18*	20*	25**	22**	24**	14	04	11
21. PA age 21 (O)	3.57(0.94)	14	-30*	38**	32*	15	21*	23**	20*	14	11	-06	07

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. (F) = Friend report; (P) = romantic partner report; Pos Beh w/ P = Positive behaviors with romantic partner; (O) = observed; P's Pos Beh = Romantic Partner's positive behaviors toward target; Freq = frequency; Binge = Binge drinking; PA = Physical Attractiveness; Avg = Average. If not specified, measures are self-report. All correlations are multiplied by 100.

Table 3. Means, standard deviations and correlations between outcomes at first measurement and average physical attractiveness and physical attractiveness at age 13.

	Outcomes At First Measurement														
	M(SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. Sociability (F) age 13	12.90(2.78)	-	.05	-.15	-.11	-.04	.07	.06	.14	.05	-.10	-.14	.20*	.26***	.30***
2. Conflict (P) age 18	5.79(2.30)		-	-.00	-.11	.01	-.03	.22*	.12	-.11	-.10	-.04	-.13	-.00	-.10
3. Pos Beh w/ P (O) age 18	2.38(0.54)			-	.73***	.09	-.20	.06	.00	.06	.44***	-.06	-.17	.18	.07
4. P's Pos Beh (O) age 18	2.37(0.53)				-	.26*	-.14	.09	-.02	-.09	.27*	-.17	-.14	.18	.13
5. Social Anxiety age 18	14.00(5.72)					-	.23**	.18*	.03	-.28***	.02	-.19*	-.41***	.03	.00
6. Coping: substances age 23	2.99(1.57)						-	.17*	-.02	.05	-.07	.01	-.07	.18*	.26**
7. Freq Alcohol age 13	0.08(0.37)							-	.73***	-.03	-.00	-.13	-.08	.04	.07
8. Freq Binge age 13	0.05(0.32)								-	.06	-.05	-.11	-.07	.13	.14
9. Extroversion age 23	35.00(7.46)									-	.31***	.14	.36***	.19*	.11
10. Agreeableness age 23	39.81(5.54)										-	.12	.08	.15	.09
11. Self-worth age 13	13.27(2.51)											-	.26***	-.08	-.09
12. PA Self-perceptions age 23	12.66(2.31)												-	.15	.20*
13. Avg PA (O)	3.64(0.76)													-	.74***
14. PA Age 13 (O)	3.68(0.76)														-

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. (F) = Friend report; (P) = romantic partner report; Pos Beh w/ P = Positive behaviors with romantic partner; (O) = observed; P's Pos Beh = Romantic Partner's positive behaviors toward target; Freq = frequency; Binge = Binge drinking; PA = Physical Attractiveness; Avg = Average. If not specified, measures are self-report. All correlations are multiplied by 100.

Individual Variation in Physical Attractiveness

It was predicted that there would be significant variation among individuals over time in rate of change of physical attractiveness, as well as in initial levels of physical attractiveness. The freely estimated latent growth curve model fit the data well (RMSEA = .032, $p = .739$, Confidence Interval (CI) .000 – .070; $\chi^2 = 29.759$, $df = 25$, $p = .234$; CFI = .993; TLI = .993; see Appendix C for a comparison with a growth model with stability coefficients). In accordance with the hypothesis, the latent growth curve of physical attractiveness assessed annually from age 13 to 19 and again at age 21 showed significant variation in the rate of change (i.e., slope; unstandardized estimate = .183, SE = .076, $p = .016$) and significant variation in the level of attractiveness at age 13, the first measurement, (i.e., intercept; unstandardized estimate = .383, SE = .058, $p < .001$; see Table 4 for unstandardized slope estimates). That is, individuals started at different levels of attractiveness, but also changed differently in their levels of attractiveness over time. Additionally, the growth model showed a significant mean value for the latent slope (unstandardized estimate = -.112, SE = .049, $p = .023$). That is, on average, physical attractiveness decreased over time. The intercept and slope parameters were not significantly correlated ($r = .027$, $p = .477$).

Table 4. Unstandardized Estimates for Freely Estimated Change in Physical Attractiveness

	Coeff	SE	P-Value
Slope			
Age 13	0.000	0.000	--
Age 14	-0.022	0.215	0.918
Age 15	0.439	0.219	0.044
Age 16	0.591	0.167	0.000
Age 17	1.086	0.221	0.000
Age 18	1.049	0.201	0.000
Age 19	1.224	0.230	0.000
Age 21	1.000	0.000	--

Note: RMSEA = .032, $p = .739$, CI .000 – .070; $\chi^2 = 29.759$, $df = 25$, $p = .234$; CFI = .993; TLI = .993

Individual Variation in Physical Attractiveness Predicts Early Adult Functioning

It was predicted that individual variation in physical attractiveness would predict more positive adult functioning, with the exception of negative functioning in terms of more alcohol use.

Sociability. The first model, which regressed friend's report of sociability on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .056, $p = .331$, CI .029 – .080; $\chi^2 = 70.755$, $df = 45$, $p = .008$; CFI = .966; TLI = .959). This analysis indicated a significant effect of racial/ethnic minority status, such that majority group members (i.e., Caucasians) had friends who reported higher levels of sociability at age 23 than did members of racial/ethnic minority groups ($\beta = -.25$, $p = .004$). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of friend's report of sociability, fit the data significantly better as assessed via chi-square difference test ($\chi^2_D(2) = 8.762$, $p = .013$; RMSEA = .049, $p = .499$, CI .016 – .075; $\chi^2 = 61.993$, df

= 43, $p = .030$; CFI = .975; TLI = .968).

The intercept of physical attractiveness, which reflects baseline physical attractiveness assessed at our first measurement (age 13), was not related to friend's report of sociability at age 23 ($\beta = .08$, $p = .523$). However, the slope of physical attractiveness over time predicted friend's report of sociability at age 23 ($\beta = .30$, $p = .033$; see Table 5). That is, the more quickly individuals increased in their physical attractiveness over time, the higher levels of sociability their friends reported at age 23.

Table 5. Regression Analysis Predicting Friend Report of Sociability at Age 23

	<u>Friend Report of Sociability</u>				
	<u>Model 1</u>		<u>Model 2</u>		
	β	R^2	β	Model 1 to 2: ΔR^2	R^2
Gender	.07		.02		
Minority Status	-.25**		-.20*		
Intercept: Physical Attractiveness	#		.08		
Slope: Physical Attractiveness	#		.30*		
Summary Statistics		.06		.10**	.16*

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. # indicates fixed parameters.

Conflict in Romantic Relationships. The first model, which regressed romantic partner's report of conflict in romantic relationships on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .051, $p = .444$, CI .021 – .076; $\chi^2 = 66.747$, $df = 45$, $p = .019$; CFI = .971; TLI = .965). This analysis indicated a significant effect of racial/ethnic minority status, such that minority group members had partners who reported greater conflict at age 23

than did racial/ethnic majority group members (i.e., Caucasian; $\beta = .38, p > .001$). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of romantic partner's report of conflict, fit the data significantly better as assessed via chi-square difference test ($\chi^2_D(2) = 10.319, p = .006$; RMSEA = .041, $p = .672$, CI .000 – .068; $\chi^2 = 56.428, df = 43, p = .082$; CFI = .982; TLI = .978).

Baseline physical attractiveness (i.e., the intercept) was not related to romantic partner's report of conflict at age 23 ($\beta = -.03, p = .825$). However, the slope of physical attractiveness over time predicted romantic partner's report of conflict at age 23 ($\beta = -.40, p = .002$; see Table 6). That is, the more quickly individuals increased in their physical attractiveness over time, the lower levels of conflict their romantic partners reported at age 23.

Table 6. Regression Analysis Predicting Romantic Partner's Report of Conflict at Age 23

	<u>Romantic Partner's Report of Conflict</u>				
	<u>Model 1</u>		<u>Model 2</u>		
	β	R^2	β	Model 1 to 2: ΔR^2	R^2
Gender	-.04		-.01		
Minority Status	.38***		.32***		
Intercept: Physical Attractiveness	#		-.03		
Slope: Physical Attractiveness	#		-.40**		
Summary Statistics		.14*		.14**	.28**

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. # indicates fixed parameters.

Target's Observed Positive Behaviors Toward Romantic Partner. The first model, which regressed target's observed positive behaviors toward romantic partner on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .056, $p = .335$, CI .028 – .080; $\chi^2 = 70.607$, $df = 45$, $p = .009$; CFI = .966; TLI = .959). This analysis indicated a significant effect of racial/ethnic minority status, such that majority group members (i.e., Caucasians) exhibited more positive behaviors toward their partner at age 23 than did members of racial/ethnic minority groups ($\beta = -.23$, $p = .041$). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of target's observed positive behaviors toward romantic partner, fit the data significantly better as assessed via chi-square difference test ($\chi^2_D(2) = 17.589$, $p < .001$; RMSEA = .036, $p = .769$, CI .000 – .064; $\chi^2 = 53.018$, $df = 43$, $p = .141$; CFI = .987; TLI = .983).

Baseline physical attractiveness predicted target's observed positive behaviors toward romantic partner at age 23 ($\beta = .39$, $p = .001$; see Table 7). That is, the more attractive targets were at age 13, the more positive behaviors toward their romantic partner were observed at age 23. However, the slope of physical attractiveness over time was not related to target's observed positive behaviors toward their romantic partner at age 23 ($\beta = .26$, $p = .079$).

Table 7. Regression Analysis Predicting Target's Observed Positive Behavior Toward Romantic Partner at Age 23

	<u>Target's Observed Positive Behavior Toward Romantic Partner</u>				
	<u>Model 1</u>		<u>Model 2</u>		
	β	R^2	β	Model 1 to 2: ΔR^2	R^2
Gender	-.14		-.18		
Minority Status	-.23*		-.13		
Intercept: Physical Attractiveness	#		.39***		
Slope: Physical Attractiveness	#		.26		
Summary Statistics		.08		.25***	.33***

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. # indicates fixed parameters.

Romantic Partner's Observed Positive Behaviors Toward Target. The first model, which regressed romantic partner's observed positive behaviors toward target on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data marginally well (RMSEA = .060, $p = .236$, CI .034 – .083; $\chi^2 = 74.682$, $df = 45$, $p = .004$; CFI = .961; TLI = .953). This analysis indicated a significant effect of racial/ethnic minority status, such that majority group members (i.e., Caucasians) had partners who exhibited more positive behaviors at age 23 than did members of racial/ethnic minority groups ($\beta = -.37$, $p = .000$). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of partner's observed positive behaviors toward target, fit the data significantly better as assessed via chi-square difference test ($\chi^2_D(2) = 15.551$, $p < .001$; RMSEA = .045, $p =$

.589, CI .000 – .071; $\chi^2 = 59.131$, $df = 43$, $p = .052$; CFI = .979; TLI = .973).

Baseline physical attractiveness predicted partner's observed positive behaviors toward target at age 23 ($\beta = .42$, $p < .001$; see Table 8). That is, the more attractive targets were at age 13, the more positive behaviors their romantic partner exhibited toward them at age 23. However, the slope of physical attractiveness over time was not related to partner's observed positive behaviors toward target at age 23 ($\beta = .16$, $p = .279$).

Table 8. Regression Analysis Predicting Romantic Partner's Observed Positive Behavior Toward Target at Age 23

	<u>Romantic Partner's Observed Positive Behavior Toward Target</u>				
	<u>Model 1</u>		<u>Model 2</u>		
	β	R^2	β	Model 1 to 2: ΔR^2	R^2
Gender	-.10		-.14		
Minority Status	-.37 ***		-.27**		
Intercept: Physical Attractiveness	#		.42***		
Slope: Physical Attractiveness	#		.16		
Summary Statistics		.15*		.22***	.37***

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. # indicates fixed parameters.

Social Anxiety. The first model, which regressed social anxiety on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .046, $p = .561$, CI .010 – .072; $\chi^2 = 62.889$, $df = 45$, $p = .040$; CFI = .976; TLI = .971). This analysis indicated a significant effect of racial/ethnic minority status, such that majority group members (i.e., Caucasians) reported being more

socially anxious than did members of racial/ethnic minority groups ($\beta = -.27, p < .001$).

