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EXPLORING THE RELATIONSHIP BETWEEN PEER POPULARITY AND SELF-
PERCEIVED LIKEABILITY IN ADOLESCENCE

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EXPLORING THE RELATIONSHIP BETWEEN PEER POPULARITY AND SELF-
PERCEIVED LIKEABILITY IN ADOLESCENCE

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Table of Contents

Table of Contents	iv
List of Tables	v
List of Figures	vi
Abstract	vii
Introduction.....	1
Summary and Prospectus	6
H1: As popularity increases, self-perceptions of likeability should also increase.....	7
H2: Self-perceptions of likeability will be higher for girls than for popular boys.	8
H3: Popularity should differentially affect girls’ and boys’ self-perceptions of likeability over time.	8
Method	10
Participants.....	10
Measures and Procedure	10
Analyses and Results	11
Model A	12
Model B	13
Model C	14
Model D	15
Model E.....	16
Discussion.....	16
Conclusions and Implications	20
References.....	22

List of Tables

Table 1. Correlation Matrix Between Sociometric Variables by Wave:	26
Table 2. Parameter estimates of each model.....	27

List of Figures

Figure 1. Spaghetti Plot of Self-Perceptions of Likeability Across Middle School.	28
Figure 2. Self-Perceived Likeability by Popularity Across Grade in Boys.	29
Figure 3. Self-Perceived Likeability by Popularity Across Grade in Girls.	30
Figure 4. Self-Perceived Likeability by Popularity Between Boys and Girls in 6 th Grade.	31
Figure 5. Self-Perceived Likeability by Popularity Between Boys and Girls in 7 th Grade.	32
Figure 6. Self-Perceived Likeability by Popularity Between Boys and Girls in 8 th Grade.	33

Abstract

The current study looked at the relationship between peer-rated popularity and self-perceptions of popularity in adolescence. Using hierarchical analysis, we looked at a longitudinal sample of middle schoolers aged 12 to 14 from a mid-sized Northeastern city. We found that popularity had a positive relationship with self-perceptions of likeability over time – as peer-nominated popularity increases, so too do *perceptions* of being liked. Individual differences in initial status and self-perceptions of likeability aside, the strengths of these effects were different for boys and girls, as well as different for boys between grades. Our findings suggest that popular teens feel as though they are liked more than they are, which may explain the prevalence of aggressive and negative behaviors commonly seen in popular youth of this age group. Our findings also suggest that as boys go through middle school, they become more aware of their actual likeability levels compared to girls. Implications and limitations are discussed further.

Keywords: Adolescence, self-perceptions, popularity, HLM, longitudinal

Introduction

Adolescence, the developmental period between childhood and early adulthood, is a period marked by psychological and social change (Casey, Jones & Hare, 2008). Adolescents sharpen their social and interpersonal skills throughout adolescence, and for some youths, these skills can initiate a move up the social hierarchy. For example, Dawes and Xie (2014) describe behaviors such as self-presentation, social interactions, and social connections as ways of increasing popularity. The study of adolescents' status has often focused on popularity.

Popularity, historically, had been defined as a measure of peer-rated likeability, often measured using peer nomination items such as "who do you like most?" (and henceforth referred to as *social preference*; Coie, Dodge, & Coppotelli, 1982). Contemporary peer relations researchers have begun to tease the idea that popularity is conceptually distinct from likeability. Thus, to be popular is not to necessarily be well-liked, but rather to be well-known (Parkhurst & Hopmeyer, 1998; Bowker, Rubin, Buskirk-Cohen, Rose-Krasnor, & Booth-LaForce, 2010; de Bruyn & van den Boom, 2005). Researchers now measure power-based social status by asking children or adolescents who in their classroom or grade is "most popular," and conceptualize popularity as social visibility and prestige (Cillessen & Marks, 2011). In fact, some studies have documented a null or even negative association between popularity and likeability across adolescence (e.g., Cillessen & Borch, 2006; Mayeux, Sandstrom, & Cillessen, 2008).

Popularity in adolescence has been associated with increases in observed aggression (Cillessen & Mayeux, 2004; Mayeux, 2014). Specifically, popularity predicts an increase in aggressive behaviors over time (Cillessen & Mayeux, 2004; Ojanen & Findley-Van Nostrand, 2014; Rose, Swenson, & Waller., 2004). Aggression is classified into two categories: overt aggression (e.g., fighting/hitting others, verbal teasing or name-calling) and relational aggression

(e.g., spreading rumors, social exclusion). The relationship between popularity and aggression has been well-documented (Cillessen & Mayeux, 2004; Hawley, 2003; Mayeux, Houser, & Dyches, 2011) and shows that as popularity increases so too do aggressive behaviors, particularly relationally aggressive behaviors (Cillessen & Borch, 2006). Peer status is important to many (though not all) adolescents (van den Broek, Deutz, Schoneveld, Burk, & Cillessen, 2016). There is an appeal to being popular, and popularity-seeking adolescents may ape the aggressive behaviors of popular peers in an attempt to gain popular status (Dawes & Xie, 2014). Adolescents are also more likely to imitate risky or oppositional behaviors when the imitated peer is highly popular (Cohen & Prinstein, 2006). These mimicked behaviors may be used as a way to raise one's standing among the popular crowd (Gommans, Sandstrom, Stevens, ter Bogt, & Cillessen, 2017). Mayeux and Cillessen (2008) found that popular individuals who also rated *themselves* as highly popular showed the highest levels of aggression towards others. The types of aggression displayed showed a clear gender difference – popular boys who were aware of their status showed increased levels of overt aggression, while popular girls who were aware of their status showed increased levels of relational aggression. And yet it should also be noted that as popularity and relational aggression increase, likeability (as rated by peers) decreases (Vaillancourt & Hymel, 2006). So why then do adolescents continue to be aggressive, if their peers dislike them for it?

One explanation may be that adolescents use aggression as a way to increase their dating popularity (defined as being nominated by opposite-sex peers as someone they would like to go on a date with; Houser, Mayeux, & Cross, 2015). Highly popular girls who were rated as highly aggressive showed higher levels of dating popularity than non-popular girls, and even girls who were highly preferred (i.e., highly likeable) only showed high dating popularity when popularity

was high. These effects were also seen for boys, albeit at less extreme levels. Another explanation may be that the power inherent in status may be too intoxicating to resist. For example, Gommans and colleagues (2017) found that adolescents are more likely to conform and listen to high-status peers than they are low-status individuals, and these effects are stronger for highly popular peers rather than well-liked peers. Further, this study showed that the lower-status member of the peer group conformed at higher rates rather than highly popular adolescents. It should be noted that not every adolescent has motivations to be popular. However, adolescents who rate popularity as an explicit goal show increased aggressive behaviors over time, perhaps as a way to increase popularity (Dawes & Xie, 2014). Keltner and colleagues (2003) found that among adults, it is the group leaders (i.e., those with the highest status) that make decisions for the group and give direction, while the low-status members follow directions. Sarah Blakemore's research (2018) also shows a similar pattern regarding the role of peer influences, such that young adolescents (between 12-14) are more influenced by their teenage peers than other age groups.

