The Tweens' Attitudes about Peers in Eyeglasses (TAPE) Study

THESIS

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By
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Graduate Program in Vision Science

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Abstract

*Purpose:* Previous studies have researched how adults and young children perceive spectacle-wearers within their peer group, but no studies have been published about preteens, or tweens. The Tweens’ Attitudes about Peers in Eyeglasses (TAPE) study was conducted to determine how tweens feel about others their age who wear eyeglasses.

*Methods:* Subjects viewed a presentation of 24 picture pairs and answered eight questions regarding which peer ... he or she would rather hang out with, appears smarter/more intelligent, looks better at playing sports, is better looking, looks more shy, looks more honest, and looks more nerdy. The peers in each comparison differed by gender, race, and spectacle wear. Calculations were performed to determine the probabilities and confidence intervals that a subject would choose a particular peer for each question.

*Results:* Ninety-seven subjects between the ages of 11 and 14 years participated. The average age was 12.7 ±0.9 years, and 39 (40.2%) of the subjects were female. Subjects reported that 86 (88.7%) were of Caucasian descent, and sixteen (16.5%) wore spectacle correction, 14 (14.4%) primarily wore contact lenses for refractive correction, and seventy-one (73.2%) had at least one family member who required refractive correction. The spectacle wearer appeared smarter (0.58, CI = 0.56-0.60), more shy (0.52, CI = 0.51-0.53), more honest (0.56, CI = 0.55-0.58), nicer (0.55, CI = 0.53-0.56) and more nerdy (0.57, CI = 0.55-0.59). The non-spectacle
wearer looked slightly better at playing sports (0.48, CI = 0.47-0.49). Overall, females appeared smarter (0.65, CI = 0.62-0.67), more shy (0.71, CI = 0.68-0.73), more honest (0.67, CI = 0.64-0.70), nicer (0.60, CI = 0.57-0.63), and more nerdy (0.67, CI = 0.64-0.69). Males looked better at playing sports (0.81, CI = 0.79-0.84) and were judged as better looking (0.56, CI = 0.53-0.60).

**Conclusions:** Spectacles may tend to make tweens appear smarter, more shy, more honest, nicer, and more nerdy to their peers. However, tweens do not consider spectacle wear when deciding with whom to hang out and who is better looking.
Dedication

This document is dedicated to the many family, friends, teachers, and knitters who have inspired and encouraged me along this journey.
Acknowledgments

Jeffrey Walline has been a great encouragement these past few years. And, he has saved me countless hours navigating many shortcuts in Microsoft Office. More than just his technical savvy, I admire his dedication to children and their visual needs and concerns.

All of my professors here at The Ohio State University College of Optometry have taught me much about vision and optometry but also about treating patients as whole people with varied needs. These professionals have been invaluable in shaping my career as an optometrist and serve as role models as I pursue further study and research.

The late Dr. Dorian Espe was my first optometrist and took the time to patiently help me choose my first pair of glasses. His dedication to children’s vision and learning needs was an inspiration to many.

Catherine and Jimmy Rowe have been encouraging and supportive in so many ways over the past few years and have become my family here in Ohio. They have been present for my high and low moments, holidays and other times just to be – including making sure that I eat at least one good meal each week.
The TAPE study involved the help of many people who deserve thanks and recognition. Kerri McTigue was kind enough to digitally alter the peer photographs for me the week before ARVO when many posters were due. Loraine Sinnott advised me on how to approach a mountain of data before I became overwhelmed. Twelve tweens agreed to be photographed for peer groups to judge, showing more courage than most would expect from children of that age. Also, special thanks to the administration, teachers, and especially students at St. Brigid of Kildare School who allowed us to enter the classrooms and conduct the surveys.
Vita

1992.......................................................... Independence High School

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Fields of Study

Major Field: Vision Science and Optometry
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Chapter 1: Introduction

Most spectacle wearers remember the day they received their first pair of glasses, and they also remember wondering what their peers thought about their appearance while walking into school or work the following day. Research has shown that those who receive their first pair of glasses as adolescents maintain a higher self-perception than those who receive glasses for the first time as younger children or as adults (Terry, 1982). This may be because preteen students go through many developmental changes, and the thought of what their friends may think of their new glasses can be extremely stressful.

1.1 Refractive error in school-aged children

1.1.1 Myopia

The prevalence of myopia, or nearsightedness, in the United States is 9.2 percent in children between the ages of five and seventeen (Ostrow, 2010). Myopia occurs when the axial length of the eye exceeds the optical power of the cornea and lens, and it progresses as children grow and develop. The incidence of myopia increases during school-aged years (Matsumura, 1999), and recent studies have shown relative increases in myopia in school-age children (Matsumura, 1999; Ostrow, 2010). Traditional school vision screenings are meant to identify the
onset and progression of myopia, and many myopic students receive their first pair of glasses during the later elementary grades or middle school. Causes for the development of myopia are unknown, yet studies consider both genetic and environmental factors. Regardless of the initial cause, myopia progresses throughout adolescence. This progression of myopic refractive error occurs more rapidly at younger ages and with more severe initial myopia (Braun, 1996).

1.1.2 Correction of myopia

Many treatments exist for correction of myopia and potential prevention of its progression. While spectacles are still the most common treatment modality for refractive error in children and tweens (Silbert, 2009; Sindt, 2011), both soft and gas permeable (GP) contact lenses are safe and effective options for children and teenagers (Berntsen, 2010; Kang, 2011; Lee, 2010; Sindt, 2011; Van Meter, 2008; Walline, 2004). Options such as orthokeratology lenses worn at night and spectacles with progressive-addition lenses can reduce the progression of myopia (Berntsen, 2010; Kang, 2011; Lee, 2010). However, while these options are safe and effective for younger patients, a significant proportion of infections and keratitis related to contact lens use have occurred in children and teenagers (Van Meter, 2008), and many optometrists agree that this population may benefit the most from daily disposable, soft contact lenses (Silbert, 2009).