The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of social anxiety, did not fit the data significantly better ($\chi^2_D(2) = 2.808, p = .246$; RMSEA = .046, $p = .559$, CI .008 – .073; $\chi^2 = 60.081, df = 43, p = .043$; CFI = .977; TLI = .971). Variation in physical attractiveness did not add significantly to the fit of the model predicting of social anxiety at age 23.

Coping by Using Substances. The first model, which regressed coping using substances on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .051, $p = .442$, CI .021 – .076; $\chi^2 = 66.801, df = 45, p = .019$; CFI = .971; TLI = .965). This analysis indicated significant effect of racial/ethnic minority status, such that majority group members (i.e., Caucasians) used substances to cope at age 23 more than did members of racial/ethnic minority groups ($\beta = -.17, p = .033$). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of coping using substances, fit the data significantly better ($\chi^2_D(2) = 6.198, p = .045$; RMSEA = .047, $p = .542$, CI .011 – .073; $\chi^2 = 60.603, df = 43, p = .039$; CFI = .976; TLI = .970).

Baseline physical attractiveness predicted coping using substances at age 23 ($\beta = .22, p = .020$; see Table 9). That is, the more attractive adolescents were at age 13, the more frequently they used substances to cope with difficult situations at age 23. The slope of physical attractiveness over time was not related to coping using substances at age 23 ($\beta = -.01, p = .914$).

Table 9. Regression Analysis Predicting Coping Using Substances at Age 23

	<u>Coping Using Substances</u>				
	<u>Model 1</u>		<u>Model 2</u>		
	β	R^2	β	Model 1 to 2: ΔR^2	R^2
Gender	-.17*		-.14		
Minority Status	-.06		-.03		
Intercept: Physical Attractiveness	#		.22*		
Slope: Physical Attractiveness	#		-.01		
Summary Statistics		.04		.04	.08

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. # indicates fixed parameters.

Frequency of Alcohol Use. The first model, which regressed frequency of alcohol use on demographic variables of gender and minority status while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .047, $p = .547$, CI .012 – .072; $\chi^2 = 63.331$, $df = 45$, $p = .037$; CFI = .976; TLI = .971). This analysis indicated a significant effect of racial/ethnic minority status and gender, such that majority group members (i.e., Caucasians) and men drank more often at age 23 than did members of racial/ethnic minority groups and women ($\beta = -.30$, $p < .001$; $\beta = -.264$, $p < .001$, respectively). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of frequency of alcohol use, fit the data significantly better as assessed via a chi-square difference test ($\chi^2_D(2) = 10.388$, $p = .006$; RMSEA = .035, $p = .771$, CI .000 – .064; $\chi^2 = 52.943$, $df = 43$, $p = .142$; CFI = .987; TLI = .984).

Baseline physical attractiveness predicted the frequency of alcohol use at age 23 ($\beta = .18$, $p = .037$; see Table 10). That is, the more attractive adolescents were at age 13, the more frequently they drank alcohol at age 23. The change in physical attractiveness over time (i.e., the slope) was not related to frequency of alcohol use at age 23 ($\beta = .15$, $p = .150$).

Table 10. Regression Analysis Predicting Frequency of Alcohol Use at Age 23

	<u>Frequency of Alcohol Use</u>				
	<u>Model 1</u>		<u>Model 2</u>		
	β	R^2	β	Model 1 to 2: ΔR^2	R^2
Gender	-.26***		-.27***		
Minority Status	-.30***		-.25***		
Intercept: Physical Attractiveness	#		.18*		
Slope: Physical Attractiveness	#		.15		
Summary Statistics		.18***		.06*	.24***

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. # indicates fixed parameters.

Frequency of Binge Drinking. The first model, which regressed frequency of binge drinking on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .052, $p = .427$, CI .022 – .076; $\chi^2 = 67.305$, $df = 45$, $p = .0172$; CFI = .971; TLI = .965). This analysis indicated a significant effect of racial/ethnic minority status and gender, such that majority group members (i.e., Caucasians) and men engaged in binge drinking more often at age 23 than did members of racial/ethnic minority groups and women ($\beta = -.23$, $p = .001$; $\beta = -.312$, $p < .001$, respectively). The second model, which estimated the latent intercept and slope of

physical attractiveness as predictors of frequency of binge drinking, did not fit the data significantly better ($\chi^2_D(2) = 5.628, p = .060$; RMSEA = .049, $p = .509$, CI .015 – .074; $\chi^2 = 61.677, df = 43, p = .032$; CFI = .976; TLI = .969). Variation in physical attractiveness did not add significantly to the fit of the model predicting of binge drinking at age 23.

Extroversion. The first model, which regressed extroversion on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .048, $p = .519$, CI .015 – .073; $\chi^2 = 64.238, df = 45, p = .031$; CFI = .974; TLI = .969). Neither gender nor minority status were significant predictors of extroversion. The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of extroversion, fit the data significantly better according to a chi-square difference test ($\chi^2_D(2) = 6.192, p = .045$; RMSEA = .044, $p = .623$, CI .000 – .070; $\chi^2 = 58.046, df = 43, p = .063$; CFI = .980; TLI = .974). Neither the intercept nor the slope of physical attractiveness were statistically significant predictors of extroversion ($\beta = .14, p = .169$; $\beta = .16, p = .193$, respectively). Variation in physical attractiveness was not a significant predictor of extroversion.

Agreeableness. The first model, which regressed agreeableness on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .046, $p = .561$, CI .010 – .072; $\chi^2 = 62.889, df = 45, p = .040$; CFI = .976; TLI = .971). This analysis indicated significant effect of racial/ethnic minority status and gender, such that majority group members (i.e., Caucasians) and women report being more agreeable than did members of racial/ethnic minority groups and men ($\beta = -.24, p = .001$; $\beta = .23, p = .002$, respectively). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of

agreeableness, did not fit the data significantly better ($\chi^2_D(2) = 3.189$, $p = .203$; RMSEA = .046, $p = .571$, CI .006 – .072; $\chi^2 = 59.700$, $df = 43$, $p = 0.047$; CFI = .978; TLI = .972).

Variation in physical attractiveness did not add significantly to the fit of the model predicting of agreeableness at age 23.

Self-worth. The first model, which regressed self-worth on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .042, $p = .662$, CI .000 – .068; $\chi^2 = 59.554$, $df = 45$, $p = .0717$; CFI = .980; TLI = .976). Neither gender nor minority status were significant predictors of self-worth at age 23. The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of self-worth, did not fit the data significantly better ($\chi^2_D(2) = 1.675$, $p = .433$; RMSEA = .043, $p = .628$, CI .000 – .070; $\chi^2 = 57.879$, $df = 43$, $p = .064$; CFI = .980; TLI = .975). Variation in physical attractiveness did not add significantly to the fit of the model predicting of self-worth at age 23.

Self-perceptions of Attractiveness. The first model, which regressed self-perceptions of attractiveness on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .051, $p = .450$, Confidence Interval (CI) .021 – .076; $\chi^2 = 66.539$, $df = 45$, $p = .020$; CFI = .971; TLI = .965). This analysis indicated significant effect of racial/ethnic minority status, such that minority group members report higher self-perceptions of attractiveness at age 23 than did racial/ethnic majority group members (i.e., Caucasians; $\beta = .22$, $p = .005$). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of self-perceptions of attractiveness, fit the data significantly better as assessed via chi-square difference test ($\chi^2_D(2) = 11.036$, $p = .004$; RMSEA =

.040, $p = .699$, CI .000 – .067; $\chi^2 = 55.503$, $df = 43$, $p = .096$; CFI = .983; TLI = .979).

Baseline physical attractiveness predicted partner's self-perceptions of attractiveness at age 23 ($\beta = .32$, $p = .001$; see Table 12). That is, the more attractive targets were at age 13, the higher their self-perceptions of attractiveness were at age 23. However, the slope of physical attractiveness over time was not related to self-perceptions of attractiveness at age 23 ($\beta = -.14$, $p = .259$).

Table 12. Regression Analysis Predicting Self-Perceptions of Attractiveness at Age 23

	<u>Self-Perceptions of Attractiveness</u>				
	<u>Model 1</u>		<u>Model 2</u>		
	β	R^2	β	Model 1 to 2: ΔR^2	R^2
Gender	-.02		.02		
Minority Status	.22**		.26***		
Intercept: Physical Attractiveness	#		.32***		
Slope: Physical Attractiveness	#		-.14		
Summary Statistics		.05		.11***	.16*

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. # indicates fixed parameters.

Assessing Variation in Physical Attractiveness as a Predictor of Individual Variation in Functioning from Adolescence into Early Adulthood

Variation in Outcomes. Significant variation in outcome variables must be established before assessing the prediction of that variation from physical attractiveness.

Sociability. The latent growth curve of sociability, assessed annually from age 13 to 22, indicated a mean value for the latent slope that was not significantly different from

zero (unstandardized estimate = .418, SE = .283, $p = .140$). However, the latent growth model did show significant variation in the latent intercept (unstandardized estimate = 3.076, SE = 1.323, $p = .020$) and the latent slope (unstandardized estimate = 7.688, SE = 2.135, $p = .000$). That is, individuals start at different levels of friend reported sociability, but also change differently in their friend reported sociability. There was significant covariation between the intercept and slope parameters (estimate = -3.648, $p = .018$). The model fit the data well (RMSEA = .024, $p = .855$, CI .000 – .061; $\chi^2 = 36.440$, $df = 33$, $p = .312$; CFI = .983; TLI = .977). See Table 13 for unstandardized slope estimates.

Table 13. Unstandardized Slope of Change in Friend Reported Sociability

	Coeff	SE	P-Value
Slope			
Age 13	0.000	0.000	--
Age 14	0.249	0.132	0.059
Age 15	0.277	0.153	0.071
Age 16	0.313	0.168	0.063
Age 17	0.410	0.188	0.029
Age 18	0.635	0.188	0.001
Age 19	0.627	0.304	0.039
Age 20	0.669	0.178	0.000
Age 21	0.742	0.127	0.000
Age 22	1.000	0.000	--

Note: RMSEA = .024, $p = .855$, CI .000 – .061; $\chi^2 = 36.440$, $df = 33$, $p = .312$; CFI = .983; TLI = .977

Conflict in Romantic Relationships. Since there were only three data points (age 18, 21, and 23) for romantic partner's report of conflict, a linear slope was estimated (as opposed to freely estimated slope parameters); however, fit statistics indicate poor model fit (RMSEA = .220, $p = .015$, CI .095– .375; $\chi^2 = 7.652$, $df = 1$, $p = .006$; CFI = .585).

This latent linear growth model showed significant variation in the latent intercept

(unstandardized estimate = 2.561, SE = 1.321, $p = .052$), but not in the latent slope (unstandardized estimate = .062, SE = .721, $p = .931$). That is, romantic partners' report of conflict starts at different levels of conflict at age 18. The intercept and slope parameters did not significantly covary (estimate = -.409, $p = .635$). A simpler change model is needed to assess change; therefore a relative change model using only the first and last data collections will be used in future analyses.

Target's Positive Behaviors Toward Romantic Partner. Since there were only three data points (age 18, 21, and 23) for target's positive behaviors toward their romantic partner, a linear slope was estimated (as opposed to freely estimated slope parameters); however, fit statistics indicate poor model fit (RMSEA = .195, $p = .034$, CI .067–.362; $\chi^2 = 5.755$, $df = 1$, $p = .016$; CFI = .713). This latent linear growth model showed non-significant variation in the latent intercept and the latent slope (unstandardized estimate = .030, SE = .068, $p = .654$; unstandardized estimate = -.067, SE = .044, $p = .126$, respectively). The intercept and slope parameters did not significantly covary (estimate = .056, $p = .244$). A simpler change model is needed to assess change; therefore a relative change model using only the first and last data collections will be used in future analyses.

Romantic Partner's Positive Behaviors Toward Target. Since there were only three data points (age 18, 21, and 23) for partner's positive behaviors toward the target, a linear slope was estimated (as opposed to freely estimated slope parameters); however, fit statistics indicate poor model fit (RMSEA = .142, $p = .102$, CI .000 – .315; $\chi^2 = 3.504$, $df = 1$, $p = .061$; CFI = .909). This latent linear growth model showed non-significant variation in the latent intercept and the latent slope (unstandardized estimate = .026, SE = .063, $p = .685$; unstandardized estimate = -.043, SE = .038, $p = .251$, respectively). The

intercept and slope parameters did not significantly covary (estimate = .056, $p = .177$). A simpler change model is needed to assess change; therefore a relative change model using only the first and last data collections will be used in future analyses.