Thus, there is an appeal to maintaining power, and in early adolescence, a salient indicator of power is an individual's popularity among peers. Power, as described by Keltner, Gruenfeld, and Anderson (2003), is defined as an individual's capacity to modify others' states by providing or withholding resources or punishments. In the case of adolescence, where resources are relatively limited, the main source of power would be an individual's status relative to his or her peers (Hawley, 2003), and resources would be socially-based (deciding who can hang out with one's group). Evidence from Van Kleef and colleagues (2008) shows that adults with higher feelings of power tend to feel less distress and emotional turmoil when confronted with another individual's suffering. Galinsky, Magee, Ena Inesi, and Gruenfeld (2006) found a

similar pattern such that individuals with power tended to have a reduced capacity to take the perspective of others. Krauss, Chen, and Keltner (2011) show that powerful individuals feel a greater capacity to “be themselves” across situations, and Berdahl and Martorana (2006) report that powerful individuals tend to feel more positive emotions than the less-powerful. While the powerful tend to feel these increased positive emotions, they also tend to overestimate the positive feelings of others (Galinsky et al., 2006). Tying back in with adolescents, perhaps the most popular teens do not aggress as a mechanism to harm others, but rather they aggress simply due to a misunderstanding of (or inability to view) others’ perspectives. However, it should be noted that Mayeux and Cillessen (2008) found that popular adolescents who were fully aware of their popularity continued to show high aggressive behaviors, so it may be the case that they are fully aware of others’ perspectives, but that the desire to be socially powerful trumps other social goals.

Support for the misunderstanding of others’ perspectives comes from the meta-accuracy literature. Meta-accuracy is the extent to which an individual, John, can take the perspective of another, Stew, to see how Stew views John (e.g., Carlson, Vazire, & Furr, 2011). Adults tend to be accurate at meta-perception, such that they are able to recognize that there may be a difference in how others view them and how they view themselves (Mosch & Borkenau, 2016), and these meta-perceptions are highly accurate when considering a broad viewpoint of how others in general see them, but are less accurate when it comes to how a specific individual views them (e.g., John knows that most people see him as funny. He is not quite as confident about whether or not Stew believes he is funny; Kenny & DePaulo, 1993). Carlson and colleagues (2011) found that individuals are capable of accurately seeing how others’ view them above and beyond how they see themselves as rated on personality traits such as the Big Five. In a sample

of fourth graders, Cillessen and Bellmore (1999) looked at the accuracy of self-perceptions across different levels of sociometric status (e.g., popular, rejected, neglected, controversial, and average). Of relevance, they found that well-accepted children were very accurate at identifying how well-liked they were but inaccurate at identifying how disliked they were. An important caveat here is that popularity was measured as social acceptance (i.e., actual likeability), not contemporary popularity (i.e., social impact). Conversely, socially rejected children were the most accurate at identifying how *disliked* they were while being the most inaccurate at identifying how well-liked they were. Thus, it appears as if sociometric status in late-childhood is associated with differential abilities in meta-accuracy. Additionally, boys were accurate at gauging how well-liked they were, yet were poor in identifying who, exactly, liked them, while girls were more accurate at both.

Anderson and colleagues (2006) explored the extent to which adults could accurately gauge their status (defined here as a measure of influence over others) and peer-rated perceptions. Notably, individuals were accurate at assessing their own status relative to the group but failed to accurately gauge their levels of acceptance. Specifically, individuals over-estimated the extent to which they were accepted by other group members. Similarly, in another study of meta-perceptions in young adults, John and Robins (1994) found that individuals are less accurate at evaluating their own performance than when evaluating their peers' performances (i.e., individuals judged their own performance higher than reality, whereas they were less-biased when judging their peers). Of note, Mosch and Borkeu (2016) found that individuals with lower status were more accurate in distinguishing between self-perception and meta-perception than individuals with high status – the high-status individuals saw themselves in a better light than reality. It is clear that there appears to be some ability for adults to accurately view how

they stand among a group with regard to status, as well as a general inability to accurately view how much others like them. We see a different pattern in children such that children tend to be accurate perceivers of how well-liked they are, particularly well-liked children (Cillessen & Bellmore, 1999). It remains unclear how similar these effects are in adolescents. One of the few studies to look at meta-perceptions in adolescence looked at individuals' self-perceptions of competence on school-related abilities (math, English, sports, and social activities) transitioning from 6th grade to 7th grade (Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991). They found that, overall, self-perceptions of social ability increased throughout 7th grade, yet the authors attributed these changes to the new environment of the school rather than to the individual students themselves. What remains to be seen is how social power plays a role in these changing perceptions.

Summary and Prospectus

The effects of power on self-perceptions in adolescence is understudied. The few studies available tend to explore the family power dynamic as it relates to peer competitions in children (e.g., Bugental & Martorell, 1999) or the power dynamic between school teachers and their students (e.g., Schwarzwald, Koslowsky, & Brody-Shamir, 2006). As far as we are aware, the self-perceptions of acceptance or rejection in popular adolescents has not been addressed in research. Zakriski and Coie (1999) explored the relationship between aggression and perceptions of rejection among 9-to-10-year-olds. They found that aggressive children were worse at perceiving their own rejection than were non-aggressive children and tended to overestimate their acceptance by peers. As previously mentioned, as popularity increases, adolescents show an increase in aggressive behaviors (e.g., Cillessen & Mayeux, 2004). Zakriski and Coie's findings suggest that popular teens should be more likely to overestimate their liking by peers.

Using data from the Manchester Youth Study (e.g., Cillessen & Mayeux, 2004), we sought to explore the longitudinal relationship between peer-nominated popularity and self-reported likeability across grades 6 through 8. Further, we looked to see if there were gender differences in the extent to which popularity influenced self-perceived likeability, perhaps due to the differential aggressive behavior patterns between boys and girls (Cillessen & Mayeux, 2004), due to the different nature of popularity between boys and girls (e.g., popularity for middle school boys is more precarious and prone to change than for girls, whose status stays fairly stable; Cillessen & Mayeux, 2004), or due to differences in self-perception accuracy (e.g., fourth grade girls are more accurate at correctly identifying who likes them compared to boys; Cillessen & Bellmore, 1999). Accordingly, our hypotheses are as follows.

H1: As popularity increases, self-perceptions of likeability should also increase.

We expect that the experience of social power is related to feelings of likeability. Again, peer-nominated popularity is not indicative of who is liked (Parkhurst & Hopmeyer, 1998; Cillessen & Borsch, 2006), but rather indicative of who is socially visible throughout the school. Thus, it should be the power inherent in popularity that leads an individual to feel liked by his or her peers (rather than actually being liked), as the effects of popularity should drive individuals to view themselves as more likeable than they are. In adults, we see this pattern such that adults with higher social status tend to overestimate how liked they are (Galinsky et al., 2006). Similarly, Cillessen and Bellmore (1999) saw that children with social power were quite accurate at identifying how well-liked they were, yet very poor at identifying how disliked they were. These enhanced feelings of likeability may stem from increased social visibility, or perhaps from the abilities of popular kids to set trends and have others follow their lead. Social power (defined as a composite of a number of peer nominations, such as “who is a leader” or “who kids will

listen to”) is associated with popularity (Vaillancourt & Hymel, 2006), and both children and adolescents describe popular boys and girls as dominant (Xie, et al., 2006). Thus, the idea that one’s peers are listening and giving attention to him or her may fill adolescents with a sense that they are liked.