In a recent survey of optometrists in the United States, 71% reported that they still prescribe eyeglasses as a first line of treatment for children and teenagers (Sindt, 2011). A study of 585 tweens and teens indicate that many prefer to not wear glasses, as they are afraid of breaking or losing them, uncomfortable wearing them to play sports, and fear being perceived
as “nerdy.” At the same time, they still like the fashionable choices, low maintenance, and ease of use of glasses (Silbert, 2009).

1.1.3 Non-compliance with spectacle wear

Lack of myopia treatment can have both educational, and later economic, consequences as, without correction, students show lower academic performance and decreased participation in scholastic and social activities (Negrel, 2000). Studies of Mexican primary and secondary students who were given free spectacles after screening refractions had only a 13% compliance rate (Castanon-Holguin, 2006), even though these students self-reported an increase in visual function when wearing their glasses, including those whose refractive errors were as minor as -0.75 D (Esteo, 2007; Sindt, 2011). Students at a greater risk for non-compliance were the older students in urban areas of Mexico who expressed more concerns about appearance and fear of being teased than the younger, rural students. However, neither gender nor amount of time since receiving glasses were indicators of spectacle wear (Castanon-Holguin, 2006).

Another study of six- to eleven-year-old myopes hypothesized that, “it is likely that attitudes toward glasses affect self-evaluations, particularly relating to physical appearance, and these in turn may influence compliance with wearing prescribed glasses (Dias, 2005).” British seven- and eight-year-olds reported that, if they wore glasses or had worn an eye patch they were 35-37% more likely to be bullied, either physically or verbally (Horwood, 2005). While these observations and conclusions seem obvious, the affect of teasing by peers and patient self-esteem on compliance has not been evaluated (Castanon-Holguin, 2006).
1.2 Self-esteem in children

Self-esteem develops in childhood, which is concurrent with the typical onset and progression of myopia. Some aspects of self-esteem change through the teen years, particularly in terms of educational competence, social acceptance, and physical appearance (Dias, 2005), as well as developmental and cognitive changes (Cole, 2001), yet global self-worth is fairly stable in childhood (Granleese, 1994). A study of myopic, spectacle-wearing children reported that they had “high levels of self-esteem, suggesting that having myopia does not negatively impact self-esteem (Dias, 2005).”

1.3 Studies of self-perceptions

Multiple studies have examined how spectacle wear affects the self-esteem of adults (Gording, 1968; Hadjistavropoulos, 1988; Harris, 1991; Terry, 1981; Terry, 1990; Terry, 1983; Terry, 1976) and children (Dias, 2005; Lyon, 2002; Terry, 1997). Reviews of the literature have concluded that spectacle wearers have more negative body images and are more anxious about their appearance (Knoll, 1978), and social interactions can be negatively affected by these insecurities. However, feelings of inferiority, anxiety, and self-degradation are not directly associated with spectacle wear, but they may be exacerbated by having to wear eyeglasses (Terry, 1982). In fact, when young adults switch from glasses to contact lenses as their primary means of refractive correction, successful wearers have a positive change in personal interactions (Gording, 1968), but they do not experience a psychological benefit, such as a change in their social abilities or shyness (Hadjistavropoulos, 1988).
As a whole, spectacle wearers have lower self-esteem where social interactions and physical appearance are concerned (Terry, 1982), yet adults’ self concepts follow gender stereotypes (Harris, 1991). Male spectacle wearers see themselves as being more intelligent but are more insecure about their eyes than females (Terry, 1990). Women spectacle wearers are more aware of their eyes and see their eyes as being less attractive (Dion, 1973; Terry, 1990). Female college students further see spectacle wear as a detriment to their own beauty (Dion, 1973) and show a more negative glasses effect than their male peers when considering their appearances. Therefore, while spectacle wear does have a greater effect on the self-concept of young adult females than young adult males, wear does not show a significantly more negative self-image (Harris, 1991).

Glasses do not play a significant role in the self-concepts of eight- to fourteen-year-olds, especially for the females in the group (Lyon, 2002). In addition, when preteens switch from glasses to contact lenses, they do not present a significant change in their overall self-concept (Dias, 2005; Terry, 1997; Walline, 2009), even though they judge themselves to be more competent when playing sports (Dias, 2005; Rah, 2010; Walline, 2009), more comfortable about their appearance (Rah, 2010; Walline, 2009) and better accepted socially (Walline, 2009).

1.4 Studies of others based on appearance

Humans are born with facial recognition centers in the cortex of their brains. Facial appearance, especially the eyes, form an elemental role in children’s facial concepts (R. L. Terry, 1993). Infants are familiar with these prototypes (Goren, 1975; Haith, 1977), and preschoolers can reliably discriminate differences in facial attractiveness (Dion, 1973). Features involving the
eyes, including an eye turn or spectacles, warrant research into how one perceives subjects as a whole person based on ocular characteristics as differences may be detrimental to educational experiences (Negrel, 2000; Uretmen, 2003), employment opportunities (Coats, 2000), and victimization of bullying (Horwood, 2005).

1.4.1 Strabismus

Other than for spectacle wearers, perceptions of persons with strabismus have also been studied. One study using photographs attached to resumes for potential job interviews found strabismic females as having less of a chance of obtaining management-level employment (Coats, 2000). Elementary teachers answered a survey by stating that they hold preconceptions about the abilities of strabismic children by assigning classroom responsibilities to “normal” children (Uretmen, 2003). A study involving watching three- to seven-year-olds play with strabismic dolls revealed that children become aware of a difference about the dolls’ eyes at the age of 4.5 years and that they develop a negative attitude toward strabismus at the age of 5.75 years (Paysse, 2001). Conversely, another study with children found that three- to eight-year-olds do not consider an eye turn when choosing a playmate (Johns, 2005).