Social Anxiety. The latent growth curve of social anxiety, assessed annually from age 18 to 20 and 22 to 23, did not converge. This is most likely due to too few data points. When age 19 social anxiety was excluded, the model converged but fit statistics were unreliable. Specifying a linear growth pattern, as opposed to freely estimated slope parameters, allowed the model to calculate fit indices. These fit statistics indicate reasonable fit (RMSEA = .000, $p = .743$, CI .000 – .094; $\chi^2 = 4.093$, $df = 5$, $p = .536$; CFI = 1.000). This latent linear growth model showed non-significant values for the mean and variance of the latent slope (unstandardized estimate = .044, SE = .146, $p = .761$; unstandardized estimate = .634, SE = .578, $p = .273$, respectively). However, the latent intercept showed significant variation (unstandardized estimate = 17.224, SE = 3.687, $p < .001$). That is, individuals start at different levels of social anxiety at age 18. The intercept and slope parameters did not significantly covary (estimate = -.254, $p = .826$). There was no significant growth indicated in social anxiety.

Frequency of Alcohol Use. The latent growth curve of frequency of alcohol use, assessed annually from age 13 to 23, showed a significant mean value for the latent slope (unstandardized estimate = 1.555, SE = .081, $p < .001$). That is, on average, the frequency with which adolescents drank alcohol increased over time. Additionally, the latent growth model showed significant variation in the latent intercept (unstandardized estimate = .065, SE = .020, $p = .002$) and the latent slope (unstandardized estimate = .676, SE = .106, $p < .001$). That is, individuals start at different levels of frequency of

drinking, and their frequency of consuming alcohol changes at different rates. The intercept and slope parameters did not significantly covary (estimate = -.015, $p = .639$). The model fit the data marginally well (RMSEA = .084, $p = .008$, CI .062 – .106; $\chi^2 = 96.098$, $df = 42$, $p < .001$; CFI = .923; TLI = .899). See Table 14 for unstandardized slope estimates.

Table 14. Unstandardized Slope Estimates for Change in Frequency of Alcohol Use

	Coeff	SE	P-Value
Slope			
Age 13	0.000	0.000	--
Age 14	0.099	0.024	0.000
Age 15	0.182	0.029	0.000
Age 16	0.297	0.035	0.000
Age 17	0.415	0.041	0.000
Age 18	0.574	0.047	0.000
Age 19	0.884	0.048	0.000
Age 20	0.935	0.045	0.000
Age 21	0.966	0.042	0.000
Age 22	0.999	0.042	0.000
Age 23	1.000	0.000	--

Note: RMSEA = .084, $p = .008$, CI .062 – .106; $\chi^2 = 96.098$, $df = 42$, $p < .001$; CFI = .923; TLI = .899

Frequency of Binge Drinking. The latent growth curve of frequency of binge drinking, assessed annually from age 13 to 23, used standardized measurements because the measurement of binge drinking changed slightly over time. Therefore, only relative change can be assessed. This model showed significant variation in the latent intercept (estimate = .607, SE = .262, $p = .020$) and the latent slope (estimate = 1.354, SE = .418, $p = .001$). That is, individuals start at different frequency of binge drinking, and their frequency of binge drinking change at different rates. There was significant covariation between the intercept and slope parameters (estimate = -.657, $p = .044$). The model fit

the data well (RMSEA = .048, $p = .510$, CI .014 – .074; $\chi^2 = 60.166$, $df = 42$, $p = .034$; CFI = .975; TLI = .968). See Table 15 for slope estimates.

Table 15. Slope Estimates for Change in Standardized Frequency of Binge Drinking

	Coeff	SE	p -Value
Slope			
Age 13	0.000	0.000	--
Age 14	0.419	0.098	0.000
Age 15	0.669	0.132	0.000
Age 16	0.642	0.102	0.000
Age 17	0.676	0.114	0.000
Age 18	0.795	0.102	0.000
Age 19	0.806	0.092	0.000
Age 20	0.734	0.090	0.000
Age 21	0.932	0.090	0.000
Age 22	0.828	0.079	0.000
Age 23	1.000	0.000	--

Note: RMSEA = .048, $p = .510$, CI .014 – .074; $\chi^2 = 60.166$, $df = 42$, $p = .034$; CFI = .975; TLI = .968

Self-worth. The latent growth curve of self-worth, assessed annually from age 13 to 23, used standardized measurements because the measurement of self-worth changed slightly over time. Therefore, only relative change can be assessed. The model fit the data well (RMSEA = .022, $p = .897$, CI .000 – .056; $\chi^2 = 45.814$, $df = 42$, $p = .317$; CFI = .994; TLI = .992). This model did not show a significant mean value for the latent slope (estimate = -.017, SE = .052, $p = .748$). Additionally, the latent growth model did not show significant variation in the latent slope (estimate = .264, SE = .159, $p = .098$). However, there was significant variation in the latent intercept (estimate = .412, SE = .090, $p < .001$). That is, individuals start at different levels of self-worth. There was significant covariation between the intercept and slope parameters (estimate = -.388, $p = .028$). Therefore, the model fit the data well, but there is no growth over time indicated.

Assessing Variation in Attractiveness as a Predictor of Variation in Functioning. It was predicted that higher levels and/or growth of physical attractiveness would be associated with positive growth in social functioning and alcohol use.

Sociability. The first model, regressing variation in friend reported sociability (both intercept and slope) on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .043, $p = .785$, CI .026 – .057; $\chi^2 = 222.131$, $df = 166$, $p = .002$; CFI = .943; TLI = .935). This analysis indicated significant effect of racial/ethnic minority status, such that majority group members (i.e., Caucasians) had friends who reported higher levels of sociability at age 13 than did members of racial/ethnic minority groups ($\beta = -.23$, $p = .033$), but members of racial/ethnic groups increased in friend reported sociability at a faster rate than majority members ($\beta = .28$, $p = .006$). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of friend reported sociability, fit the data significantly better as assessed via chi-square difference test ($\chi^2_D(4) = 25.200$, $p < .001$; RMSEA = .034, $p = .950$, CI .011 – .050; $\chi^2 = 196.931$, $df = 162$, $p = .032$; CFI = .964; TLI = .959).

In addition, individual baseline physical attractiveness predicted baseline friend reported sociability ($\beta = .41$, $p < .001$; see Table 16). That is, the more attractive adolescents were at age 13 (the first measurement), the higher levels of sociability were reported by their friends reported at age 13. Baseline physical attractiveness was not related to the slope of sociability ($\beta = -.21$, $p = .235$). The slope of physical attractiveness was not related to baseline friend reported sociability ($\beta = .16$, $p = .313$), nor the slope of friend reported sociability ($\beta = -.09$, $p = .607$).

Table 16. Regression Analysis Predicting Growth in Friend Reported Sociability

	<u>Friend Reported Sociability</u>									
	Model 1				Model 2					
	<i>i</i>		<i>s</i>		<i>i</i>			<i>s</i>		
	β	R ²	β	R ²	β	Model 1 to 2: ΔR^2	R ²	β	Model 1 to 2: ΔR^2	R ²
Gender	-.02		-.02		.00			-.03		
Minority Status	.28**		-.23*		.35***			-.26**		
Intercept: Physical Attractiveness	#		#		.41***			-.21		
Slope: Physical Attractiveness	#		#		.16			-.09		
Summary Statistics		.08		.05		.19***	.27**		.05	.10

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. # indicates fixed parameters.

Conflict in Romantic Relationships. No adequately fitting latent growth model was found for romantic partner's report of conflict. This is most likely due to the limited data available (i.e., only three repeated measures). Therefore, a simpler change model was used to assess whether variation in physical attractiveness predicted changes in romantic partner's report of conflict. Evaluation of means provides some evidence for change over time ($m_{\text{age}18} = 5.765$; $m_{\text{age}23} = 7.057$). Instead of using latent growth models, relative change in manifest measurements of romantic partner's report of conflict was assessed using a multiple regression analysis. Specifically, gender, minority status, baseline conflict (age 18) and the latent intercept and slope of physical attractiveness were all entered as predictors of romantic partner's report of conflict at age 23. Individuals' baseline physical attractiveness did not predict relative changes in conflict in romantic relationships ($\beta = -.02$, $p = .853$). However, rate of change in physical attractiveness predicted relative changes in conflict in romantic relationships ($\beta = -.40$, $p = .002$; see Table 17). That is, the faster individuals increase in physical attractiveness, the less conflict their romantic partner reports over time.

Table 17. Regression Analysis Predicting Relative Changes in Romantic Relationship Quality at Age 23

	<u>Partner Reported Conflict</u>		<u>Target's Positive Behavior Toward Partner</u>		<u>Partner's Positive Behavior Toward Target</u>	
	β	R^2	β	R^2	β	R^2
Gender	-.01		-.18		-.12	
Minority Status	.31**		-.14		-.21*	
Baseline (age 18)	-.02		.18		.38**	
Intercept: Physical Attractiveness	-.02		.41***		.34**	
Slope: Physical Attractiveness	-.40**		.31*		.09	
Summary Statistics		.29**		.36***		.47***

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Target's Positive Behavior Toward Romantic Partner. No adequately fitting latent growth model was found for target's positive behavior toward their romantic partner. This is most likely due to the limited data available (i.e., only three repeated measures). Therefore, a simpler change model was used to assess whether variation in physical attractiveness predicted changes in target's positive behavior toward their romantic partner. Instead of using latent growth models, relative change in manifest measurements of target's positive behavior toward their romantic partner was assessed using a multiple regression analysis. Specifically, gender, minority status, baseline positive behavior toward romantic partner (age 18), and the latent intercept and slope of physical attractiveness were all entered as predictors of target's positive behavior toward romantic partner at age 23. Both individuals' baseline physical attractiveness, and their rate of change in attractiveness predicted relative changes in target's positive behavior

toward their romantic partner ($\beta = .41, p = .001, \beta = .31, p = .038$, respectively; see Table 17). That is, the more attractive an individual was at age 13, the greater the increases in positive behaviors they displayed toward their partner from age 18 to age 23.

Additionally, the faster an individual increased in physical attractiveness, the greater the increases in positive behaviors they displayed toward their partner from age 18 to age 23.

Romantic Partner's Positive Behavior Toward Target. No adequately fitting latent growth model was found for romantic partner's positive behavior toward the target. This is most likely due to the limited data available (i.e., only three repeated measures). Therefore, a simpler change model was used to assess whether variation in physical attractiveness predicted changes in romantic partner's positive behavior toward the target. Instead of using latent growth models, relative change in manifest measurements of romantic partner's positive behavior toward the target was assessed using a multiple regression analysis. Specifically, gender, minority status, baseline positive behavior toward target (age 18), and the latent intercept and slope of physical attractiveness were all entered as predictors of romantic partner's positive behavior toward target at age 23. Individuals' baseline physical attractiveness, but not their rate of change, predicted relative changes in romantic partner's positive behavior toward the target ($\beta = .34, p = .006, \beta = .09, p = .521$, respectively; see Table 17). That is, the more attractive an individual was at age 13, the greater the increases in positive behaviors displayed toward them by their romantic partner from age 18 to age 23.

Social Anxiety. No significant growth or variance in growth was found for social anxiety. Therefore, no follow-up analyses were conducted.

Frequency of Alcohol Use. The first model, regressing variation in frequency of

alcohol use (both intercept and slope) on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .047, $p = .623$, CI .033 – .060; $\chi^2 = 261.036$, $df = 185$, $p < .001$; CFI = .949; TLI = .942). This analysis indicated that men and racial/ethnic majority group members (i.e., Caucasians) increase in frequency of drinking at a faster rate than women and racial/ethnic minority group members ($\beta = -.32$, $p < .001$; $\beta = -.39$, $p < .001$, respectively). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of frequency of alcohol use, fits the data significantly better as assessed via chi-square difference test ($\chi^2_D(4) = 17.863$, $p = .001$; RMSEA = .043, $p = .785$, CI .028 – .057; $\chi^2 = 243.173$, $df = 181$, $p < .001$; CFI = .958; TLI = .952).