H2: Self-perceptions of likeability will be higher for girls than for popular boys.

If girls tend to be more popular than boys in general (e.g., Cillessen & Mayeux, 2004), it should stand that they should also have higher self-perceptions of likeability than boys, as we expect that popularity is associated with self-perceptions of likeability. Adolescent girls tend to focus more on peer relations and interpersonal engagement than boys, and they care more about peer status and evaluations (Rose & Rudolph, 2008). Again, it should be noted that girls tend to be more liked than boys overall (Cillessen & Mayeux, 2004), and they are more accurate perceivers of how-liked they are (Cillessen & Bellmore, 1999). Since girls are generally more popular and well-liked (and are quite aware of it), *and* they care about these statuses more than boys, we expect that self-perceptions for girls will be higher than boys. This effect may manifest itself such that since girls are more worried about interpersonal relations, they may report more peers as liking them as a self-presentation bias, or since girls tend to be accurate observers, they may report more peers as liking them because their peers actually like them.

H3: Popularity should differentially affect girls’ and boys’ self-perceptions of likeability over time.

While popularity for girls is fairly stable in middle school, there is still variability in the ability to maintain status. Likewise, as mentioned, boys’ status is generally more precarious than girls’ throughout middle school (Bowker et al., 2010; Cillessen & Mayeux, 2004). Thus, we expect that there should be not only significant individual variations in self-perceived likeability

across middle school, there should also be significant differences in these changes between boys and girls across middle school. It is unclear whether time will positively affect self-perceptions of likeability – for example, perhaps middle schoolers become more adept at recognizing who likes them (which could indicate a decrease in self-perception of likeability), or perhaps, as they get more opportunities to meet and interact with their classmates, they increasingly consider more classmates to be friends (which could indicate an increase in self-perceptions of likeability). Regarding gender differences, girls may show slower rates of change than boys in self-perceptions of likeability, as they tend to reach puberty earlier than boys, which itself is associated with an increase in brain connectivity in regions associated with social cognition (e.g., Blakemore & Mills, 2014), and thus should be able to more accurately gauge their likeability. If this is the case, the most popular girls in 8th grade should report lower likeability scores than the most popular boys, as popular girls are less-liked than popular boys (Cillessen & Mayeux, 2004). On the other hand, girls may show faster rates of change than boys due to an increase in social visibility, as female adolescents also tend to be more popular than boys (Cillessen & Mayeux, 2004). If this is the case, 8th grade girls should report higher likeability scores than boys due to the misattribution of social prestige and likeability. Thus, taking the previous hypotheses into account, we should expect there to be a three-way interaction between time, popularity, and gender. As middle school progresses so too will individuals' level of popularity also change. These changes tend to be different for boys and girls, and, assuming that our previous hypotheses are correct, we should expect to see different rates of change for boys and girls in self-perceptions of likeability across grade as well as within each grade.

To address these hypotheses, we used a hierarchical linear modeling approach (HLM; Raudenbush & Bryk, 2002) in order to explore the individual differences in the rates of change of how peer-rated popularity can influence and changes self-perceptions of likeability.

Method

Participants

Participants were 597 children (49% girls) initially in the 6th grade who were enrolled in the Manchester Youth Study (e.g., Cillessen & Mayeux, 2004), a longitudinal study initiated in 1994 that followed an entire public school cohort from Grade 4 through approximately age 20. Participants were recruited from the public school system in a mid-sized Northeastern city serving primarily lower-middle and middle-class neighborhoods. The grades of interest for this study, grades 6-8, were split across two middle schools that fed into one high school. Average class size for each middle school was about 300 children per grade. The ethnic composition of the Grade 6 sample was 72.3% White, 17.4% African American, 8.5% Latin American, 1.4% Asian-American, and .2% other. Passive parental consent was obtained in each year, and participant assent was requested on each day of testing. The proportion of students who provided data for the current study was 90%, 78%, and 90% of the students in grades 6 through 8, respectively.

Measures and Procedure

Both popularity and self-perceived liking were measured via peer nominations. Participants were presented with a battery of sociometric questions as part of a larger longitudinal study (for a more in-depth review, see Cillessen & Mayeux, 2004). The current analyses used only two peer nomination items – Most Popular (in which participants are asked to “circle the names of the kids in your grade who are most popular”) and Like You the Most (in

which participants are asked to “circle the names of the kids in your grade who like you the most”). Participants were given a set of rosters that contained the names of every member of their grade with a corresponding code number. Names of each of their peers were alphabetized by first name in multiple columns. Each sociometric question was printed on top of a new roster, and questions were answered by circling code numbers directly on that roster. Participants were allowed unlimited nominations for each question and were also permitted to use both same- and cross-sex nominations. Self-nominations were discouraged and discarded during data processing, and researchers were on hand to answer any questions. The sociometric instrument was designed to take about 30 minutes to complete to be taken during one class period (English). For Most Popular, the number of nominations received by peers was counted and standardized within grade to a z-Score with a mean of 0 and a standard deviation of 1; this was each participant’s peer popularity score. For Like You the Most, the number of nominations participants made were counted and standardized within grade as well; this z-score became each participant’s self-reported likeability score.

Analyses and Results

For our analyses, we ran preliminary, unconditional means and unconditional growth models, followed by several theoretical models. The theoretical models involved including variables of interest as predictors of likeability. It should be noted that, as is common in sociometric data, each variable was standardized within each time point, meaning that we cannot directly compare levels of likability or popularity between grades (Cillessen & Borsch, 2006). However, we *can* explore how these predictor variables relatively affect the outcome variable within each individual, which is the purpose of these analyses. A correlation matrix showing the between-wave intercorrelations of self-perceived likeability and peer-rated popularity can be

seen in Table 1. Our model process began with model A, an unconditional means model, which would then give way to more complex models. These models were run in SAS 9.4 using PROC MIXED. All final model parameter estimates can be seen in Table 2.

Model A

When running a Hierarchical Linear Model, one of the first steps is to run a random effects ANOVA model (Also known as an unconditional means model; UMM). While technically this isn't a necessary step with longitudinal data, we feel that the model-building process is important to detail. This first step, generally, is key in determining how necessary HLM is in analyzing one's data by outputting information about the within-group and between-group variance components. These components are integral in computing the intraclass-correlation coefficient (ICC), which is the amount of redundancy there is within clusters (in this case, individuals), as well as the deviance effect, which is the magnitude of adjustment needed to produce accurate standard errors when using clustered data. With regard to the deviance effect, the general rule of thumb is to use HLM when the deviance effect is greater than two. The combined UMM model looked as follows:

$$Likeability_{ij} = \Gamma_{00} + \mu_{0j} + r_{ij}$$

where Γ_{00} indicates the fixed-effect mean and $\mu_{0j} + r_{ij}$ indicate the random effects with regard to meta-accuracy. μ_{0j} corresponds with between-group variation (τ_{00}), where r_{ij} corresponds with within-group variation (σ^2). Γ_{00} was equal to .0178, $p = .63$, indicating that there was not a significant difference in the means of individuals' meta-accuracy scores. Of interest, both random components were significant, $\tau_{00} = .699$, $p < .001$ and $\sigma^2 = .3$, $p < .001$. The fact that both of these components were significant indicates that both time-varying (e.g., popularity) and time-invariant (e.g., gender) factors could be at play with regard to meta-accuracy. Computing the

ICC, $\tau_{00} / (\tau_{00} + \sigma^2)$, found that 70% of the variability within meta-accuracy was due to differences between individuals.