1.4.2 Spectacles on adults

Many studies have been performed to report how adults view other adults who wear glasses and the judgments made about personalities and characteristics of the wearers. Most often, spectacle wearers were believed to appear as being more intelligent (Boshier, 1975; Harris, 1991; Knoll, 1978; Manz, 1968; Roger L Terry, 1993). Other qualities included appearing
more dependable (Harris, 1991; Knoll, 1978; Manz, 1968), more industrious (Knoll, 1978; Manz, 1968), more honest (Knoll, 1978), more trustworthy with others’ money (Manz, 1968), and friendlier (Harris, 1991). Another attribute was that spectacle wearers may appear as less attractive (Knoll, 1978). Other potentially negative effects of eyeglasses that have been reported are seeming shy (Terry, 1989b), introverted (Terry, 1989b), and less assertive (Roger L Terry, 1993).

Many of the characteristics varied with the gender of the spectacle wearer, but both genders experienced a glasses effect. Males received some of the negative effects but also many positive effects from spectacle wear (Terry, 1989b) such as appearing artistic, slender, and better looking (Terry, 1989a). Females primarily received the negative effects (Terry, 1989b), such as appearing far more timid (Harris, 1991; Terry, 1989a). Women described other women as being less attractive in glasses, but men viewed women in glasses as being more attractive and sexier than women without glasses (Harris, 1991). Perhaps the adage, “Men who wear glasses don’t make passes at women who wear glasses,” is only true from a female’s perspective.

1.4.3 Spectacles on children

The beliefs of adults are reflected in the development of children’s beliefs, including stereotypes about people who wear glasses (R. L. Terry, 1993). Children are capable of meaningfully differentiating abilities in cognition, social interactions with peers, physical activities and general self-worth (Harter, 1982). Preschoolers have been observed being more friendly towards attractive peers (Dion, 1974). Studies of first- and third-graders indicated that
they judged children wearing glasses as having more negative characteristics, especially girls who wear glasses. These students described spectacle wearing children as being meaner, worse looking, and funnier looking (Terry, 1991).

In another study of first-graders, the low- and mid-cognitive ability students (as labeled by their teachers), did not presume a glasses effect in making judgments about their peers. However, the higher-cognitive first-graders held a generally negative glasses belief, judging peer spectacle wearers as less attractive (especially the girls), poorer at school, and less well-behaved. They did view boys with glasses as less friendly and girls with glasses as friendlier. The authors hypothesized that one reason for the negative perceptions could be that many younger children who wear glasses have not only vision problems but also additional developmental delays (R. L. Terry, 1993).

One recent study, The Children’s Attitudes about Kids in Eyeglasses (CAKE) Study, had six- to ten-year-olds view photograph pairs and complete surveys to determine if spectacles affect their perceptions about their peers. Results indicated that glasses made children appear smarter and slightly more honest to their peers, but glasses had no effect on who they wanted to play with and who looked better at playing sports, more shy, or nicer. In addition, CAKE determined that boys looked better at playing sports to both boys and girls, and boys and girls want to play with kids of their same gender (Walline, 2008).
1.5 Purpose of this study

Previous studies looked at the judgments of spectacle wearers made by adults, young college students, and children, however none have considered the thoughts of preteens, ages eleven to fourteen years. Eleven- to fourteen-year-olds are important to evaluate because myopia prevalence increases and self-esteem transforms in the face of changing social interactions for these individuals. For whatever reason, many young students refuse to wear their glasses when in school, and it may be beneficial to know if their concerns about peer reactions are founded. The Tweens’ Attitudes about Peers in Eyeglasses (TAPE) Study was conducted to determine whether or not spectacle wear of peers affects tweens’ perceptions about their peers.
Chapter 2: Methods

The TAPE study adhered to the tenets of the Declaration of Helsinki and received approval of The Ohio State University Biomedical Institutional Review Board. A parent or guardian gave written informed consent, and written child assent was obtained from all study participants (referred to as subjects in this report). Additional consent was obtained from a parent or guardian of the photographed children (referred to as peers in this report) for the use of the child’s photographs in this study and any publications resulting from this study.

The overall design of this study was based on a previous study, CAKE, involving six- to ten-year-olds and having them view pairs of photographs and make judgments about personality characteristics of the children in the pictures (Walline, 2008). Changes were made to have the photographs shown to classrooms of tweens to more quickly obtain a large subject population. For ease of viewing, a PowerPoint presentation was created instead of a binder of picture pairs. Also, the question of whom the subjects preferred to play with was changed to “hang out” to make it more age appropriate, and two questions were added about appearances, a common concern of tweens (Rah, 2010; Silbert, 2009; Walline, 2009): “better looking” and “looks more nerdy.”
2.1 Creating the photographs

Twelve tweens and teens were photographed for use with the survey. Two males and two females each of African-American, Caucasian, and Far East Asian descent were chosen. All photographed children were recruited from the patient reception desk at The Ohio State University Optometry Services as patients, or family members of patients, and were unknown to the study subjects.

The children were photographed from the shoulders up with a digital camera positioned four feet in front of the child. Photographs were taken with the children looking straight ahead and expressionless. One photograph was taken with the child not wearing spectacle correction, and one was taken while wearing a pair of glasses of their choice. Children who were not already wearing a pair of glasses were allowed to pick out a spectacle frame from the Eyewear Gallery at The Ohio State University College of Optometry. The spectacles were digitally moved from the picture of the child wearing spectacles and placed on the child not wearing spectacles in order to create a pair of identical photographs of each student both wearing and not wearing their eyeglasses. The photographs were then further cropped to make the details of the eyes more easily visible (Figure 2.1).

Pairs of photographs were then arranged into a PowerPoint presentation with each child presented in four comparisons: twice while wearing glasses, and twice without glasses. The same children were paired with and without spectacles so that if a particular student chose a picture based on characteristics of the child other than spectacle wear (i.e., hair, clothing, facial
features), those choices would be negated given the even number of pairings, with and without glasses, for each child.

The presentation consisted of 24 picture comparisons with each pair being of a male and female, two different ethnicities, and only one child wearing spectacles (Appendix A). These three variables randomly appeared on either the left or right side of the slides (Figure 2.2). The pairings are listed in Table 2.1.