In addition, individuals' baseline physical attractiveness predicted the rate of change in frequency of alcohol use over time ($\beta = .28$, $p = .003$; see Table 19). That is, the more attractive adolescents were at age 13 (the first measurement), the faster they increased the frequency with which they drink alcohol. Baseline physical attractiveness was not related to the intercept of frequency of alcohol use ($\beta = .04$, $p = .784$). The slope of physical attractiveness was not related to the intercept of frequency of alcohol use ($\beta = .09$, $p = .566$), nor the slope of frequency of alcohol use ($\beta = .10$, $p = .408$).

Table 19. Regression Analysis Predicting Growth in Frequency of Alcohol Use

	<u>Frequency of Alcohol Use</u>									
	Model 1				Model 2					
	<i>i</i>		<i>s</i>		<i>i</i>			<i>s</i>		
	β	R^2	β	R^2	β	Model 1 to 2: ΔR^2	R^2	β	Model 1 to 2: ΔR^2	R^2
Gender	.01		-.32***		.00			-.30***		
Minority Status	-.17		-.39***		-.16			-.34***		
Intercept: Physical Attractiveness	#		#		.04			.28**		
Slope: Physical Attractiveness	#		#		.09			.10		
Summary Statistics		.03		.28***		.01	.04		.09*	.37***

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. # indicates fixed parameters.

Frequency of Binge Drinking. The first model, regressing variation in frequency of binge drinking (both intercept and slope) on demographic variables while constraining the intercept and slope of physical attractiveness to be zero, fit the data well (RMSEA = .041, $p = .845$, CI .025 – .055; $\chi^2 = 243.140$, $df = 185$, $p = .027$; CFI = .963; TLI = .958). This analysis indicated significant effect of racial/ethnic minority status, such that majority group members (i.e., Caucasians) increased in frequency of binge drinking at a faster rate than did members of racial/ethnic minority groups ($\beta = -.49$, $p = .039$). The second model, which estimated the latent intercept and slope of physical attractiveness as predictors of frequency of alcohol use, fit the data significantly better as assessed via chi-square difference test ($\chi^2_D(4) = 9.396$, $p = .052$; RMSEA = .040, $p = .869$, CI .024 – .054; $\chi^2 = 234.944$, $df = 181$, $p = .004$; CFI = .965; TLI = .960). Although this model fit significantly better, neither intercept nor slope of physical attractiveness was a significant predictor of variation in frequency of binge drinking.

Self-worth. No significant growth or variation in growth over time was found in self-worth. Therefore, no follow-up analyses were conducted.

Gender Moderators of Variation in Attractiveness Predicting Change in Functioning

It was hypothesized that the effects of physical attractiveness would be more pronounced for women than for men, with the exception of alcohol use where the effects of physical attractiveness were predicted to be more pronounced for men than for women. It is important to note that these analyses are exploratory and tentative. There are many proposed analyses, and therefore results should be interpreted with caution.

Sociability. An unconstrained multiple group model was fit to the data. However, this model did not converge. Examining results from a multiple group model constrained to be equal, it appears that there is insufficient variance in the female group.

Conflict in Romantic Relationships. Just as relative change models were used in previous analyses, they will be used in these multiple group analyses for conflict in romantic relationships. An unconstrained multiple group model fit the data well (RMSEA = .038, $p = .702$, CI .000–.069; $\chi^2 = 107.478$, $df = 95$, $p = .180$; CFI = .984; TLI = .981). Follow-up analyses (comparing a multiple group model constrained to be equal to a model freeing one parameter to be estimated differently across groups) indicated that men and women do not differ in the way their rate of change in physical attractiveness or their baseline physical attractiveness predict their relative change in conflict in romantic relationships from age 18 to 23 ($\chi^2_D(1) = .421$, $p = .516$; $\chi^2_D(1) = .001$, $p = .975$, respectively).

Target's Positive Behavior Toward Romantic Partner. Just as relative change models were used in previous analyses, they will be used in these multiple group analyses for positive behaviors. An unconstrained multiple group model fit the data well (RMSEA = .034, $p = .756$, CI .000–.067; $\chi^2 = 104.947$, $df = 95$, $p = .228$; CFI = .987; TLI = .985). Follow-up analyses (comparing a multiple group model constrained to be equal to a model freeing one parameter to be estimated differently across groups) indicated that men and women did not differ in the way their rate of change in physical attractiveness or baseline physical attractiveness predict their relative change in positive behaviors displayed toward their romantic partner ($\chi^2_D(1) = 2.613$, $p = .106$; $\chi^2_D(1) = 2.795$, $p = .095$, respectively).

Romantic Partner's Positive Behavior Toward Target. Just as relative change models were used in previous analyses, they will be used in these multiple group analyses for partner's positive behavior toward target. An unconstrained multiple group model fit the data reasonably well (RMSEA = .083, $p = .017$, CI .058–.106; $\chi^2 = 154.735$, $df = 95$, $p < .001$; CFI = .927; TLI = .917). Follow-up analyses (comparing a multiple group model constrained to be equal to a model freeing one parameter to be estimated differently across groups) indicated that men and women do not differ in the way their rate of change in physical attractiveness or their baseline physical attractiveness predict their relative change in positive behaviors displayed by their romantic partner ($\chi^2_D(1) = .577$, $p = .447$; $\chi^2_D(1) = 1.99$, $p = .158$, respectively).

Social Anxiety. As no growth or variation in growth was indicated for social anxiety, no follow-up analyses were conducted.

Frequency of Alcohol Use. An unconstrained multiple group model fit the data reasonably well (RMSEA = .084, $p < .001$, CI .072–.096; $\chi^2 = 606.691$, $df = 368$, $p < .001$; CFI = .845; TLI = .840). Follow-up analyses (comparing a multiple group model constrained to be equal to a model freeing one parameter to be estimated differently across groups) indicated that men and women differ in the way their rate of change in physical attractiveness predicts their rate of change in alcohol use ($\chi^2_D(1) = 10.8477$, $p = .001$). That is, the model which allows men and women to differ on this parameter fit the data significantly better. Specifically, the unconstrained model showed that the more quickly women increase in attractiveness, the more quickly they increase their frequency of alcohol use ($\beta = .46$, $p = .001$); however, men's change in attractiveness over time is not related to their change in frequency of alcohol use ($\beta = -.31$, $p = .121$).

Additionally, follow-up analyses indicated that men and women differ in how their baseline attractiveness was associated with their baseline frequency of alcohol use ($\chi^2_D(1) = 7.351, p = .007$). The unconstrained model showed that the more attractive women are at age 13, the more frequently they drink alcohol at age 13 ($\beta = .33, p = .051$); however, men's attractiveness at age 13 is not related to their frequency of alcohol use at age 13 ($\beta = -.37, p = .066$; see Table 20).

Table 20. Standardized estimates from unconstrained multiple group analysis predicting growth in Frequency of Alcohol Use across men and women.

	<u>Frequency of Alcohol Use</u>							
	Men				Women			
	<i>i</i>		<i>s</i>		<i>i</i>		<i>s</i>	
	β	R ²	β	R ²	β	R ²	β	R ²
Minority Status	-.09		-.36**		-.37**		-.24*	
Intercept: Physical Attractiveness	-.37		.32		.33*		.29*	
Slope: Physical Attractiveness	.35		-.31		-.35		.46***	
Summary Statistics		.213		.34*		.351		.46***

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Frequency of Binge Drinking. An unconstrained multiple group model fit the data reasonably well (RMSEA = .056, $p = .242$, CI .040–.071; $\chi^2 = 449.894$, $df = 348$, $p < .001$; CFI = .938; TLI = .932). Follow-up analyses (comparing a multiple group model constrained to be equal to a model freeing one parameter to be estimated differently across groups) indicated that men and women do not differ in the way their rate of change in physical attractiveness predicts their rate of change in frequency of binge drinking ($\chi^2_D(1) = 2.574$, $p = .109$), or their baseline frequency of binge drinking ($\chi^2_D(1) = 2.131$, $p = .144$). Additionally, follow-up analyses indicated that men and women do not differ in how their baseline attractiveness was associated with their baseline frequency of binge drinking ($\chi^2_D(1) = 1.409$, $p = .235$) or their change in frequency of binge drinking over time ($\chi^2_D(1) = .169$, $p = .681$).

Self-worth. As no growth or variation in growth was indicated for self-worth, no follow-up analyses were conducted.

It is important to note, given the number of tests, these results could be due to chance, and therefore these results should be interpreted with caution.

Self-Perceptions of Attractiveness and Observed Physical Attractiveness as Predictors of Early Adult Functioning

It was hypothesized that self-perceptions of physical attractiveness would predict early adult functioning after accounting for overall observed physical attractiveness.

Factor of Physical Attractiveness. The first five eigenvalues from an exploratory factor analysis were 5.195, 0.693, 0.569, 0.448, and 0.342, suggesting a one factor model is appropriate for the data. Accordingly, a one factor confirmatory factor analysis with one factor was fit to the data – Table 21 shows the factor loadings and

model fit from the CFA. The one factor model fit the data well and will be used in future analyses.

Table 21. Standardized Estimates for Physical Attractiveness One Factor Model

	Estim	SE	c^2
Physical Attractiveness Age 13	.667	.047	.445
Physical Attractiveness Age 14	.640	.050	.409
Physical Attractiveness Age 15	.663	.052	.440
Physical Attractiveness Age 16	.815	.031	.664
Physical Attractiveness Age 17	.841	.027	.707
Physical Attractiveness Age 18	.858	.026	.737
Physical Attractiveness Age 19	.864	.026	.746
Physical Attractiveness Age 21	.816	.032	.667

Note: RMSEA = .068, $p = .174$, CI .032 – .102; $\chi^2 = 37.167$, $df = 20$, $p = .011$; CFI = .976; TLI = .967

Influence of Self-perceptions of Attractiveness on Early Adult Functioning.

The correlation between self-perceptions of physical attractiveness and overall observed physical attractiveness (i.e., the factor of attractiveness) was .171 ($p = .086$). See Table 2 for correlations between repeated measures of observed attractiveness and self-perceptions of attractiveness.

Sociability. Regression analysis indicated that self-perceptions of attractiveness did not predict friend's report of sociability at age 23 ($\beta = -.09$, $p = .327$) while accounting for overall observed attractiveness ($\beta = .26$, $p = .002$).

Conflict in Romantic Relationships. Regression analysis indicated that self-perceptions of attractiveness did not predict romantic partner's report of conflict at age 23 ($\beta = -.04, p = .672$) while accounting for overall observed attractiveness ($\beta = -.25, p = .018$).

Target's Positive Behaviors Toward Romantic Partner. Regression analysis indicated that self-perceptions of attractiveness did not predict observed positive behaviors exhibited toward romantic partner at age 23 ($\beta = .01, p = .752$) while accounting for overall observed attractiveness ($\beta = .45, p < .001$).

Romantic Partner's Positive Behaviors Toward Target. Regression analysis indicated that self-perceptions of attractiveness did predict observed positive behaviors from romantic partner toward target at age 23 ($\beta = -.22, p = .033$), while accounting for overall observed attractiveness ($\beta = .51, p < .001$; see Table 22).

Social Anxiety. Regression analysis indicated that self-perceptions of attractiveness did predict social anxiety ($\beta = -.33, p < .001$), while accounting for overall observed attractiveness ($\beta = .20, p = .012$; see Table 22).

Coping Using Substances. Regression analysis indicated that self-perceptions of attractiveness did not predict coping using substances in early adulthood ($\beta = -.09, p = .281$), while accounting for overall observed attractiveness ($\beta = .20, p = .016$).

Frequency of Alcohol Use. Regression analysis indicated that self-perceptions of attractiveness did not predict frequency of drinking behaviors in early adulthood ($\beta = -.04, p = .635$), while accounting for overall observed attractiveness ($\beta = .25, p = .001$).

Frequency of Binge Drinking. Regression analysis indicated that self-perceptions of attractiveness did not predict frequency of binge drinking in early adulthood ($\beta = -.02$, $p = .809$), while accounting for overall observed attractiveness ($\beta = .18$, $p = .022$).

Extroversion. Regression analysis indicated that self-perceptions of attractiveness did predict extroversion ($\beta = .38$, $p < .001$; see Table 22), even while accounting for overall observed attractiveness ($\beta = .12$, $p = .120$).