Model B

Model B is the unconditional growth model. This adds a time variable at level-1 in order to determine the extent to which time influences our predicted variable, but no variables at level-2. The combined model is as follows:

$$Likeability_{ti} = \beta_{00} + \beta_{10} * (Time_{ti}) + r_{0i} + r_{1i} * (Time_{ti}) + e_{ti}$$

in which meta-accuracy is a function of individual growth parameters (β_{10} and r_{1i}), an intercept (β_{00} and r_{0i}), and an error term (e_{ti}). Time, in these analyses, was centered around grade 6 such that the intercept, 0, would correspond with the meta-accuracy of individuals in the sixth grade. As with Model A, the fixed effects in this model were not significant, but the variance components were. The variance of the intercept ($\tau_{00} = .792, p < .001$) indicates that the variation in self-perceptions of likeability differed significantly in 6th grade. The variance of time ($\tau_{11} = .063, p < .001$) indicates that there is significant variation around the trajectory of self-perceptions of likeability. The covariance between the intercept and time was also significant ($\tau_{01} = -.07, p = .001$) which indicates that individuals with high scores of meta-accuracy at grade 6 had lower trajectories than individuals with low scores of meta-accuracy at grade 6. That the fixed-effect of time was not significant, yet the variance components were, indicates that some individuals increase in feelings of self-perception over time, while others decrease. A spaghetti plot of a subset of 50 different individual rates of change is shown in figure 1.

We then ran a quadratic equation in order to see if there were any non-linear effects. Generally, non-linear functions are better suited for data with four or more time points

(Anderson, 2012), but we tested for nonlinear effects anyway. Thus, as expected, the quadratic term did not improve model fit nor was the term itself significant ($\text{Time}^2 = -.007, p = .773$).

Model C

Model C looked at the effect of perceived popularity (as rated by peers) on one's feelings of being liked. The best-fitting model was as follows:

$$\text{Likeability}_{ii} = \beta_{00} + \beta_{10}*(\text{Time}_{ii}) + \beta_{20}*(\text{popularity}_{ii}) + r_{0i} + r_{1i}*(\text{Time}_{ii}) + r_{2i}*(\text{popularity}_{ii}) + e_{ii}$$

in this model, popularity fit better as a random effect than a fixed effect, as the AIC and BIC fit indices were lower for the random effects model. The fixed effect of time was, again, not significant ($\Gamma_{10} = .009, p = .579$). However, the intercept was found to be significant ($\Gamma_{00} = .076, p = .007$), which indicates that the grand mean of self-perceived likeability in 6th grade was significantly different from 0. The fixed-effect of popularity was also significant ($\Gamma_{20} = .89, p < .001$), indicating that, in 6th grade, as an individual's perceived popularity increases, the number of peers they consider to like them also increase. The more popular an individual is, the more they feel that they are liked.

The random effect of the intercept was significant ($\tau_{00} = .233, p < .001$) which indicates that there is between-person variation in perceived likeability in 6th grade. The variance of time was significant ($\tau_{11} = .039, p < .001$) which shows that there is significant variation in the growth rate of perceived likeability between grades. The covariation between the intercept and time was significant ($\tau_{01} = -.029, p = .042$) which indicates that individuals who indicated high perceived likeability at grade 6 showed smaller growth over time than individuals who had low perceived likeability at grade 6. The variance of popularity was also significant ($\tau_{22} = .115, p <$

.001) which indicates that there is significant variation in perceived likeability between individuals of different levels of popularity.

Model D

Model D built off of Model C. Here we introduced sex as a level-2, time-invariant predictor in order to help explain gender differences in self-perceptions of likeability. The model was as follows:

$$\text{Likeability}_{ti} = \beta_{00} + \beta_{01}*(\text{Female}) + \beta_{10}*(\text{Time}_{ti}) + \beta_{20}*(\text{popularity}_{ti}) + \beta_{21}(\text{Popularity}_{ti}*\text{Female}) + r_{0i} + r_{1i}*(\text{Time}_{ti}) + r_{2i}*(\text{popularity}_{ti}) + e_{ti}$$

The fixed effect of the intercept was significant ($\Gamma_{00} = -.096, p = .007$), indicating that the expected 6th grade male's perceived likeability with average popularity was significantly lower than the class average. The fixed effect of popularity was also significant ($\Gamma_{20} = 1.006, p < .001$), which indicates that popularity is associated with feelings of being liked in 6th grade boys. For boys, as perceived popularity increased, so too did feelings of being liked. The level 2 fixed effect of gender was also significant ($\Gamma_{01} = .353, p < .001$). This indicates that girls' perceived likeability is significantly higher than boys. The final significant fixed effect was the interaction between gender and popularity ($\Gamma_{21} = -.244, p < .001$). This indicates that popularity for girls is associated with a smaller slope than for boys. Popularity has a weaker effect on girls' perceptions of likeability.

Random effects show that the intercept ($\tau_{00} = .205, p < .001$) was found to be significant, thus there were individual differences in the amount of likeability boys felt in 6th grade. The random effect of time was also shown to be significant ($\tau_{11} = .04, p < .001$) which shows that there was significant variation in the growth rate of perceived likeability between boys

throughout middle school. The covariation between time and the intercept was significant ($\tau_{10} = -.035, p = .012$). This indicates that boys who had high self-perceptions of likeability at grade 6 showed lower growth rates than individuals with low perceived likeability at grade 6. The variance of popularity was also significant ($\tau_{22} = .104, p < .001$), which shows that there are individual differences in how much popularity influences perceived likeability. Finally, the residual variance was also significant ($\sigma^2 = .202, p < .001$) indicating overall within-person variability.

Model E

$$\begin{aligned} Likeability_{it} = & \beta_{00} + \beta_{01}*(Female) + \beta_{10}*(Time_{it}) + \beta_{11}*(Time*Female) + \\ & \beta_{20}*(popularity_{it}) + \beta_{21}(Popularity*Female) + \beta_{30}*(Time*Popularity) + \\ & \beta_{31}*(Time*Popularity*Female) + r_{0i} + r_{1i}*(Time_{it}) + r_{2i}*(popularity_{ij}) + e_{it} \end{aligned}$$

Model E was the final model and added a level-1 interaction between time and popularity. This effect was significant ($\Gamma_{30} = -.09, p < .001$), indicating that there is a significant difference between grades in how popularity affects self-perceptions of likeability in boys (Fig. 2). Model E also included a three-way, cross-level interaction to observe potential sex differences. This interaction effect was significant ($\Gamma_{31} = .08, p = .02$), indicating that there is a significant difference in rates of change between boys and girls throughout middle school as popularity increases, as well as significant differences in the rates of change *within* each gender between each grade, as can be seen in Fig. 3-6. Of note, the interaction between time and sex was marginally significant ($\Gamma_{11} = .06, p = .06$), indicating that throughout middle school, boys and girls differ in their growth rates of self-perceived likeability.