2.2 The questionnaire

Subjects were surveyed using a questionnaire (Figure 2.3) that first asked them to identify their personal background characteristics of age, gender, spectacle status, race, and spectacle status of family members. The questionnaire then asked the subjects to indicate their preferences for the following eight qualities of the children in each of the 24 comparisons:

Which child...

1) would you rather hang out with,
2) looks smarter/more intelligent,
3) looks better at playing sports,
4) do you think is better looking,
5) looks more shy,
6) looks more honest,
7) looks nicer/more approachable, and
8) looks nerdier?
2.3 Viewing the presentation

The subjects in this study consisted of 97 tweens between the ages of 11 and 14 years. At the time of the study, all subjects were sixth-, seventh-, and eighth-graders at Saint Brigid of Kildare School, a private, Catholic school in Dublin, Ohio, USA.

The PowerPoint slideshow was shown individually to six classrooms of 12 to 22 students each. Administration of the surveys was done during part of a class period, and students who chose not to participate or who did not have signed permission slips were sent to study hall in the library.

Each pair of photographs was presented for one-and-a-half minutes while the students looked at the pairs and completed the survey indicating which child they preferred for each of the comparisons. Any student who felt uncomfortable with a question had the option of leaving the response unanswered.

2.4 Statistical analyses

Data were entered into a Microsoft Excel spreadsheet and further analyzed using PASW software. Independent models were formed for each of the eight questions.

The primary aim was to investigate the probabilities of the subjects having chosen peers wearing glasses. In addition, the study considered whether or not a student may have based this decision on one’s own characteristics, i.e., whether or not the students chose a child who had
the same characteristics as him- or herself. The background information included the subject’s gender and spectacle status.

The probabilities for each of the eight questions were calculated for each of the 97 subjects. Further analysis of Z-scores was used to determine a 95% confidence interval for each subject. The individual values were then averaged and compared to the probability of chance, 0.50. Each modeled outcome was binary, and, therefore, chance of occurrence was modeled for each case with a 95% confidence interval for the true chance of occurrence. Significant preferences for a particular variable were only considered valid if the confidence band was entirely above or below 0.50. In subpopulation comparisons, differences were considered significant if the subgroup’s confidence band did not overlap with the band for the confidence interval for the overall population of 97 subjects.
Figure 1: Cropped, identical photograph pair with and without spectacles (after editing).
Comparison #1

Figure 2: Example of a picture comparison being of a male and female, two different races, and only one child wearing spectacles.
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<th>Peer B</th>
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<td>African-American male 1, no glasses</td>
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<tr>
<td>2</td>
<td>Caucasian male 1, no glasses</td>
<td>Asian female 1, glasses</td>
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<tr>
<td>3</td>
<td>Caucasian female 2, glasses</td>
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<td>4</td>
<td>Caucasian male 2, no glasses</td>
<td>African-American female 1, glasses</td>
</tr>
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<td>Asian female 2, glasses</td>
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<td>Asian female 1, no glasses</td>
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<tr>
<td>24</td>
<td>African-American female 1, no glasses</td>
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</tr>
</tbody>
</table>

*Table 1: Peer pairings in picture comparisons.*
Chapter 3: Results

Ninety-seven subjects between the ages of 11 and 14 years were enrolled in the study between March and May 2010. They were recruited from their homerooms at Saint Brigid of Kildare School. The average (±SD) age was 12.7 ±0.9 years, and 39 (40.2%) of the subjects were female. Subjects reported that 86 (88.7%) were of Caucasian descent, two (2.1%) were of Asian descent, 1 (1.0%) was of African-American descent, and 8 (8.2%) were of races other than the three represented in the photographs that were shown. As Asians and African-Americans each made up less than five percent of the total subjects, race was categorized as Caucasian, 86 (88.7%) and non-Caucasian, 11 (11.3%). Sixteen (16.5%) wore spectacle correction, and 14 (14.4%) primarily wore contact lenses for refractive correction. Seventy-one (73.2%) subjects had at least one family member requiring refractive correction (mother: 39 (40.2%), father: 49 (50.5%), sibling: 33 (34.0%)).

3.1 Spectacle wear on peers’ decisions

Does spectacle-wear of peers play a role regarding how 11-14-year-old tweens answer the eight questions presented?
The average probability (and 95% confidence interval) of picking a peer who wears glasses for each of the eight questions is shown in Figure 3.1. Spectacle wear did not play a role in deciding “who to hang out with” or “who is better looking.” Subjects did choose the spectacle wearer more often than chance (0.50) when asked, “Which child looks smarter?,” “... more shy?,” “...more honest?,” “...nicer?,” and “...more nerdy?” They more often selected the non-spectacle wearer when asked, “Which child looks better at playing sports?”

3.2 Characteristics of the subject

Do characteristics of the tween choosing affect whether or not he/she chooses the spectacle wearer?

Characteristics of the tweens which may have had an effect on their decision making were also considered, specifically age, gender, race, their own refractive correction, and whether their mother, father and siblings wore spectacles. Significant differences in characteristics are those in which the confidence intervals do not overlap with the bands of the total subject population. Gender and refractive correction of family members did not have a significant effect on the subjects’ answers to the questionnaire.

3.2.1 Age

The eleven-year-olds chose the spectacle wearers more often than the older subjects when deciding who “to hang out with,” “who is better looking,” and who appears “nicer.” The fourteen-year-olds placed less emphasis on spectacle wear when deciding who “looked better at playing sports.” (Table 3.1)
3.2.2 Refractive correction of subject

Subjects who wore spectacles showed a stronger preference for the spectacle wearer when considering who “looks smarter” and appears “nicer.” The subjects who primarily wore contact lenses or had no correction did not show a significant difference in answers to the questionnaire. (Table 3.2)

3.2.3 Race

Tweens of minority descent chose the spectacle wearer more often than Caucasians when asked “Who looks more shy?” and “Who looks more nerdy?” (Table 3.3)

3.2.4 Refractive correction of family members

If family members of tweens wear spectacles, family wear does not significantly influence the subjects’ decisions as the confidence interval do overlap those of the total population. However, it should be noted that when fathers of the subjects wear glasses, the confidence interval for these subjects’ choices no longer includes chance, indicating that they would be more likely to “hang out” with spectacle wearers. When mothers or siblings wear glasses, the confidence intervals for subjects choices now includes chance, indicating that spectacle wear has no bearing on who they believe “looks better at playing sports.” Also, a similar pattern is indicated if any family member wears glasses, showing that the confidence intervals would no longer identify spectacle wearers as looking “more shy.” (Table 3.4)
3.3 Similar characteristics between tweens and peers

*Do females pick females and do males pick males?*

The role of gender similarities was also compared, regardless of spectacle wear. For all questions, a preference was shown for one gender over another. Overall, both males and females agreed that females were statistically “smarter,” “more shy,” “more honest,” “nicer,” and “more nerdy” (Table 3.5); males were more likely chosen to “hang out” with, look “better at playing sports” and were “better looking” (Table 3.6).