Agreeableness. Regression analysis indicated that self-perceptions of attractiveness did not predict agreeableness ($\beta = .12$, $p = .143$), while accounting for overall observed attractiveness ($\beta = .11$, $p = .185$).

Self-worth. Regression analysis indicated that self-perceptions of attractiveness did predict self-worth at age 23 ($\beta = .72$, $p < .001$), while accounting for overall observed attractiveness ($\beta = -.06$, $p = .375$; see Table 22).

Table 22. Regression Analysis Predicting Functioning at age 23

	<u>Romantic Partner's Positive Behaviors Toward Target</u>		<u>Social Anxiety</u>		<u>Extroversion</u>		<u>Self-worth</u>	
	β	R^2	β	R^2	β	R^2	β	R^2
Gender	-.17		-.01		.01		.06	
Minority Status	-.19		-.16*		-.16*		-.12	
Factor: Observed Physical Attractiveness	.51***		.20**		.12		-.06	
Self-Perceptions Attractiveness	-.22*		-.33***		.38***		.72***	
Summary Statistics		.41***		.19***		.18***		.49***

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Developmentally Sensitive Period

It was hypothesized that there would be a residual effect of levels of early adolescent attractiveness on adult functioning (even after accounting for overall levels of attractiveness). Specifically, a developmentally sensitive period in early adolescence, during which attractiveness is lower than average, would predict lower self-perceived physical attractiveness even after accounting for overall levels of observed attractiveness across adolescence and early adulthood.

Choosing the Developmentally Sensitive Period. Based on the freely estimated slope estimates described above (Table 4), age 14 was used as the indicator variable for early adolescent attractiveness as it is the only year in which attractiveness decreases from the previous year. This age was hypothesized to be the year most likely to have long-term associations.

Self-perceptions of attractiveness. Regression analysis indicated that, after accounting for overall physical attractiveness ($\beta = .05$, $p = .657$), attractiveness at age 14 significantly predicted self-perceptions of attractiveness at age 23 ($\beta = .22$, $p = .045$; see Table 23).

Table 23. *Regression Analysis Predicting Self-Perceptions of Attractiveness at age 23*

	<u>Self-perceptions of Attractiveness</u>			
	β entry	β final	ΔR^2	R^2
Gender	-.02	-.01		
Minority Status	.26***	.26***		
Factor: Observed Physical Attractiveness	.21**	.05	.09*	.09*
Step 2:				
Physical Attractiveness Age 14 (Observed)	.22*	.22*		
Summary Statistics			.02*	.11*

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Post-hoc analyses with self-perceptions of attractiveness. In order to further test whether early adolescent observed attractiveness has more influence than early adult observed attractiveness, a multiple regression analysis was conducted. Specifically, self-perceptions of attractiveness at age 23 were regressed on demographic covariates gender and minority status, age 14 physical attractiveness, and age 21 physical attractiveness. This analysis indicates that, after accounting for gender and minority status, observed physical attractiveness at age 14 is a better predictor of self-perceptions of attractiveness at age 23 ($\beta = .29$, $p = .002$) than observed physical attractiveness at age 21 ($\beta = -.04$, $p = .670$).

Additionally, age 13 physical attractiveness was tested in the same way. This analysis indicates that, after accounting for gender and minority status, observed physical attractiveness at age 13 is a better predictor of self-perceptions of attractiveness at age 23 ($\beta = .22$, $p = .023$) than observed physical attractiveness at age 21 ($\beta = .01$, $p = .958$).

Post-hoc analyses examining additional outcome variables. Additional analyses were run to examine any additional predictions from the developmentally sensitive period. Out of 11 additional analyses, only one was significant, thus raising the possibility that this was observed due to chance. See Appendix D for reported estimates.

Summary of Results

In summary, physical attractiveness was related to a variety of social functioning outcomes (see Table 24). Early adolescent physical attractiveness (i.e., baseline physical attractiveness) was related to higher ratings of sociability by friends, better quality romantic relationships, higher self-perceptions of attractiveness, using substances to cope more often, more frequent binge drinking, and increased frequency of alcohol consumption over time. Additionally, *increases* in physical attractiveness over time (i.e., growth) were related to higher ratings of sociability by friends, and better quality romantic relationships. The effects of physical attractiveness are generally not significantly different across men and women, with the clear exception of frequency of alcohol use, for which the associations with physical attractiveness are more powerful for women than for men. Although observed physical attractiveness is not related to personality traits or self-worth, self-perceptions of attractiveness are positively related to extroversion and self-worth and negatively related to social anxiety and observed behaviors from romantic partners. Finally, early adolescent attractiveness is a better predictor of early adult self-perceptions of attractiveness than overall attractiveness.

Table 24. Summary of Results

Outcome→ Hypothesis:	Sociability	Romantic Relationship Quality	Social Anxiety	Alcohol/Substance Use	Personality	Self-worth	Self-perceptions of Attractiveness
Variation in Physical Attractiveness (PA) predicts early adult functioning	Increases in PA over time predicted higher sociability	Increases in PA over time predicted lower conflict Higher baseline PA predicted higher levels of positive behavior from the target and their partner	Ø	Higher baseline PA predicted more frequently using substances to cope, drinking alcohol, and binge drinking	Ø	Ø	Higher baseline PA predicted higher self- perceptions of attractiveness
Variation in Physical Attractiveness predicts variation in functioning	Higher baseline PA predicted higher baseline sociability	Higher baseline PA predicted relative increases in target's positive behavior toward partner from age 18 to 23 AND partner's positive behavior toward target from age 18 to 23.	No growth or variation in growth found	Higher baseline PA predicted increases in frequency of alcohol use over time	n/a	No growth or variation in growth found	n/a
		Positive change in PA over time predicted relative decreases in conflict from age 18 to 23 AND relative increases in target's positive behavior toward partner from age 18 to 23.					
Gender Moderators	Ø	Ø	Ø	Higher baseline PA predicted higher baseline and more steep increases in frequency of alcohol use for	n/a	Ø	n/a

				women but not men. Furthermore, increases in physical attractiveness over time are associated with more steep increases in frequency of alcohol use for women but not men.			
Self-perceptions predict age 23 functioning (accounting for overall attractiveness)	Ø	Self perceptions of PA predicted less positive behavior from partner	Self perceptions of PA predicted less social anxiety	Ø	Self perceptions of PA predicted more extroversion	Self perceptions of PA predicted more self-worth	n/a
Sensitive Period	See Appendix D	See Appendix D	See Appendix D	See Appendix D	See Appendix D	See Appendix D	Higher early adolescent PA predicted higher early adult self-perceptions of PA after accounting for overall PA

Note. PA = Physical Attractiveness. Ø = null findings.

Discussion

The current study investigated the influence of physical attractiveness (both observed attractiveness and self-perceptions of attractiveness) on social development, focusing on the transitional period from early adolescence into emerging adulthood (i.e., 13 to 23 years old). The results indicate that individuals vary in the way their attractiveness changes over time, and that this individual variation in physical attractiveness predicts not only functioning in early adulthood, but also change in outcomes from adolescence into adulthood. Results show few differences in the predictive power of variation in physical attractiveness between men and women. Furthermore, results evidence that in some areas, self-perceptions of attractiveness are more predictive than observed physical attractiveness. Lastly, results indicate that early adolescent attractiveness may be more predictive of early adult social functioning than attractiveness at later ages.

Individual Variation in Physical Attractiveness

Looking at physical attractiveness over the course of adolescence, we see that physical attractiveness changes, and does so in different ways for different adolescents. Results indicate that, as hypothesized, there was significant variation among individuals over time in the rate of change of physical attractiveness, as well as in initial levels of physical attractiveness. That is, at age 13, individuals start at different levels of physical attractiveness, and individuals change in their observed physical attractiveness from ages 13 to 21. This is not overly surprising given the many physical changes that occur during adolescence and the uniqueness inherent in physical change. For example, all adolescents go through puberty; however, each adolescent experiences puberty in a unique way: some

hitting a growth spurt at age 14, some at age 16, some experiencing little acne, some experiencing more, etc. (Lucky, et al, 1994; Pinyerd & Zipf, 2005).

Individual Variation in Physical Attractiveness Predicts Early Adult Functioning

Looking beyond changes in physical attractiveness to what physical attractiveness might predict, the current study found that individual variation in physical attractiveness predicts functioning in early adulthood. Variations in both (i) baseline levels of early adolescent attractiveness and (ii) change in attractiveness over time, predicted early adult functioning. Specifically, higher levels of baseline observed physical attractiveness (age 13) were predictive of higher levels of positive behavior from the target and their partner at age 23, more frequent use of substances to cope at age 23, more frequent alcohol use and binge drinking at age 23, and higher self-perceptions of attractiveness at age 23. In addition, positive *change* in observed attractiveness was predictive of higher ratings of sociability at age 23 as reported by close friends of the target, and lower conflict in romantic relationships at age 23 as reported by the romantic partner of the target.

These results suggest that being attractive in early adolescence is associated with more positive romantic relationships, but also with more problematic drinking (i.e., using alcohol to cope and binge drinking) in early adulthood. This is in line with previous research that indicates that attractiveness is associated with both alcohol use and social competence. One study found that more attractive individuals had a lower likelihood of being asked to show identification when buying alcohol (McCall, 1997). Alcohol has been shown to be a social activity, particularly in adolescence (Engles, Knibbe, & Drop, 1999). If individuals are attractive in early adolescence, perhaps they become involved in more frequent and more complex social situations than their peers. These situations may

involve early drinking behavior. Previous research has shown that the younger people are when they first start drinking alcohol, the more likely they are to exhibit problematic alcohol behaviors (e.g., binge drinking, drinking and driving) later in life (see Ham & Hope, 2003 for review). Therefore, if being more attractive in early adolescence leads to more opportunities to use alcohol, it is therefore more likely that those individuals will develop problematic behaviors related to alcohol use, especially if these individuals lack alternative coping mechanisms. However, in the same way that these more frequent and complex social situations may lead to problematic drinking, they may also lead to more healthy social skills. Increased exposure to social situations (i.e., learning by direct experience) is thought to lead to learned social skills (Bandura, 1977). So, attractive individuals may spend more time in social situations than their less attractive peers, thus learning how to navigate new and complex social situations sooner. It is also likely that individuals who are more attractive in early adolescence will have more opportunities to be in romantic relationships since attractiveness has been shown to be an important predictor of romantic involvement (see Feingold, 1988). As such, these attractive adolescents are likely to have more opportunities to practice social skills particular to romantic relationships.

In contrast to these mixed results for early adolescent baseline physical attractiveness, positive *change* in attractiveness over time was associated with more positive friendships and romantic relationships (i.e., more sociability and less conflict, respectively). It seems possible that even slight increases in physical attractiveness over time may set individuals up for more positive relationships with friends and partners. It is interesting to note that the variables significantly associated with individual change in

observed physical attractiveness were variables dealing with interpersonal functioning. Previous research has indicated that attractive adolescents and adults are thought to be more socially skilled than less attractive individuals (Langlois et al, 2000). The current results may take this further, indicating that the social competence attributed to attractive individuals is not simply an informational cue, but is a stereotype carried through an individuals' development, one that changes based on changes in the information cue itself. For example, as a 13 year-old becomes more attractive during adolescence, his or her 16 year-old friends deem him or her more socially competent than his or her 13 year-old friends deemed him or her as a 13-year old. Further supporting this idea is the fact that the variables significantly associated with change in observed physical attractiveness over time were either reported by the friend or partner of the target, or were observed and recorded by researchers. That is, since other people were involved in reporting on these particular variables, this may be evidence that these other reporters were susceptible to the well-established physical attractiveness bias.

The other possibility is that individuals who are increasing in observed attractiveness over time are also increasing in social competence over time. Implicit personality theory would suggest that the characteristics originally attributed to an individual based on initial information gathering (e.g., an attractive person is thought to be socially competent) would either be proved or disproved as the individual acquired more information about the person. This means that friends and partners who have known the target for months and often years should be less susceptible to the physical attractiveness bias. Therefore, as implicit personality theory would suggest, these target individuals may in fact be changing behaviors over time, providing their friends and

partners with additional information about their social competence. Furthering the idea that attractive people are becoming more socially skilled over time, attractive people receive more positive feedback than those who are less attractive in social settings (Cash, & Burns, 1977). Therefore, more attractive individuals may devote more time to developing social skills than others. For example, they may make an effort to improve their social skills because that is the domain in which they receive a great deal of positive feedback. In contrast, less attractive individuals may receive more positive feedback in academic situations (as compared to social situations), leading them to focus their energy in making improvements in that domain. It is also possible that more attractive individuals simply have more opportunities to practice and hone their social skills because they are involved in and/or invited to more social activities.