Discussion

This study explored the causal relationship of peer-nominated popularity on self-perceptions of likeability using growth curve analysis. We hypothesized that popularity would be associated with increased feelings of being liked by peers, possibly due to the attribution of feelings of social power as being more liked by peers, as well. Consistent with this hypothesis, there was a significant effect of popularity on self-perceptions of likeability in adolescence. As popularity increases, regardless of grade or gender, adolescents report that their peers like them more. That there were significant individual differences in perceived likeability in 6th grade is not surprising, as adolescents differ in general in their meta-perceptions – not every 6th grader is the same (e.g., Bellmore & Cillessen, 1999). Thus, the significant random effects indicate that there are considerable individual differences in starting levels of perceived likeability, yet the fixed effect suggests that overall, popularity contributes to self-perceptions of liking in adolescence.

We also explored gender differences in popularity and perceived likeability. We hypothesized that, since girls are more popular than boys in middle school (Cillessen & Mayeux, 2004), they will generally report higher perceived likeability than boys. This hypothesis was supported, as adolescent girls did, in fact, report higher self-perceived likeability scores than boys. It should be noted that in middle school, girls tend to be more prosocial than boys (e.g., Coie et al., 1982) and tend to actually be more liked than boys (Bowker et al., 2010). In middle school, girls also report having closer relationships than boys (Rose & Rudolph, 2006). It may be the case here that girls are receiving more social feedback in general about being liked than boys, which would lead to a more-optimistic view of how others see them.

Finally, we hypothesized that boys and girls would differ in how popularity affected their growth rates of self-perceptions of likeability. This hypothesis was supported through the three-way interaction. We found that throughout middle school, popularity had a stronger effect on

boys' self-perceptions of likeability than girls, such that less-popular boys reported lower feelings of likeability than less popular girls across all grades, yet the slopes of popularity for boys was sharper – indicating that popularity influenced self-perceptions of likeability more intensely than for girls. Of interest, popular boys, as they move through middle school, report lower and lower likeability than they did the year before – Popular 8th grade boys report lower self-perceptions of likeability than popular 6th grade boys. For popular girls, however, these changes do not appear to take effect – Popular girls in 6th grade and popular girls in 8th grade both report similar self-perceptions of likeability scores. Taking these findings into broader context, Cillessen and Mayeux (2004) found that throughout middle school, as popularity increases for an individual, his or her actual likeability decreases. That is to say, the more popular one is, the less liked he or she is, and they found that this effect is particularly strong for girls. Our findings suggest that throughout middle school, boys are becoming increasingly more aware of exactly how well-liked they are, whereas girls do not appear to notice this decrease in acceptance by peers. This is at odds with the findings of Cillessen and Bellmore (1999) which suggested that girls are more accurate at distinguishing their likeability compared to boys. That they looked at meta-accuracy in late childhood may be of importance, as the connection-orientation goals of girls do not begin to strongly emerge until early to middle adolescence (Rose & Rudolph, 2006). Thus, there may be differential social cognitive processes between late childhood and adolescence. O'Brian and Bierman (1988) interviewed a group of youths ranging from 5th grade to 11th grade regarding their perceptions of peer influence. Of interest, the youngest group (ages 10-13) responded similarly to the older adolescents in that peers provide companionship and self-worth, yet they differed in that they did not indicate that peer acceptance impacted self-evaluation.

Our findings also map onto the patterns of power and self-perceptions seen by Berdahl and Martorana (2006) and Galinsky et al. (2006). Berdahl and Martorana (2006) reported that powerful individuals tend to feel more positive emotions than those without power, where Galinsky and colleagues reported that individuals with power tend to overstate positive feelings of others. The current study implies that adolescents with power follow a similar pattern – while the unpopular youth reported low self-perceptions of likeability from others (particularly boys), as peer-nominated popularity increased, self-perceptions of likeability increased. Thus, it appears that the mere aspect of being known and visible in one’s school is enough to create the perception that others like and accept them, even if that is not always accurate.

This may partially explain the prevalence of aggression seen in popular adolescents: while we know that some popular kids know how popular they are (Mayeux & Cillessen, 2008), perhaps they (incorrectly) think that they get some sort of “pass” to do these behaviors. This ties in with Zakriski and Coie’s (1999) study that found that aggressive (i.e., popular) 9 and 10-year-olds were poor at perceiving rejection from others, while at the same time overestimating their acceptance. In their minds they may believe that their peers are *allowing* these behaviors. If this is the case, then the aggressors have very little incentive to stop being aggressive. While popular kids are not necessarily liked, perceived popularity is at its highest when it is also coupled with leadership, sociability, or cooperation (Puckett, Aikins, & Cillessen, 2008). This indicates a sort of cycle such that an adolescent can be aggressive in one situation, and then later behave cooperatively towards that same peer to try and minimize any hard feelings. Future work should look at the dual-nature of popular teens day-to-day interactions with peers.

A major limitation of this study is the use of peer-rated popularity as an indirect measure of power. While it is assumed that popularity shares similar attributes as power (e.g., setting

rules or having others follow directions), it is unclear the extent to which adolescents view these concepts as similar. In particular it is unclear if popular adolescents believe that they have power over others. While Vaillancourt and Hymel (2006) created a measure of *perceived power* as a sociometric measure of power in adolescents and found large correlations between perceived power and perceived popularity as rated by peers, in this dataset we did not have a measure of perceived power and must instead rely on this indirect measure.

Another limitation is when and where the data were collected. Data were collected from roughly 1994 to 2004 from a small, Northeastern city, which may not be representative of adolescents in general, but rather only adolescents in that particular region at that time. However, the large, longitudinal nature of the sample itself should be noted, as well as the relatively large consent rates of the participants in the study.

Finally, as was previously mentioned, there are many individual differences in adolescents, and these differences may manifest in different ways throughout adolescence. The current study only looked at three years in middle school to see how popularity affected self-perceptions of likeability. By using hierarchical linear modeling on only three time points, we were only able to explore linear trends, yet the growth pattern throughout all of adolescence may be non-linear in nature.

Conclusions and Implications

This study found that there is a link between popularity and self-perceptions of likeability in early adolescence. Popularity appears to indicate to adolescents that they are well-liked by their peers, even though that is not always the case. Unpopular boys in particular showed much lower self-perceptions of likeability than unpopular girls, yet both groups showed this pattern compared to average and popular boys and girls. This study also indicated that, contrary to other

studies on early-adolescent perceptions, boys may actually be more aware of how well-liked they are by their peers than girls. Implications from this paper indicate that popular, aggressive kids see themselves not only as popular, but also as well-liked. If highly aggressive kids continually think this is the case, then they will not particularly have any reason to stop behaving aggressively- that is, they believe they can get away with these negative, harmful behaviors. Future studies should look at self-perceptions of power in popular and unpopular teens and how that influences aggressive and prosocial behaviors.