However, two differences are noticed when dividing the tweens responses by gender. Both genders also indicated that females are nicer, but females were significantly more likely to choose another female (Table 3.7). Individually, females wish to “hang out” with other females and males with males (Tables 3.7 and 3.8).

3.4 Peer popularity

*Were some of the children in the pictures chosen more often than other kids in the pictures?*

In order to rule out whether or not the “popularity” of some children influenced the choice of tweens and potentially biased the results, the frequency (with 95% confidence intervals) of how often each child was chosen was determined (shown on Table 3.9). Only four of the twelve peers were chosen with a frequency rate that included chance. Four peers, three males and one female, were picked less often than chance alone, and four peers, one male and three females, were picked more often.
3.5 Skipped questions

Whenever a subject was uncomfortable answering a question to a particular comparison, the student was allowed to skip the question. None of the 97 subjects answered all 192 items. The question asking “Which child looks smarter?” was answered by the most subjects, yet only 77 of them answered the item in all of the 24 comparisons. The question, “Which child looks better at playing sports?” was only answered in all 24 of the comparisons by five of the subjects. The frequency of how often students skipped one of the eight questions is indicated (within a 95% confidence interval) on Table 3.10. The two questions, “Which child looks better at playing sports?” and “Which child do you think is better looking?” were skipped by the subjects by an average of more than five percent of the time. Two students skipped the better looking question entirely, and one other subject answered the better looking question in only one of the comparisons.
Figure 3: Probability and confidence band of tweens having chosen the spectacle wearer. Significant findings are those where the confidence bands do not cross/touch the 0.50 probability (chance).
Table 2: Probability and confidence band of tweens having chosen the spectacle wearer based on the subjects’ ages. Bold indicates probabilities and intervals that are significantly different from those of the total subject population.

<table>
<thead>
<tr>
<th>Which child...</th>
<th>Age</th>
<th>Probability of choosing spectacle wearer</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>...would you rather hang out with?</td>
<td>11</td>
<td>0.56</td>
<td>0.55, 0.57</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>0.49</td>
<td>0.48, 0.50</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>0.51</td>
<td>0.50, 0.52</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>0.51</td>
<td>0.50, 0.52</td>
</tr>
<tr>
<td>...looks better at playing sports?</td>
<td>11</td>
<td>0.45</td>
<td>0.43, 0.47</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>0.48</td>
<td>0.47, 0.49</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>0.48</td>
<td>0.47, 0.49</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>0.50</td>
<td>0.50, 0.51</td>
</tr>
<tr>
<td>...do you think is better looking?</td>
<td>11</td>
<td>0.60</td>
<td>0.55, 0.64</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>0.51</td>
<td>0.50, 0.52</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>0.49</td>
<td>0.47, 0.50</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>0.51</td>
<td>0.50, 0.52</td>
</tr>
<tr>
<td>...looks nicer?</td>
<td>11</td>
<td>0.58</td>
<td>0.55, 0.60</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>0.55</td>
<td>0.53, 0.56</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>0.54</td>
<td>0.53, 0.55</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>0.55</td>
<td>0.53, 0.56</td>
</tr>
</tbody>
</table>

Table 3: Probability and confidence band of tweens having chosen the spectacle wearer based on the subjects’ own spectacle wear status. Bold indicates probabilities and intervals that are significantly different from those of the total subject population.

<table>
<thead>
<tr>
<th>Which child...</th>
<th>Refractive correction</th>
<th>Probability of choosing spectacle wearer</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>...looks smarter?</td>
<td>Glasses</td>
<td>0.65</td>
<td>0.63, 0.67</td>
</tr>
<tr>
<td></td>
<td>Contact lens</td>
<td>0.62</td>
<td>0.60, 0.64</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>0.56</td>
<td>0.54, 0.58</td>
</tr>
<tr>
<td>...looks nicer?</td>
<td>Glasses</td>
<td>0.57</td>
<td>0.56, 0.59</td>
</tr>
<tr>
<td></td>
<td>Contact lens</td>
<td>0.55</td>
<td>0.53, 0.56</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>0.54</td>
<td>0.53, 0.55</td>
</tr>
</tbody>
</table>
### Table 4: Probability and confidence band of tweens having chosen the spectacle wearer based on the subjects’ race. Bold indicates probabilities and intervals that are significantly different from those of the total subject population.

<table>
<thead>
<tr>
<th>Which child…</th>
<th>Race</th>
<th>Probability of choosing spectacle wearer</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>...looks more shy?</td>
<td>Caucasian</td>
<td>0.52</td>
<td>0.50, 0.53</td>
</tr>
<tr>
<td>...looks more nerdy?</td>
<td>Minority</td>
<td>0.56</td>
<td>0.56, 0.57</td>
</tr>
<tr>
<td>...looks more shy?</td>
<td>Caucasian</td>
<td>0.56</td>
<td>0.55, 0.58</td>
</tr>
<tr>
<td>...looks more nerdy?</td>
<td>Minority</td>
<td>0.64</td>
<td>0.60, 0.67</td>
</tr>
</tbody>
</table>

### Table 5: Probability and confidence band of tweens having chosen the spectacle wearer based on the family members’ spectacle wear. Note that while, none of the sub groupings had a significant enough difference from the original data, some confidence bands are different enough to include/not include chance, 0.50, indicated in bold.