It is interesting to note that early adolescent observed physical attractiveness, (although not growth in attractiveness over time) was predictive of self-perceptions of attractiveness at age 23. This may suggest that early adolescent attractiveness is more influential in self-perceptions of attractiveness than current levels of attractiveness. This may give further evidence for a sensitive period of development in which physical attractiveness is more salient, and therefore has longer lasting effects than at other times of development.

Additionally, although positive behaviors from the target and their partner, using alcohol and binge drinking more frequently, using substances to cope more frequently, and self-perceptions of attractiveness at age 23 were associated with baseline levels of early adolescent physical attractiveness, they were not associated with change in attractiveness.

Similarly, although conflict in romantic relationships was related to change in physical attractiveness, it was not related to baseline levels of early adolescent physical attractiveness. Perhaps the presence of positive social behaviors is associated with early adolescent attractiveness, whereas the absence of negative behaviors (i.e., conflict) is related to change over time.

Finally, social anxiety, extroversion, agreeableness, and self-worth were not associated with baseline levels of early adolescent attractiveness or change in attractiveness. Perhaps self-perceptions of attractiveness will be important predictors of these self-reported measures of self-concept.

Variation in Physical Attractiveness Predicting Variation in Functioning from Adolescence into Early Adulthood

Expanding the previous hypothesis, the current study next investigated whether variation in physical attractiveness predicted variation in functioning from adolescence into adulthood. Results indicated that variation in attractiveness predicted variation in social functioning and alcohol use. Specifically, higher levels of *baseline* observed physical attractiveness were predictive of relative increases in target's positive behavior toward partner from age 18 to 23, relative increases in partner's positive behavior toward target from age 18 to 23, and increases in frequency of alcohol use over time (age 13 to 23).

Together, these data suggest that being more attractive in early adolescence is associated with both positive and negative (albeit socially normative) behaviors. Moreover, there is some evidence to suggest that precocious development may be related to pseudomature behavior, which has been shown to be problematic in previous research.

That is, individuals with high levels of observed attractiveness in early adolescence seem to be participating in some kinds of pseudomature behavior (i.e., drinking alcohol) in early adolescence. Furthermore, in previous research, pseudomature behaviors that are developmentally appropriate during adolescence but that are exhibited during early adolescence, such as kissing or making out with romantic partners, have been associated with long-term difficulties in relationships, problems with alcohol use, and criminal behavior (Allen, Schad, Oudekerk, & Chango, 2013). Pseudomature behaviors are behaviors intended to achieve social maturity without the parallel level of emotional or behavioral maturity (Greenberger & Steinberg, 1986). Pseudomature behavior has been theorized to most likely occur when adolescents lack confidence in their ability to meet the normal developmental challenge of managing peer and romantic relationships (Cicchetti & Rogosch, 2002). Another possible mechanism behind these mixed results may be influences of peer groups (both positive and negative). For example, peers have been shown to be a significant influence on adolescent alcohol use from adolescence into early adulthood (VanRyzin, Fosco, & Dishion, 2012), but are also significant sources of support during adolescence (see Brown, 2004 for review).

In addition to variation in baseline levels of early adolescent attractiveness, *change* in observed physical attractiveness was also predictive of variation in social functioning. For instance, positive change in physical attractiveness was predictive of relative decreases in conflict in romantic relationships from ages 18 to 23 as reported by the romantic partner of the target, and relative increases in the target's observed positive behaviors toward their romantic partner from ages 18 to 23. These findings provide further evidence for the possibility that individuals who are increasing in observed

attractiveness over time are also increasing in social competence over time. These target individuals may be changing behaviors over time, perhaps in tandem with changes in their physical attractiveness. Previous research has shown that people are more willing to help attractive people and exhibit more prosocial behavior toward attractive individuals as compared to less attractive individuals (Patzner, 1985). It is possible that as people increase in attractiveness, they are treated better by others in their own lives, and they in turn start exhibiting more positive behaviors towards other people, as might be hypothesized based on social learning theory.

Looking at individual variation in physical attractiveness both at age 13 (i.e., baseline) and growth over time, change in attractiveness over time is associated with more positive interpersonal functioning, whereas higher baseline levels of attractiveness (at age 13) are associated with both positive interpersonal functioning, but also increased alcohol use (including higher frequency of binge drinking and using alcohol to cope with stress). Perhaps this furthers the argument for pseudomature behavior and precocious development. That is, adolescents who are more physically attractive early in adolescence are more quickly pulled into complex social situations, which they are not yet skilled enough to navigate. In the absence of effective coping strategies, these adolescents may learn to use alcohol as a coping mechanism.

It is interesting to consider variables that were predicted to be associated with variation in physical attractiveness, but showed no significant relationships (although null findings should be interpreted with caution). For example, growth in physical attractiveness was associated with sociability at age 23, but not with growth in sociability over time. Additionally, baseline physical attractiveness was associated with baseline

sociability, but not with growth in sociability. Perhaps additional social competence is attributed to physically attractive individuals in early adulthood because of new social contexts (e.g., new jobs). These new contexts give opportunities for social interaction, where physically attractive individuals flourish. Perhaps it is not that the individual is slowly increasing in sociability over time, but instead that new contexts in early adulthood allow the previously existing skills to be noticed and reported by their friends.

Growth in physical attractiveness was not associated with the partner's positive behaviors toward target at age 23, nor relative increases therein. However, baseline physical attractiveness was associated with both partner's positive behaviors toward target at age 23, and relative changes in those behaviors from age 18 to 23. Interestingly, this may indicate that where individuals start in terms of physical attractiveness has implications for how well romantic partners will treat them in future romantic relationships.

No change analyses were conducted for the outcome variables social anxiety or self-worth, because no significant change or variation in change was found.

Gender Moderators of Variation in Attractiveness Predicting Change in Functioning

Although gender differences were investigated in this study, only one difference in the way physical attractiveness predicted functioning was found between men and women: frequency of alcohol use. For women only, higher levels of baseline physical attractiveness were predictive of more frequent use of alcohol in early adolescence, and more steep increases in frequency of alcohol use from age 13 to 23. Moreover, increases in observed physical attractiveness over time were associated with more steep increases

in frequency of alcohol use for women but not men. These results were in contrast to hypotheses and previous research indicating that in areas considered primarily male activities, the effects of attractiveness may be more pronounced for men than for women (Braun, & Peus, 2012).

It is possible that drinking alcohol is a more social activity for women than men, which might explain why changes in frequency of alcohol use were associated with changes in women's observed physical attractiveness but not changes in men's physical attractiveness. It is also possible that increased attractiveness in adolescent women generates more social activities or invitations, which gives them greater opportunities for drinking. Similarly, being involved in early drinking behavior may make adolescent females more attractive to older adolescents and may increase the pool from which these social invitations stem. In contrast, increased attractiveness in adolescent men may not lead to increases in social invitations (in a way that athleticism or humor might). Alternatively, adolescent men may drink without social invites.

Although previous research would suggest that drinking alcohol in adolescence is both a normative and social behavior (see Keefe, 1994), research on gender differences in alcohol consumption indicates that men and women who drink alcohol differ in several ways (Abrams & Wilson, 1979). Some have argued that since gender differences in alcohol behaviors are seen in many cultures worldwide, they are manifestations of culturally bound social roles (Wilsnack & Wilsnack, 1997). Although gender differences may be culturally bound, rates of alcohol consumption between men and women are converging (see Holmila & Raitasalo, 2005 for a review). One possible reason for this is the contagion effect. For example, one study showed that as the number of men in a

woman's social circle increases, so does her alcohol use (Haavio-Mannila, 1991). In terms of the results of the current study, perhaps attractive females increase in drinking over time because they begin to have more male friends over the course of adolescence, a pattern seen in previous research (Poulin, Denault, & Pedersen, 2011).

Given the number of tests, this may be due to chance. Overall, this lack of findings suggests that (at least in our normative adolescent sample) there is very little difference in the way physical attractiveness predicts social development between men and women. This is consistent with previous research that indicates that the influence of physical attractiveness is quite similar for men and women (Langlois et al, 2000).

Although there are some phenomena which are influenced by physical attractiveness differently for men and women (e.g., body image; Feingold & Mazzella, 1998), much of the social development literature shows similar predictions from physical attractiveness for men and women (Langlois et al, 2000).

Self-Perceptions of Attractiveness and Observed Physical Attractiveness as Predictors of Early Adult Functioning

The effects of observed physical attractiveness have been well documented by previous research and the current study. Previous research has also documented the influence of self-perceptions of attractiveness. The current study builds on this by offering a unique lens into the predictive value of self-perceptions of attractiveness, while also accounting for the influence of observed attractiveness. When controlling for the influence of overall observed physical attractiveness, self-perceptions of attractiveness were predictive of higher levels of extroversion, as well as higher levels of self-worth, and lower levels of social anxiety and fewer positive behaviors from romantic partner.

One question that arises from these findings is why personality and self-worth are only significantly predicted by self-perceptions of attractiveness and not observed attractiveness, nor changes in observed attractiveness over time. In his theory of personality development, Erikson (1959) argues that adolescents, who according to normal development are in the identity versus identity diffusion stage of development, are preoccupied with comparing their own self-perceptions with what they believe others think of them. He further argues that underlying an individual's identity crisis is a deep insecurity about how attractive they are to others. This insecurity, he argues, is predicated on the physical changes occurring during adolescence. Adolescents use both sets of data (their own self-perceptions, and what they believe others think about them) to try to master this crisis. Erikson also posits that each successful mastery of a developmental stage endows the individual with self-worth, and depending on how these stages are mastered, an individual's personality is developed. Therefore, in a simplified way, Erikson argues that an adolescent's self-perceptions of attractiveness influence their self-worth and personality development.

This phenomenon potentially exhibits itself in a number of ways in the current study. For instance, extroversion was predicted by self-perceptions of attractiveness. It is not surprising that individuals who believe they are attractive also see themselves as outgoing and extroverted. These individuals, as seen in this study, have lower social anxiety, and previous research would indicate they have probably received positive feedback in social situations throughout their life (Cash, & Burns, 1977). This finding also provides further evidence for a long-standing finding in the social psychology literature: that physical attractiveness is associated with social competence. If these

individuals are in fact more socially competent, they would feel more comfortable in social situations, and as Erikson might suggest, after mastering social interactions in adolescence, this might lead to a personal identity as an outgoing, extroverted person.

It is also possible that these extroverted individuals are simply more self-confident, and thus rate their attractiveness more highly because of this confidence (even if there is little objective basis for this). Perhaps not surprisingly, extroversion has been linked to self-esteem (e.g., Veselska, et al, 2010). However, there is very little research linking extroversion directly to self-perceptions of attractiveness. What has been found indicates that for both extroversion and attractiveness, there are specific areas of the face that are focused on when determining whether someone is attractive or extroverted. Researchers attempting to map facial appearance found correlations between specific structural features and social perceptions of extroversion and attractiveness (Rojas, Masip, Todorov, & Vitria, 2011). More indirectly, happy people have been shown to report being more extroverted (Sahoo, Sahoo, & Kalpana, 2005), and happy people also have more positive self-biases (Taylor & Brown, 1988). So, it is possible that extroverted individuals have more positive self-biases, although this direct premise remains untested.

In contrast, neither variation in observed physical attractiveness nor self-perceptions of attractiveness were associated with the personality trait of agreeableness. This is in contrast to previous research, which indicates that early adolescent attractiveness is associated with agreeableness (Schad, Allen, Szwed, & Chango, 2012a). However, previous research also shows that physically attractive individuals are considered more persuasive (Patzner, 1985) and more influential (Schad, Hafen, Allen, Loeb, & Tan, 2013). Given this, perhaps it is not surprising that they are not more

agreeable, but instead are outgoing, allowing them to accomplish necessary tasks (e.g., compromises) in relationships using their attractiveness or associated social skills.