References

- Anderson, D. (2012). *Hierarchical linear modeling (HLM): An introduction to key concepts within cross-sectional and growth modeling frameworks*. (Report No. 1308). Retrieved from <https://eric.ed.gov/?id=ED545279>
- Anderson, C., Srivastava, S., Beer, J. S., Spataro, S. E., & Chatman, J. A. (2006). Knowing your place: self-perceptions of status in face-to-face groups. *Journal of Personality and Social Psychology, 91*(6), 1094-1110. doi: 10.1037/0022-3514.91.6.1094
- Berdahl, J. L., & Martorana, P. (2006). Effects of power on emotion and expression during a controversial group discussion. *European Journal of Social Psychology, 36*(4), 497-509. doi: 10.1002/ejsp.354
- Blakemore, S.J. (2018). Avoiding social risk in adolescence. *Current Directions in Psychological Science, 27*(2), 116–122. doi: <https://doi.org/10.1177/0963721417738144>
- Blakemore, S. J., & Mills, K. L. (2014). Is adolescence a sensitive period for sociocultural processing? *Annual Review of Psychology, 65*, 187-207. doi: <https://doi.org/10.1146/annurev-psych-010213-115202>
- Bowker, J. C., Rubin, K. H., Buskirk-Cohen, A., Rose-Krasnor, L., & Booth-LaForce, C. (2010). Behavioral changes predicting temporal changes in perceived popular status. *Journal of Applied Developmental Psychology, 31*, 126-133. doi: 10.1016/j.appdev.2009.10.002
- Bugental, D. B., & Martorell, G. (1999). Competition between friends: The joint influence of the perceived power of self, friends, and parents. *Journal of Family Psychology, 13*(2), 260-273. <http://dx.doi.org/10.1037/0893-3200.13.2.260>
- Carlson, E. N., Vazinre, S., & Furr, R. M. (2011). Meta-insight: do people really know how others see them? *Journal of Personality and Social Psychology, 101*(4), 831-846. doi: 10.1037/a0024297
- Casey, B. , Jones, R. M. and Hare, T. A. (2008), *The Adolescent Brain*. Annals of the New York Academy of Sciences, 1124: 111-126. doi:10.1196/annals.1440.010
- Cillessen, A., & Bellmore, A. (1999). Accuracy of social self-perceptions and peer competence in middle childhood. *Merrill-Palmer Quarterly, 45*(4), 650-676. Retrieved from <http://www.jstor.org/stable/23093376>
- Cillessen, A. H. & Borsch, C. (2006). Developmental trajectories of adolescent popularity: a growth curve modelling analysis. *Journal of Adolescence, 29*, 935-959. DOI: 10.1016/j.adolescence.2006.05.005
- Cillessen, A. H., & Mayeux, L. (2004). From censure to reinforcement: Developmental changes in the association between aggression and social status. *Child Development, 75*(1), 147-163. doi: <https://doi.org/10.1111/j.1467-8624.2004.00660.x>
- Cohen, G. L. and Prinstein, M. J. (2006), Peer contagion of aggression and health risk behavior among adolescent males: An experimental investigation of effects on public conduct and private attitudes. *Child Development, 77*: 967-983. doi:10.1111/j.1467-8624.2006.00913.x

- Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology, 18*(4), 557-570. doi: <http://dx.doi.org/10.1037/0012-1649.18.4.557>
- Dawes, M., & Xie, H. (2014). The role of popularity goal in early adolescents' behaviors and popularity status. *Developmental Psychology, 50*(2), 489.
- de Bruyn, E. H. & van den Boom, D. C. (2005). Interpersonal behavior, peer popularity, and self-esteem in early adolescence. *Social Development, 14*(4), 555-573. doi: <https://doi.org/10.1111/j.1467-9507.2005.00317.x>
- Galinsky, A. D., Magee, J. C., Inesi, M. E., & Gruenfeld, D. H. (2006). Power and perspectives not taken. *Psychological Science, 17*(12), 1068-1074
- Gommans, R., Sandstrom, M. J., Stevens, G. W., ter Bogt, T. F., & Cillessen, A. H (2017). Popularity, likeability, and peer conformity: Four field experiments. *Journal of Experimental Social Psychology, 73*, 279-289. doi: <http://dx.doi.org/10.1016/j.jesp.2017.10.001>
- Hawley, P. H. (2003). Strategies of control, aggression, and morality in preschoolers: An evolutionary perspective. *Journal of Experimental Child Psychology, 85*(3), 213-235. doi: [https://doi.org/10.1016/S0022-0965\(03\)00073-0](https://doi.org/10.1016/S0022-0965(03)00073-0)
- Houser, J. J., Mayeux, L., & Cross, C. (2015). Peer status and aggression as predictors of dating popularity in adolescence. *Journal of Youth Adolescence, 44*, 683-695. doi: [10.1007/s10964-014-0174-z](https://doi.org/10.1007/s10964-014-0174-z)
- John, O. P. & Robins, R. W. (1994). Accuracy and bias in self-perception: individual differences in self-enhancement and the role of narcissism. *Journal of Personality and Social Psychology, 66*(1), 206-219. doi: <http://dx.doi.org/10.1037/0022-3514.66.1.206>
- Keltner, D., Gruenfeld, D. H., & Anderson, C. (2003). Power, approach, and inhibition. *Psychological Review, 110*(2), 265-284. doi: <http://dx.doi.org/10.1037/0033-295X.110.2.265>
- Kenny, D. A. & DePaulo, B. M. (1993). Do people know how others view them? An empirical and theoretical account. *Psychological Bulletin, 114*(1), 145-161.
- Kraus, M. W., Chen, S., & Keltner, D. (2011). The power to be me: Power elevates self-concept consistency and authenticity. *Journal of Experimental Social Psychology, 47*(5), 974-980. doi: <https://doi.org/10.1016/j.jesp.2011.03.017>
- Mayeux, L., & Cillessen, A. H. (2008). It's not just being popular, it's knowing it, too: The role of self-perceptions of status in the associations between peer status and aggression. *Social Development, 17*(4), 871-888. doi: <https://doi.org/10.1111/j.1467-9507.2008.00474.x>
- Mayeux, L. (2014). Understanding popularity and relational aggression in adolescence: The role of social dominance orientation. *Social Development, 23*(3), 502-517. doi: <https://doi.org/10.1111/sode.12054>
- Mayeux, L., Houser, J. J., & Dyches, K. D. (2011). Social acceptance and popularity: Two distinct forms of peer status. In A. H. N. Cillessen, D. Schwartz, & L. Mayeux (Eds.), *Popularity in the Peer System* (pp. 79-102). New York, NY, US: The Guilford Press.