<table>
<thead>
<tr>
<th>Which child…</th>
<th>Refractive correction of family members</th>
<th>Probability of choosing spectacle wearer</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>...would you rather hang out with?</td>
<td>Mother</td>
<td>0.50</td>
<td>0.49, 0.52</td>
</tr>
<tr>
<td>...looks better at playing sports?</td>
<td>Father</td>
<td>0.52</td>
<td>0.51, 0.53</td>
</tr>
<tr>
<td>...looks more shy?</td>
<td>Sibling</td>
<td>0.49</td>
<td>0.48, 0.51</td>
</tr>
<tr>
<td>...looks better at playing sports?</td>
<td>Mother</td>
<td>0.49</td>
<td>0.48, 0.50</td>
</tr>
<tr>
<td>...looks more shy?</td>
<td>Father</td>
<td>0.48</td>
<td>0.47, 0.49</td>
</tr>
<tr>
<td>...looks more shy?</td>
<td>Sibling</td>
<td>0.49</td>
<td>0.48, 0.50</td>
</tr>
<tr>
<td>...looks more shy?</td>
<td>Mother</td>
<td>0.52</td>
<td>0.50, 0.53</td>
</tr>
<tr>
<td>...looks more shy?</td>
<td>Father</td>
<td>0.52</td>
<td>0.50, 0.53</td>
</tr>
<tr>
<td>...looks more shy?</td>
<td>Sibling</td>
<td>0.51</td>
<td>0.50, 0.53</td>
</tr>
<tr>
<td>Which child...</td>
<td>Probability of choosing</td>
<td>95% Confidence interval</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------</td>
<td>-------------------------</td>
<td></td>
</tr>
<tr>
<td>...would you rather hang out with?</td>
<td>0.39</td>
<td>0.35, 0.44</td>
<td></td>
</tr>
<tr>
<td>...looks smarter?</td>
<td><strong>0.65</strong></td>
<td><strong>0.62, 0.67</strong></td>
<td></td>
</tr>
<tr>
<td>...looks better at playing sports?</td>
<td>0.19</td>
<td>0.16, 0.21</td>
<td></td>
</tr>
<tr>
<td>...do you think is better looking?</td>
<td>0.44</td>
<td>0.40, 0.48</td>
<td></td>
</tr>
<tr>
<td>...looks more shy?</td>
<td><strong>0.71</strong></td>
<td><strong>0.68, 0.73</strong></td>
<td></td>
</tr>
<tr>
<td>...looks more honest?</td>
<td>0.67</td>
<td>0.64, 0.70</td>
<td></td>
</tr>
<tr>
<td>...looks nicer?</td>
<td>0.60</td>
<td>0.57, 0.63</td>
<td></td>
</tr>
<tr>
<td>...looks more nerdy?</td>
<td>0.67</td>
<td>0.64, 0.69</td>
<td></td>
</tr>
</tbody>
</table>

**Table 6:** Probability and confidence band of tweens having chosen the female. Bold indicates significantly favorable probabilities/intervals when compared to chance, 0.50.

<table>
<thead>
<tr>
<th>Which child...</th>
<th>Probability of choosing</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>...would you rather hang out with?</td>
<td>0.61</td>
<td>0.56, 0.65</td>
</tr>
<tr>
<td>...looks smarter?</td>
<td>0.35</td>
<td>0.33, 0.38</td>
</tr>
<tr>
<td>...looks better at playing sports?</td>
<td><strong>0.81</strong></td>
<td><strong>0.79, 0.84</strong></td>
</tr>
<tr>
<td>...do you think is better looking?</td>
<td><strong>0.56</strong></td>
<td><strong>0.53, 0.60</strong></td>
</tr>
<tr>
<td>...looks more shy?</td>
<td>0.29</td>
<td>0.27, 0.32</td>
</tr>
<tr>
<td>...looks more honest?</td>
<td>0.33</td>
<td>0.30, 0.36</td>
</tr>
<tr>
<td>...looks nicer?</td>
<td>0.40</td>
<td>0.37, 0.43</td>
</tr>
<tr>
<td>...looks more nerdy?</td>
<td>0.32</td>
<td>0.29, 0.34</td>
</tr>
</tbody>
</table>

**Table 7:** Probability and confidence band of tweens having chosen the male. Bold indicates significantly favorable probabilities/intervals when compared to chance, 0.50.
<table>
<thead>
<tr>
<th>Which child...</th>
<th>Gender</th>
<th>Probability of choosing females</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>...would you rather hang out with?</td>
<td>Female</td>
<td>0.56</td>
<td>0.52, 0.60</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>0.28</td>
<td>0.25, 0.31</td>
</tr>
<tr>
<td>...looks nicer?</td>
<td>Female</td>
<td>0.67</td>
<td>0.64, 0.70</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>0.55</td>
<td>0.52, 0.58</td>
</tr>
</tbody>
</table>

**Table 8:** Probability and confidence band of tweens having chosen the female based on the subjects’ gender. Bold indicates probabilities and intervals that are significantly different from those of the total subject population.

<table>
<thead>
<tr>
<th>Which child...</th>
<th>Gender</th>
<th>Probability of choosing own gender</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>...would you rather hang out with?</td>
<td>Female</td>
<td>0.56</td>
<td>0.53, 0.60</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>0.72</td>
<td>0.69, 0.75</td>
</tr>
</tbody>
</table>

**Table 9:** Probability and confidence band of tweens having chosen a peer of their own gender.
### Table 10: Probability and confidence band of tweens having chosen an individual peer. Bold indicates significant probabilities/intervals when compared to chance, 0.50.