It is also interesting to note that the self-perceptions of attractiveness are related to less social anxiety, whereas observed physical attractiveness is related to greater social anxiety. This highlights the importance of self-perceptions in the development of anxiety symptoms. Cognitive theories about the development of anxiety (e.g., Beck, 2005) suggest that it is the beliefs about certain thoughts or realities that cause distress and anxiety, and certain behaviors that sustain anxiety (namely avoidance). That is, if an individual believes they are attractive, this belief is likely to have the same positive effect on anxiety symptoms as does observed physical attractiveness. What is more difficult to understand is why observed physical attractiveness is predictive of more social anxiety. Perhaps self-perceptions of physical attractiveness are an indication of confidence or comfort in social settings, whereas observed physical attractiveness has very little to do with how comfortable an individual feels in social situations. Alternatively, those with higher observed physical attractiveness may be more concerned with maintaining said attractiveness (and the status that accompanies it) and are fearful of losing it, creating triggers for social anxiety, which are absent in their less attractive peers. It is also possible that, because they are attractive, people expect these attractive individuals to be more competent than they actually are. These high expectations may be perceived by the individual and cause anxiety if the individual believes they cannot live up to these expectations of competence.

Like social anxiety, self-perceptions of attractiveness were negatively related to partner's positive behavior toward target while observed attractiveness was positively

related to these behaviors. Previous research indicates that others treat attractive individuals better than less attractive individuals (Snyder, Tanke, & Berscheid, 1977). Therefore, these results may indicate that although some individuals see themselves as attractive, their partners do not, and therefore do not exhibit these positive behaviors. This then may imply that the observed attractiveness is more accurate than self-perceptions of attractiveness, which supports Patzer's (1985) claim that self-judgments of attractiveness are less accurate and therefore less useful than observed attractiveness in terms of predicting other's behaviors toward attractive individuals. This interactive effect is an intriguing area for future research to explore. Perhaps more direct investigation could disentangle accurate self-perceptions of attractiveness from inaccurate self-perceptions and explore how these groups differ in their functioning.

After accounting for observed attractiveness, self-perceptions of attractiveness were not associated with sociability at age 23, target's positive behaviors toward partner, conflict in romantic relationships, frequency of alcohol use at age 23, coping using substances at 23, or binge drinking at 23. Interestingly, self-perceptions of attractiveness were related to self-report measures of the self in social contexts or observed behaviors exhibited toward the target, while measures reported by others in relationship to the target (e.g., friends, romantic partners), or that pertained to alcohol use, or observed behaviors of the target were not associated with self-perceptions of attractiveness. This could simply indicate a self-report bias; however, it also supports the idea that self-perceptions of physical attractiveness are associated with self-concept, particularly the self in social contexts, whereas observed attractiveness is associated with others' reports of social competence.

Developmentally Sensitive Period

The current study hypothesized that a developmentally sensitive period in early adolescence, during which attractiveness is lower than average, would predict lower self-perceived physical attractiveness even after accounting for overall levels of observed attractiveness across adolescence and early adulthood. Results supported this hypothesis, showing that self-perceptions of attractiveness were predicted by early adolescent attractiveness (ages 13 and 14), after accounting for overall observed attractiveness – that is, the degree to which targets were attractive when they were 13 or 14 predicts how attractive they feel as adults. This is the idea that a successful businessman in his 30s may always think of himself as “the fat kid in gym class.” Admittedly, this is a mixed message to parents, seeing that attractive adolescents at age 13 or 14 may start drinking alcohol early and/or using substances to cope. However, their self-worth and certain personality traits in adulthood are tied to their perceptions of their attractiveness, and these perceptions of attractiveness are tied to their observed attractiveness at age 13.

The other possible explanation is that the changes in attractiveness after age 13 are not large enough to account for additional variance in outcomes. That is, these results may suggest that attractiveness is relatively stable, and thus measuring it at 13 tells us much of what we need to know for predictions into early adulthood.

If, however, this does indicate a sensitive period of attractiveness (age 13 – 14), results may further suggest that on some level, adolescent attractiveness imprints more strongly than does attractiveness at any other time period in their lives (past or future). In addition to the developmental challenges of adolescence such as finding autonomy from parents (Allen, Aber, & Leadbeater, 1990,), there are many physical and social changes,

such as burgeoning romantic relationships (Allen, Weissberg, Hawkins, 1989; Pinyerd & Zipf, 2005; Sullivan, 1953). Given this, adolescents may feel incompetent in many ways as they tackle all of these challenges simultaneously. Perhaps because of the multifaceted nature of the challenges of adolescent development, adolescents may use implicit personality theory and stereotyping more than individuals do at other time periods. Because their cognitive load is so high, they may use stereotypes (e.g., physical attractiveness to imply social competence, gender to imply empathic ability, ethnicity to imply academic achievement) as heuristics or social short cuts (Eagly & Steffen, 1984; Kao, 2000). As noted earlier, implicit personality theory explains that one major information cue used by individuals to imply (i.e., stereotype) characteristics about others is physical attractiveness, which is an ever-present cue.

Furthermore, as people develop, the focus on physical attributes (especially in its influence on romantic involvement) becomes more and more taboo (Hadjistavropoulos & Genest, 1994; Patzer, 1985), perhaps as a reaction against the supreme focus on it in adolescence. It is also possible to take an evolutionary interpretation: by the mid to late twenties, people have often found their selected mate and no longer need to demonstrate their physical desirability or fitness. Research has shown that when desire for a relationship is high, physical attractiveness (of the self and of the potential partner) is considered more important than when desire for a relationship is low (Sanchez, Good, Kwang, & Saltzman, 2008). This might also explain why physical attractiveness is so much more important in adolescence, when romantic relationships are just beginning.

There are several limitations to consider in the current study. First, although longitudinal in nature, the data from this study does not allow for causal inferences.

Second, the sample size was relatively small, which did not allow for more sophisticated statistical analysis and often did not allow for follow-up analyses. Third, there were a large number of statistical tests run. Thus, while certain patterns emerged, there is also a substantial likelihood that some findings emerged due to chance amid the large number of tests conducted, and all findings require replication to further support interpretations presented here. Fourth, change in romantic relationships was difficult to assess because of the availability of relatively fewer repeated measurements. Continued exploration in this area is needed. Fifth, although a strength of the study is its multi-method approach, all of the outcome measures were obtained from individuals who may well have been influenced by the target's attractiveness (the participants themselves, their friends, their partners, and even the researchers coding their interactions) – thus their attractiveness and the others' ratings of such are very difficult to disentangle.

In conclusion, it appears that physical attractiveness, particularly in early adolescence is an important predictor of long term social functioning. Individuals have been shown to vary in their levels of early adolescent attractiveness, and the way their attractiveness changes over time. This variation was related to positive social functioning (such as less conflict and more positive observed behaviors in romantic relationships), but also increased alcohol use (including using alcohol to cope and binge drinking). In addition, self-perceptions of attractiveness over and above overall observed attractiveness were shown to be an important predictor of self-worth, extroversion, and social anxiety. Finally, the current study provides some evidence for a sensitive period of development in which attractiveness is “imprinted”, and from which it can predict functioning into early adulthood.

The implications of research in this field are potentially profound. Physical attractiveness has been associated with social development as early as preschool. The effects for higher attractiveness are generally positive, and those who are less attractive experience more depression and anxiety, fewer friendships, and poorer quality relationships (see Langlois et al, 2000 for review). Furthermore, attractive people are perceived as more intelligent by teachers, given higher salaries, and for females, evaluated less harshly in trial situations (Ahola, Helltrom, & Christianson, 2010; Hudosa, Stone-Romero & Coats, 2003; Jacobson, 1981). Attractiveness has also been shown to elicit preferential treatment in both elementary school systems and adult professional environments (Jawahar & Mattsson, 2005; Parks & Kennedy, 2007). For example, adolescent physical attractiveness has been linked to earnings in adulthood through indirect effects on academic achievement and social capital (Gordon, Crosnoe, & Wang, 2013). If physical attractiveness has positive long-term effects on more physically attractive people, the negative effects of physical attractiveness could be drastic, even if they go unnoticed. Although the current study shows positive outcomes for attractive individuals, less attractive individuals seem to have difficulty in relationships throughout adolescence and early adulthood. Less attractive individuals have more conflict in their romantic relationships, display fewer positive behaviors in their romantic relationships, and are seen as less sociable by friends. Furthermore, if they perceive themselves to be less attractive, they also have lower levels of self-worth. As negative outcomes compound over time, less attractive adolescents may continue to have difficulty forming and maintaining relationships throughout adulthood. The current study highlights the

need for a more explicit awareness of both the potential explicit and implicit biases toward physically attractive individuals.

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Appendix A.

Physical Attractiveness Coding Team Protocol

Megan M Schad
Joseph P Allen

Goal: To code gestalt physical attractiveness of participants on a 7 point scale without verbal cues (i.e. visual only) with 7 being the most attractive.

Training: As this is a gestalt phenomenon, no formal training was required. Coders were racially diverse, and we had an equal number of male and female coders. Practice was done on participants to make sure the full range on the scale was being used and that the procedure was sufficiently clear. Demographics of coders are taken into account (see Coder Demographics Questionnaire).

Procedure:

1. Get a list of FAMIDs to code from Megan. This list will indicate the wave and which interaction (i.e. Peer SBT or RP)
2. Go through entire list coding ONLY participant on left (i.e. the target teen). To do this, you must have a dark piece of paper covering the right half of the screen.
 - a. To find the DVD's: Wave 4 dvd's are in the RA lab on the shelf beside the printer. Waves 5-10 are in Nell's office, 329D, key DD53 on the little pig opens that door – it's the same key as for the PC office. DVD's for waves 1-4 are in room 026F or 026B. Ask the PCs for the key to those rooms.
3. Once your list is completed for the target teen (i.e. the person on the left), repeat coding, but for person on the right of screen. To do this, move the dark paper to the left side of screen.
4. To code:
 - a. Cover ½ of screen
 - b. MUTE TV!
 - c. On menu screen, find first peer or RP interaction on DVD (i.e. Peer or RP SBT)
 - d. Have coding sheet out and ready
 - e. Select the interaction (i.e. play it)
 - f. Watch 10 seconds ONLY. Stop DVD.
 - g. Stop DVD.
 - h. Select your rating on the coding sheet.
 - i. Make sure your sheet indicates the proper famid/indid/status id as well as your interviewer/coder number and the date coded
5. When your list is complete, enter codes in SPSS (Q:\kliff\wave XX\coded data\look for data set with your name). Stamp as entered.
6. Have another RA check your entered codes. Stamp as checked.

7. File in coded data drawers.
8. Ask Megan for another list.

Statistical Analysis of coder gender on ratings of physical attractiveness.

Mixed effect models were utilized to test whether there was an interaction effect between coder gender and participant gender. For example, did male coders rate attractiveness of male participants differently than female participants? Random effects were included to account for dependencies in the data. Fixed effects are presented in Table A-1.

Table A-1. Mixed effects models assessing coder gender on ratings of physical attractiveness.

	Physical Attractiveness											
	Age 13			Age 14			Age 15			Age 16		
	est	SE	ρ	est	SE	ρ	est	SE	ρ	est	SE	ρ
Gender:												
Target	-.40	.15	.01	-.01	.13	.92	.16	.16	.34	.14	.16	.37
Coder	-.02	.17	.89	-.05	.16	.76	-.04	.26	.87	.07	.24	.77
CoderXTarget	.21	.13	.11	-.12	.10	.22	-.15	.12	.20	.02	.13	.85
AIC	2909.6			2856.3			2412.6			2657.3		
BIC	2893.6			2842.3			2396.6			2641.3		
	χ^2		ρ	χ^2		ρ	χ^2		ρ	χ^2		ρ
CoderXTarget	2.56		.11	1.50		.22	1.68		.19	0.04		.85
	Physical Attractiveness											
	Age 17			Age 18			Age 19			Age 21		
	est	SE	ρ	est	SE	ρ	est	SE	ρ	est	SE	ρ
Gender:												
Target	-.04	.13	.76	.03	.14	.85	.04	.15	.69	-.15	.18	.39
Coder	-.08	.15	.60	.09	.15	.56	.16	.18	.37	.27	.20	.18
CoderXTarget	-.13	.09	.16	.01	.11	.91	.11	.11	.30	.12	.14	.40
AIC	3130.3			2592.8			2100.6			2988.5		
BIC	3114.3			2576.8			2086.6			2972.5		
	χ^2		ρ	χ^2		ρ	χ^2		ρ	χ^2		ρ
CoderXTarget	2.00		.16	0.01		.91	1.08		.30	.72		.40

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Appendix B

Additional correlation matrices.