- Mayeux, L., Sandstrom, M. J., & Cillessen, A. H. (2008). Is being popular a risky proposition? *Journal of Research on Adolescence, 18*(1), 49-74. doi: <https://doi.org/10.1111/j.1532-7795.2008.00550.x>
- Mosch, A. & Borkeu, P. (2016). Psychologically adjusted persons are less aware of how they are perceived by others. *Personality and Social Psychology Bulletin, 42*(7), 910-922. doi: 10.1177/0146167216647383
- O'Brien, S. F., & Bierman, K. L. (1988). Conceptions and perceived influence of peer groups: Interviews with preadolescents and adolescents. *Child Development, 59*(5), 1360-1365. doi: 10.2307/1130498
- Ojanen, T. & Findlay-Van Nostrand, D. (2014). Social goals, aggression, peer preference, and popularity: Longitudinal links during middle school. *Developmental Psychology, 50*(8), 2134-2143. DOI: <http://dx.doi.org/10.1037/a0037137>
- Parkhurst, J. T., & Hopmeyer, A. (1998). Sociometric popularity and peer-perceived popularity: Two distinct dimensions of peer status. *The Journal of Early Adolescence, 18*(2), 125-144. doi: <https://doi.org/10.1177/0272431698018002001>
- Puckett, M. B., Aikins, J. W., & Cillessen, A. H. (2008). Moderators of the association between relational aggression and perceived popularity. *Aggressive Behavior, 34*(6), 563-576. doi:10.1002/ab.20280
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (Vol. 1). Sage.
- Rose, A. J., & Rudolph, K. D. (2006). A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin, 132*(1), 98-131. doi:<http://dx.doi.org/10.1037/0033-2909.132.1.98>
- Rose, A. J., Swenson, L. P., & Waller, E. M. (2004). Overt and relational aggression and perceived popularity: Developmental differences in concurrent and prospective relations. *Developmental psychology, 40*(3), 378.
- Schwarzwald, J., Koslowsky, M., & Brody-Shamir, S. (2006). Factors related to perceived power usage in schools. *British journal of educational psychology, 76*(3), 445-462. doi: <https://doi.org/10.1348/000709905X39189>
- Vaillancourt, T. & Hymel, S. (2006). Aggression and social status: the moderating roles of sex and peer-valued characteristics. *Aggressive Behavior, 32*, 396-408. doi: 10.1002/ab
- van den Broek, N., Deutz, M. H., Schoneveld, E. A., Burk, W. J., & Cillessen, A. H (2016). Behavioral correlates of prioritizing popularity in adolescence. *Journal of Youth Adolescence, 45*, 2444-2454. doi: 10.1007/s10964-015-0352-7
- Van Kleef, G. A., Oveis, C., Van Der Löwe, I., LuoKogan, A., Goetz, J., & Keltner, D. (2008). Power, distress, and compassion: Turning a blind eye to the suffering of others. *Psychological Science, 19*(12), 1315-1322. doi: <https://doi.org/10.1111/j.1467-9280.2008.02241.x>

- Wigfield, A., Eccles, J. S., Mac Iver, D., Reuman, D. A., & Midgley, C. (1991). Transitions during early adolescence: changes in children's domain-specific self-perceptions and general self-esteem across the transition to junior high school. *Developmental Psychology, 27*(4), 522-565.
- Xie, H., Li, Y., Boucher, S. M., Hutchins, B. C., & Cairns, B. D. (2006). What makes a girl (or a boy) popular (or unpopular)? African American children's perceptions and developmental differences. *Developmental Psychology, 42*(4), 599.
- Zakriski, A. L. and Coie, J. D. (1996), A Comparison of aggressive-rejected and nonaggressive-rejected children's interpretations of self-directed and other-directed rejection. *Child Development, 67*: 1048-1070. doi:10.1111/j.1467-8624.1996.tb01782.x

Table 1. Correlation Matrix Between Sociometric Variables by Wave:

	Likeability 6 th	Likeability 7 th	Likeability 8 th	Popularity 6 th	Popularity 7 th	Popularity 8 th
Likeability 6 th	1	.770**	.659**	.717**	.657**	.624**
Likeability 7 th	.722**	1	.742**	.698**	.790**	.757**
Likeability 8 th	.588**	.638**	1	.539**	.590**	.685**
Popularity 6 th	.660**	.615**	.495**	1	.827**	.745**
Popularity 7 th	.615**	.662**	.544**	.912**	1	.911**
Popularity 8 th	.591**	.626**	.595**	.884**	.948**	1

Note. Boys' correlations are above the diagonal, girls' below. ** indicates p -value < .01.

Table 2. Parameter estimates of each model.

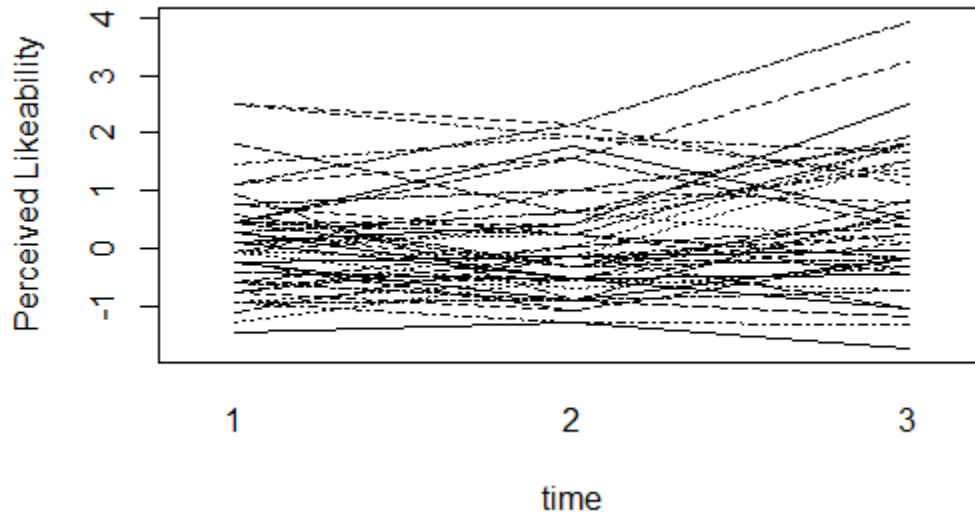
	Parm	Model A	Model B	Model C	Model D	Model E
<i>Fixed Effects</i>						
Intercept	Γ_{00}	.018(.037)	.002(.041)	.076(.029)**	-.096(.036)**	-.067(.038)
Grade	Γ_{10}		.018(.018)	.001(.017)	.008(.017)	-.027(.023)
Popular	Γ_{20}			.890(.035)***	1.010(.049)***	1.093(.056)***
Popular*Grade	Γ_{30}					-.096(.027)***
Female	Γ_{01}				.353(.046)***	.297(.054)***
Grade*Female	Γ_{11}					.063(.033) ^o
Popular*Female	Γ_{21}				-.244(.069)***	-.289(.077)***
Popular*Grade*Female	Γ_{31}					.083(.035)*
<i>Random Effects</i>						
Within-Person	σ^2	.296(.013)***	.234(.015)***	.202(.013)***	.202(.013)***	.202(.013)***
Between-Person						
Intercept	τ_{00}	.699(.047)***	.792(.087)***	.233(.030)***	.204(.028)***	.194(.027)***
Grade	τ_{11}		.063(.014)***	.039(.011)***	.042(.012)***	.038(.011)***
Popularity	τ_{22}			.115(.030)***	.104(.027)***	.110(.029)***
Grade*Intercept	τ_{01}		-.07(.021)***	-.028(.014)*	-.035(.014)*	-.027(.014)*
<i>Fit statistics</i>						
-2LL		3821.2	3792.4	3133.7	3047.7	3034.1
AIC		3825.2	3804.4	3153.7	3071.7	3064.1
BIC		3834	3830.7	3197.6	3124.4	3130.0

Appendix

Table 1. Parameter estimates of each model.

Note. *** indicates $p < .001$; ** indicates $p < .01$; * indicates $p < .05$; ^o indicates $p < .07$.

Figure 1. Spaghetti Plot of Self-Perceptions of Likeability Across Middle School.



Note. "Time 1" refers to 6th grade, "time 2" refers to 7th grade, and "time 3" refers to 8th grade. Each line indicates a specific individual's growth rate.