<table>
<thead>
<tr>
<th>Which child... (in order of appearance)</th>
<th>Probability the peer was chosen</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian female 1</td>
<td>0.49</td>
<td>0.46, 0.51</td>
</tr>
<tr>
<td>African-American male 1</td>
<td>0.34</td>
<td>0.32, 0.37</td>
</tr>
<tr>
<td>Caucasian male 1</td>
<td>0.39</td>
<td>0.36, 0.41</td>
</tr>
<tr>
<td>Asian female 1</td>
<td>0.63</td>
<td>0.61, 0.66</td>
</tr>
<tr>
<td>Caucasian female 2</td>
<td>0.39</td>
<td>0.37, 0.41</td>
</tr>
<tr>
<td>Asian male 1</td>
<td>0.55</td>
<td>0.52, 0.57</td>
</tr>
<tr>
<td>Caucasian male 2</td>
<td>0.34</td>
<td>0.32, 0.36</td>
</tr>
<tr>
<td>African-American female 1</td>
<td>0.50</td>
<td>0.47, 0.52</td>
</tr>
<tr>
<td>Asian female 2</td>
<td>0.58</td>
<td>0.55, 0.60</td>
</tr>
<tr>
<td>African-American male 2</td>
<td>0.51</td>
<td>0.48, 0.53</td>
</tr>
<tr>
<td>Asian male 2</td>
<td>0.52</td>
<td>0.50, 0.55</td>
</tr>
<tr>
<td>African-American female 2</td>
<td>0.57</td>
<td>0.54, 0.59</td>
</tr>
</tbody>
</table>

### Table 11: Probability and confidence band of tweens skipping an item.

<table>
<thead>
<tr>
<th>Which child...</th>
<th>Probability item was skipped</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>...would you rather hang out with?</td>
<td>0.047</td>
<td>0.034, 0.061</td>
</tr>
<tr>
<td>...looks smarter?</td>
<td>0.011</td>
<td>0.006, 0.015</td>
</tr>
<tr>
<td>...looks better at playing sports?</td>
<td>0.052</td>
<td>0.045, 0.058</td>
</tr>
<tr>
<td>...do you think is better looking?</td>
<td>0.070</td>
<td>0.038, 0.100</td>
</tr>
<tr>
<td>...looks more shy?</td>
<td>0.016</td>
<td>0.090, 0.023</td>
</tr>
<tr>
<td>...looks more honest?</td>
<td>0.027</td>
<td>0.013, 0.040</td>
</tr>
<tr>
<td>...looks nicer?</td>
<td>0.033</td>
<td>0.019, 0.047</td>
</tr>
<tr>
<td>...looks more nerdy?</td>
<td>0.040</td>
<td>0.021, 0.059</td>
</tr>
<tr>
<td>Overall totals</td>
<td>0.042</td>
<td>0.030, 0.054</td>
</tr>
</tbody>
</table>
Chapter 4: Discussion

According to this study, tweens between the ages of 11 and 14 years will often consider a peer’s spectacle wear when making judgments about him or her. They do not, however, typically make judgments based on peers’ spectacle wear when deciding whether to hang out with him/her or who is better looking. Judgments by tweens also follow gender roles.

4.1 Spectacle Wear

These findings indicate that tweens judge their peers based on spectacle wear when making decisions on their peers’ intelligence, athletic ability and personality.

4.1.1 Spectacles and Intelligence

The most significant result was that subjects indicated that spectacles made the wearer look smarter (understood to mean more intelligent rather than more stylish here in the United States). Previous studies confirm this same finding in adults (Boshier, 1975; Harris, 1991; Knoll, 1978; Manz, 1968; Terry, 1990; R. L. Terry, 1993) and younger children (Walline, 2008). Other studies have claimed an association between myopia and higher intelligence (Ostrow, 2010; Rosner, 1987). This theme is consistent throughout both genders, all age groups, Caucasian or minority race, and whether or not the subjects or their family members wear glasses or contact
lenses. In fact, subjects who wore spectacles judged their spectacle-wearing peers as significantly smarter than as judged by the non-spectacle-wearing subjects, which is also reflected by how spectacle-wearing college students see themselves (Harris, 1991). The stereotype of persons in glasses being smarter than others has not been formally tested, but tweens indicate that they have assimilated the thought into their own attitudes. It could be from media portrayals or other outside, personal influences that tweens believe that spectacles wearers are smarter, but regardless of where the notion originates, tweens thoughts are in agreement of those from a similar study with younger children (Walline, 2008). The idea of glasses making people appear smarter is formed at a young age and maintained into adolescence.

Along with spectacle-wearers appearing smarter, tweens hold the notion that their peers who wear glasses are also “nerdier.” Other than teenagers not wanting to appear nerdy in glasses and preferring to wear contact lenses (Silbert, 2009), no known studies have specifically used this term to describe spectacle wearers. The manifestation of this stereotype is unknown, yet may again reside in personal experiences or media influence (think Jacob Ben Israel, played by Josh Sussman on the television show Glee). It is also interesting to note that the probabilities for looking “smarter,” and for looking “more nerdy” are not equal. Often nerds are considered some of the smartest kids in school, but to tweens, a peer’s apparent nerdiness must include other factors of the peer’s personality than merely bookish intelligence.
4.1.2 Spectacles and personality

Tweens indicated in this study that they see peers who wear glasses as being more shy, more honest, and nicer. Similar personal attributes—such as timidity (Harris, 1991; Terry, 1989b), kindness (Terry, 1989b), less adept at social interaction (Reis, 1982; R. L. Terry, 1993), and dependability, industriousness, and honesty with money (Manz, 1968), were viewed to also be present in adults who wear spectacles. Younger children either showed no glasses effect for being shy or nice (Walline, 2008), or they considered spectacle-wearing peers to be less friendly and less nice (R. Terry, 1993). At some point, yet to be studied, children begin to view spectacle-wearers as having the diminished forcefulness seen in adults (R. L. Terry, 1993). It could be that as children who wear glasses are more likely to be victims of physical or verbal bullying (Horwood, 2005), tween subjects see their spectacle-wearing peers as being easier targets or as needing protecting. Either way, these peers are viewed as being gentler of spirit.