Table B-1. Means, standard deviations and correlations among repeated measures of friend reported sociability.

	Friend Reported Sociability											
	M(SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Age 13	12.89(2.78)	-	31***	27***	22**	15	13	-10	16	03	-10	11
2. Age 14	13.34(2.55)		-	43***	40***	37***	21*	05	19*	29***	08	02
3. Age 15	13.11(2.85)			-	34***	29**	25*	-06	07	14	14	11
4. Age 16	13.05(2.49)				-	42***	17	10	07	18*	10	-07
5. Age 17	13.04(2.52)					-	34***	14	26**	19*	14	07
6. Age 18	13.19(2.45)						-	21	33***	35***	35***	14
7. Age 19	13.00(2.44)							-	44***	34***	18	12
8. Age 20	13.21(2.55)								-	47***	40***	22*
9. Age 21	13.36(2.24)									-	47***	38***
10. Age 22	13.38(2.22)										-	36***
11. Age 23	13.25(2.44)											-

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. All correlations are multiplied by 100.

Table B-2. Means, standard deviations and correlations among repeated measures of romantic partner report of conflict in romantic relationships.

	Conflict in Romantic Relationships			
	M(SD)	1.	2.	3.
1. Conflict Age 18	5.79(2.30)	-	.38***	.19
2. Conflict Age 21	7.07(2.32)		-	.24*
3. Conflict Age 23	7.10(2.61)			-

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table B-3. Means, standard deviations and correlations among repeated measures of positive behavior in romantic relationships.

	Positive Behavior in Romantic Relationships						
	M(SD)	1.	2.	3.	4.	5.	6.
1. Target toward Partner Age 18	2.38(.54)	-	.41**	.50**	.73***	.46***	.57***
2. Target toward Partner Age 21	2.21(.43)		-	.33*	.32*	.55***	.28*
3. Target toward Partner Age 23	2.33(.46)			-	.45**	.36**	.65***
4. Partner toward Target Age 18	2.37(.52)				-	.42**	.57***
5. Partner toward Target Age 21	2.27(.48)					-	.51***
6. Partner toward Target Age 23	2.39(.45)						-

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table B-4. Means, standard deviations and correlations among repeated measures of social anxiety.

	Social Anxiety					
	M(SD)	1.	2.	3.	4.	5.
1. Age 18	14.00(5.72)	-	.65***	.53***	.54***	.55***
2. Age 19	13.54(5.76)		-	.62***	.54***	.60***
3. Age 20	13.75(5.85)			-	.48***	.57***
4. Age 22	13.99(5.33)				-	.65***
5. Age 23	14.01(5.82)					-

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table B-5. Means, standard deviations and correlations among repeated measures of frequency of alcohol use.

	Frequency of Alcohol Use											
	M(SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Age 13	0.09(.37)	-	29***	14	12	17*	00	10	11	05	04	05
2. Age 14	0.22(.53)		-	46***	52***	47***	38***	27**	31***	24**	17*	24**
3. Age 15	0.35(.65)			-	68***	40***	48***	27**	25**	15	18*	23**
4. Age 16	0.55(.83)				-	58***	58***	42***	32***	24**	20*	36***
5. Age 17	0.71(1.00)					-	57***	42***	43***	35***	31***	39***
6. Age 18	0.91(1.06)						-	58***	49***	48***	38***	48***
7. Age 19	1.43(1.10)							-	63***	52***	45***	57***
8. Age 20	1.53(1.12)								-	68***	59***	60***
9. Age 21	1.64(1.03)									-	64***	61***
10. Age 22	1.67(1.08)										-	68***
11. Age 23	1.62(1.04)											-

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. All correlations are multiplied by 100.

Table B-6. Means, standard deviations and correlations among repeated measures of frequency of binge drinking.

	Frequency of Binge Drinking											
	M(SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Age 13	.05(.32)	-	48***	-03	15	11	01	06	10	-07	-00	-09
2. Age 14	.18(.61)		-	50***	42***	31***	15	22**	34***	27***	30***	31***
3. Age 15	.32(.73)			-	67***	46***	39***	31***	36***	30***	26**	35***
4. Age 16	.56(.94)				-	61***	42***	38***	35***	38***	32***	48***
5. Age 17	.92(1.04)					-	55***	41***	39***	39***	46***	44***
6. Age 18	1.01(1.02)						-	65***	35***	52***	43***	48***
7. Age 19	1.25(1.03)							-	48***	54***	52***	57***
8. Age 20	.74(.93)								-	67***	54***	50***
9. Age 21	.81(.99)									-	62***	62***
10. Age 22	.83(.96)										-	69***
11. Age 23	.74(.95)											-

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. All correlations are multiplied by 100.

Table B-7. Means, standard deviations and correlations among repeated measures of self-worth.

	Self-worth											
	M(SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Age 13	13.27(2.51)	-	37***	27***	21**	18*	16	15	11	20**	21**	25**
2. Age 14	13.44(2.60)		-	47***	39***	37***	36***	32***	24**	29***	39***	43***
3. Age 15	13.18(2.68)			-	56***	52***	54***	41***	32***	37***	28***	36***
4. Age 16	13.20(2.79)				-	58***	49***	37***	40***	48***	29***	38***
5. Age 17	13.12(2.61)					-	60***	47***	48***	46***	47***	50***
6. Age 18	16.84(2.84)						-	45***	38***	41***	41***	40***
7. Age 19	16.65(2.97)							-	66***	65***	46***	53***
8. Age 20	16.46(2.94)								-	63***	47***	49***
9. Age 21	16.14(3.05)									-	46***	55***
10. Age 22	16.30(2.84)										-	62***
11. Age 23	19.61(3.38)											-

Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$. All correlations are multiplied by 100. Age 23

Self-worth includes one additional item, which accounts for the jump in mean. This was the age at which the measure changed from the adolescent version of the Harter Self-Perception Profile to the Adult version. One item that had been previously missing from this measure was added at the age 18 data collection, accounting for the sudden increase in means. Similarly, at age 23, the adult version of the same measure was initiated, which includes one additional item.

Appendix C

Individual Variation in Physical Attractiveness

A freely estimated latent growth curve model without stability coefficients fit the data well (RMSEA = .032, $p = .739$, CI .000 – .070; $\chi^2 = 29.759$, $df = 25$, $p = .234$; CFI = .993; TLI = .993). A latent growth model with covariances between each repeated measure of physical attractiveness constrained to be equal was also fit to the data (see below for path diagram). This model fit the model equally well (RMSEA = .034, $p = .713$, CI .000 – .072; $\chi^2 = 29.092$, $df = 24$, $p = .217$; CFI = .993; TLI = .992), but was not statistically different from the original model ($\chi^2_D(1) = .667$, $p = .414$). Thus, in favor of parsimony, the original model will be used in all analyses.

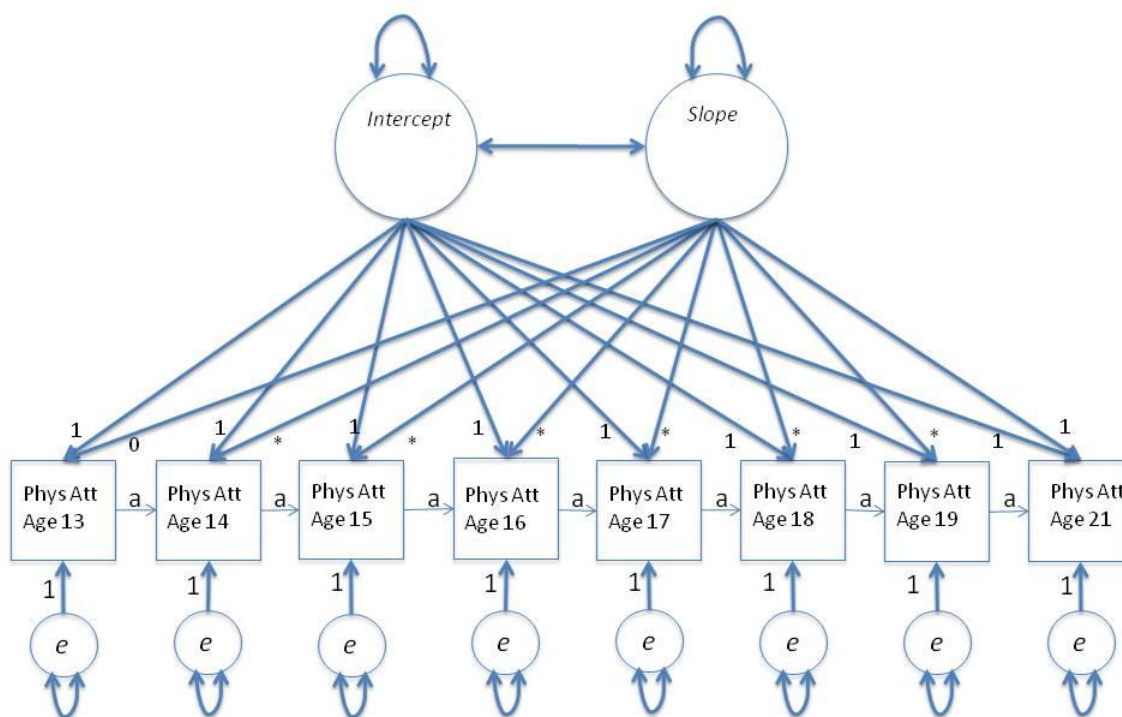


Figure C-1. Path diagram for physical attractiveness factor with covariances between time points constrained to be equal.

Appendix D

Developmentally Sensitive Period

Post-hoc analyses examining additional outcome variables. Additional analyses were run to examine any additional predictions from the developmentally sensitive period.

Sociability. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = .260, p = .034$), attractiveness at age 14 did not significantly predict sociability as reported by friends at age 23 ($\beta = -.022, p = .859$).

Conflict in Romantic Relationships. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = -.392, p = .005$), attractiveness at age 14 did not significantly predict conflict in romantic relationships at age 23 ($\beta = .195, p = .167$).

Target's Positive Behaviors Toward Romantic Partner. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = .487, p = .002$), attractiveness at age 14 did not significantly predict target's positive behaviors toward their romantic partner at age 23 ($\beta = .019, p = .915$).

Romantic Partner's Positive Behaviors Toward Target. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = .574, p < .001$), attractiveness at age 14 did not significantly predict romantic partner's positive behaviors toward target at age 23 ($\beta = -.167, p = .353$).

Social Anxiety. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = .024, p = .834$), attractiveness at age 14 did not significantly predict social anxiety at age 23 ($\beta = .143, p = .209$).

Coping Using Substances. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = .150, p = .209$), attractiveness at age 14 did not significantly predict coping by using substances at age 23 ($\beta = .043, p = .721$).

Frequency of Alcohol Use. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = .270, p = .009$), attractiveness at age 14 did not significantly predict frequency of alcohol use at age 23 ($\beta = -.038, p = .722$).

Frequency of Binge Drinking. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = .092, p = .388$), attractiveness at age 14 did not significantly predict frequency of binge drinking at age 23 ($\beta = .116, p = .265$).

Extroversion. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = .178, p = .128$), attractiveness at age 14 did not significantly predict extroversion at age 23 ($\beta = .027, p = .819$).

Agreeableness. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = .284, p = .011$), attractiveness at age 14 did significantly predict agreeableness at age 23 ($\beta = -.219, p = .053$; see Table D-1).

Table D-1. *Regression Analysis Predicting Agreeableness at age 23*

	<u>Agreeableness</u>	
	β	R^2
Gender	.22**	
Minority Status	-.21**	
Factor: Physical Attractiveness	.28**	
Physical Attractiveness Age 14	-.22*	

Summary Statistics		.14**
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Note. * $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Self-worth. Regression analysis indicated that, while accounting for overall observed physical attractiveness ($\beta = .020$, $p = .867$), attractiveness at age 14 did not significantly predict self-worth at age 23 ($\beta = .103$, $p = .373$).