Figure 2. Self-Perceived Likeability by Popularity Across Grade in Boys.

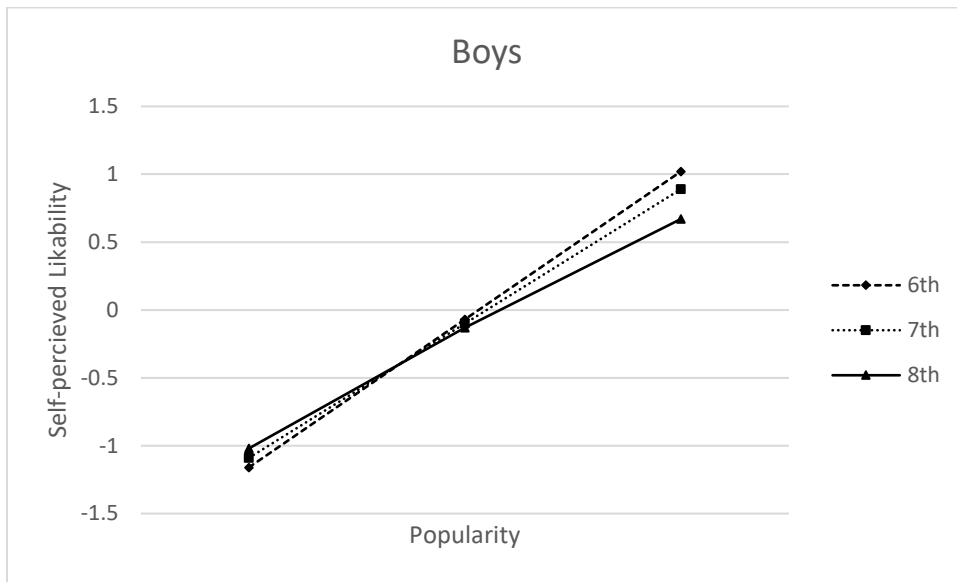


Figure 3. Self-Perceived Likeability by Popularity Across Grade in Girls.

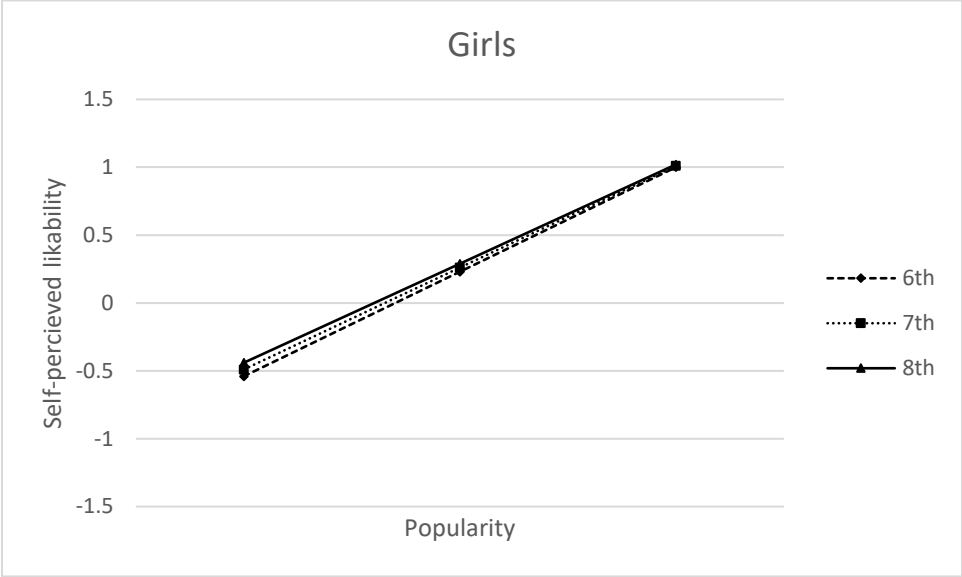


Figure 4. Self-Perceived Likeability by Popularity Between Boys and Girls in 6th Grade.

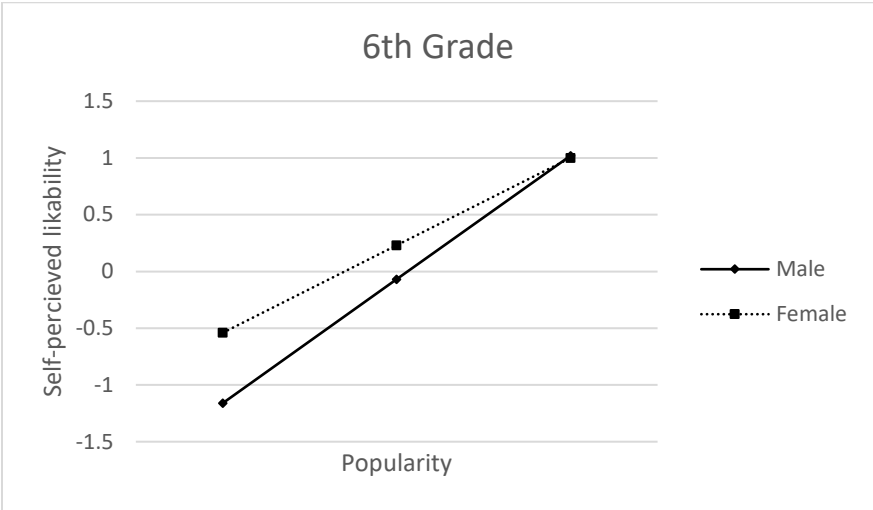


Figure 5. Self-Perceived Likeability by Popularity Between Boys and Girls in 7th Grade.

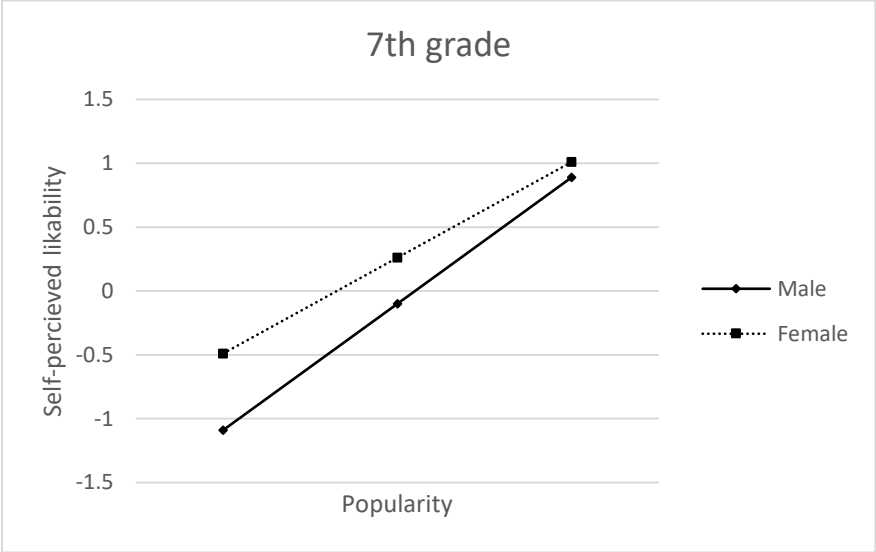


Figure 6. Self-Perceived Likeability by Popularity Between Boys and Girls in 8th Grade.