An interesting result is that, while the spectacle-wearing status of subjects’ family members did not change the significance of personality decisions, the confidence intervals for shyness included chance and, if judged separately, would indicate that to those whose family members wear glasses, spectacles are not a point of consideration when evaluating this potentially negative characteristic of peers. A similar view is indicated from subjects with siblings; they no longer consider spectacles when deciding who looks better at playing sports. This is consistent with the prediction that, “having prior experiences with people who wear glasses might be expected to ameliorate a negative glasses effect (R. Terry, 1993).”
4.2 Gender

As a balance, this study also compared the tweens’ decision-making based on the gender of peers chosen, and the tween subjects showed a definite bias toward gender in making decisions about their peers. Both males and females picked females as smarter, more shy, more honest, nicer, and nerdier. Males were chosen as appearing better at playing sports and more attractive. Yet, when it comes to with whom a tween would rather hang out, females chose females, and males chose males.

4.2.1 Female personality

Both male and female subjects believed that females were smarter, more shy, more honest, nicer, and nerdier. This is consistent with other studies of young people. Females were viewed as “good, nice, generous, pleasant, dependable, [and] honest” in a study of sixth- to eighth-graders, and younger girls were shown to be more shy and withdrawn (Walker, 2005). Although this may not be associated with spectacle wear, it does lend credence to the validity of the study, due to consistency with studies of gender roles.

4.2.2 Male personality

Both male and female subjects believed that males were better looking and decidedly appear to look better at playing sports. Younger children also held strong opinions that boys look better playing sports (Walline, 2008) in a similar study. A previous study concluded that adolescents hold gender stereotypes when it comes to sports (Alley, 2005). These findings all confirm that the stereotype that males are better athletes than females begins at a young age.
4.2.3 Similar gender

The only survey item divided by gender was with whom tween subjects wanted to hang out. Females want to hang out with females, and males with males. Gender is not a factor in making decisions about spectacle wear as the spectacle wearer was equally balanced between male and female. If subjects were choosing their own gender in the majority of the comparisons, then the peers wearing glasses and not wearing glasses would balance in the final totals.

The literature indicates previous documentation of these findings in younger children (Alexander, 1994; R. Terry, 1993; Walline, 2008) who choose to play with other children of their same gender. Neither spectacle wear (Walline, 2008) nor an eye turn (Johns, 2005) are factors when determining who to play with as children tend to choose peers with similar play styles (Alexander, 1994). Also, when choosing friends subjects may be considering more than just the appearance of a peer as, “selecting a friend involves relatively complicated social judgment (R. Terry, 1993).”

4.3 Potential limitations

In this study, the presentation included equal proportions of gender, race, and spectacle wear. However, the tween subject population was not as equally distributed in any of these three characteristics. For example, data sorted by gender showed that females wish to hang out with females and males with males, but Tables 3.5 and 3.6 indicated that tweens overall would rather hang out with males. The number of males in this study outnumbered females enough to sway that overall result with a bias toward males. The lack of minority subjects prevented being
able to fully evaluate the role of race in the attitudes of tweens about their peers. The decision to survey subjects in a classroom environment made for efficient data collection from multiple students, but further investigation of a more diverse sample would make the results more generalizable.

Subjects may have also shown a potential bias toward or against glasses wear if they had been thinking about it for a couple of days. Parents were informed of the purpose of the study prior to giving consent, and some families discussed the study at home. Also, subjects who were surveyed on the second day had heard about the study from schoolmates who had participated on the first day. However, after completion of the survey, many subjects indicated that they considered clothing, hairstyles, and other aspects of the peers when choosing their responses.

The “popularity” of the peers that were photographed varied widely, ranging from 34% of the time to 63% of the time. Although popularity may influence who was chosen overall, it is unlikely to affect the choice of spectacle wear because every peer was shown four times, twice while wearing glasses and twice without glasses. Many of the female peers were more popular than the males. However, many of the questions asked were more traditionally identified as feminine traits. If the study is repeated, further vetting of the peers to compare only those with similar popularities will be necessary prior to presentation of the pairs of pictures.

None of the subjects completed all 192 items of the questionnaire. While some answered more questions than others, each of the eight characteristics was skipped by more than one student. Two of the subjects did not answer any of the items referring to which peer
was better looking. It is not known whether they were uncomfortable making a decision based on the appearance of their peers in the photographs, or if the discomfort came from choosing between opposite genders, comparing races, or another factor. Further analysis into why subjects skipped certain items could prove interesting.

Additional analysis of the data could also further examine the interactions between spectacle wear and gender. Current analysis is limited to binary comparisons, yet it may be beneficial to consider controlling for gender when looking at the role of spectacle wear of peers and vice versus – especially as the probability of many gender judgments are higher than those of the spectacle-wear judgments.
Chapter 5: Conclusions

In this study, tweens indicated that spectacle wear of their peers does influence their attitudes on judgments made about those peers. The tweens also have strong attitudes about the gender roles of their peers.

1) Tweens believe peers appear to be smarter, more shy, more honest, nicer, and more nerdy when wearing glasses.

2) Tweens think peers appear to look better at playing sports when not wearing glasses.

3) Tweens who wear glasses significantly consider spectacle-wearing peers to appear smarter and nicer as compared to tweens who do not wear glasses.

4) Minority tween subjects significantly deem spectacle-wearing peers as being more shy and more nerdy than the judgments made by Caucasians.

5) Neither the gender of the subjects nor the spectacle-correction status of their family members has a significant effect on the attitudes about spectacle-wearing peers.

6) Regardless of the gender of the subject choosing, tweens judge female peers to appear smarter, more shy, more honest, nicer, and more nerdy; males appear better at playing sports and better looking.
7) Female tweens prefer to hang out with females, and male tweens prefer to hang out with males.
Appendix: PowerPoint presentation of comparisons

Comparison #1

A

B
Comparison #2

A

B

Comparison #3

A

B
Comparison #6

A

B

Comparison #7

A

B
Comparison #12

A

B

Comparison #13

A

B
Comparison #16

A

B

Comparison #17

A

B
Comparison #24

A

B

Thank You!

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References


