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Keywords
Eyeglasses; Hearing aids; Impression formation

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Impression Formation of Male and Female Millennial Students Wearing Eye Glasses or Hearing Aids

First impressions are formed quickly, within milliseconds (ms) of exposure. Willis and Todorov (2006) found that only a brief exposure to a face was needed to make specific trait inferences, and research has demonstrated bias in judgments, stereotypes, and expected behaviors based on brief exposure. People make very quick judgments about another’s intelligence (Bar et al., 2006), emotions, personality (Mast et al., 2011), competence, trustworthiness, likeability, and attractiveness (Willis & Todorov, 2006). Therefore, the purpose of this study was to investigate perceptions of persons wearing eye glasses (hereinafter “glasses”) or hearing aids after brief exposure to images in an online survey. Because findings from existing research demonstrate that women are generally more accurate when assessing first impression accuracy (e.g., Murphy, Hall & Colvin, 2003; Vogt & Colvin, 2003) the current study also intended to investigate whether gender related to discrepancies in impression formation. The findings from this study provide further information on stigmas associated with wearing visible corrective devices (i.e., glasses, hearing aids). The identification and understanding of psychosocial factors, which may present as barriers to hearing aid and corrective lenses usage is potentially beneficial to health care professionals and related disciplines (e.g., audiology) where the aim is to treat physical impairments.

Impression Formation

Our initial impressions obviously do not reflect the complexity of each individual person, but initial evaluations are necessary for quick and coherent categorization of others, organization
of information, and making sense of our social surroundings (Bar, Neta, & Linz, 2006).

Although human character is very dynamic and complex, we most frequently use physical attributes (e.g., attractiveness, gender, ethnicity) to interpret personality traits of others (constant and temporal), and establish our overall impression of someone (Naumann, Vazir, Rentfrow, & Gosling, 2009). This assessment subsequently affects our attitudes towards others and how we will respond during the social perception process.

Extant research suggests that bias in judgments, stereotypes, and expected behaviors are based on brief exposure (e.g., Mast, Bangerter, Bulliard & Aerni, 2011). There are many studies that have investigated the relationship between facial expressions and personality judgment during impression formation (e.g., Naumann et al., 2009; Petrican, Todorov, & Grady, 2014; Vernon, Sutherland, Young, & Hartley, 2014). Willis and Todorov (2006) found that only a 100 ms exposure to a face was needed to make specific trait inferences, though increased exposure served to increase confidence in the judgment of the observer. Bar et al., (2006) found that consistent threatening personality impressions could be made in as little as 39 ms of exposure to a face with a neutral expression. These findings suggest that personality inferences from facial appearance (e.g., expressions) may be uncontrollable and automatic (Willis & Todorov, 2006).

Other studies have addressed variations in the process of impression formation between the males and females and revealed contradictory findings. Huma (2010) did not reveal differences between female and male evaluations, despite research that says females are more accurate in decoding facial expression and the perception of personality traits (e.g., Murphy et al., 2003). According to Feingold (1994), variations in person perceptions are probably due to gender differences in personality. Furthermore, gender differences may reflect basic differences in the acquisition and use of nonverbal codes made by females and males (Riggio & Freidman,
Another study (Hack, 2014) maintains that gender stereotypes and expectations also influence our impression of personality traits in others. For example, smiling women are rated more favorably on traits related to warmth compared to males (Hack, 2014). Because of gendered trait expectations, one could surmise that participants will form different impressions about female targets wearing a hearing aid or glasses compared to male targets wearing a hearing aid or glasses.

**Implicit Personality Theory**

Social cognition refers to the manner in which people process, remember, and use information in social contexts in order to make sense of others’ behavior. In our perception of others, we utilize many accessible factors, such as body language, facial appearance, and clothing to formulate a complete picture of someone (Hack, 2014; Riggio & Friedman, 1986; Schneider, 1973; Willis & Todorov, 2006). During the process of assessment and evaluation we even construct ideas about a person’s personality traits. As perceivers, we believe that a person’s appearance is consistent with, or is metaphorical for, personality attributes (Crisp & Turner, 2014; Kaiser, 1985).

Implicit personality theory, introduced by Bruner and Tagirui (1954) describes heuristic assumptions about the presumed relationships among traits/attributes of people, or a set of assumptions about why people behave the way they do (Jackson, Chan, & Strickler, 1978; Schneider, 1973). Assumptions about personality are achieved by recognizing specific patterns through experiences across various contexts, and then determining which characteristics co-occur. People frequently categorize and form impressions of others based on minimal information and the assumption that the relationship among traits is significant (Jackson, et al., 1978; Schneider, 1973). Despite frequent exaggerations in interpretation, implicit personality
theories are adaptive mental shortcuts that allow people to draw conclusion about others and social situations (Schneider, 1973). Implicit personality theory is sometimes controversial because the mental aggregates used to form perceptions of others (e.g., groups) are often based on insubstantial evidence, thereby reducing the assumption to nothing more than a stereotype (Kunda & Thagard, 1996). For example, a person who is nice is also perceived to be more trustworthy. Or a talkative person is automatically considered to be extroverted. A person with a disability is judged as less competent than an able-bodied person. Therefore, people may negatively evaluate particular personal attributes of individuals who wear visible corrective devices (e.g. glasses, hearing aids).

**Impression Formation, Impairment, Disorders, and Disability**

Stereotypes can bias the interpretation of other traits and behavior. Stereotypes (e.g., of disability) may affect the perceptions of others in the absence of individuating information (e.g., personality; Kunda & Thagard, 1996). Rohmer and Louvet’s (2009) research suggests that disability can be considered a superordinate social category (like ethnicity or gender) in person perception because they tend to be immediately visible. They found that people with disability (e.g., wheelchair bound) are instantaneously described by their disability. However, individuals without a disability are generally identified by their gender and/or ethnicity (Rohmer & Louvet, 2009). The salience of disability often results in negative perceptions (Robillard & Fichten, 1983). Compared to positive information, negative information is more distinct due to its rarity. Therefore, in the processing information during impression formation, the evaluation of a disabled individual is more likely to be unfavorable (Fiske, 1980).

Lease, Cohen, and Dahlbeck (2007) illustrate the importance of perceived attractiveness to others in mediating the negative relations between the impact of the disability and
interpersonal competencies. Because of societal misrepresentations (i.e., stereotypes) of disability, individuals with disabilities are often not viewed as sexually attractive as those without (Lease et al., 2004). Disability can also affect the psychological well-being of disabled individuals themselves because self-perception, is to a large extent, influenced by perceptions and behavioral expectations of others. In a sample of amputees, Rybarczyk and colleagues (1995) found that perceived social stigma made a significant contribution to depression in individuals with leg amputations. Likewise, people with invisible stigmatized identities (e.g., learning disorders/disabilities, hearing loss) are also more susceptible to negative affects (e.g., depression, low self-esteem) resulting from arbitrary judgment by others (Santuzzi, Waltz, Rupp, & Finkelstein, 2014). For example, Bickett and Milich (1990) showed that boys with learning disabilities or attention deficit disorder were devalued relative to popularity, as well as subject to negative judgments of physical attractiveness.

While visual impairment is not traditionally viewed as a conventional physical disability uncorrected refractive error (myopia) is the leading cause of visual disability among children across the world (Congdon et al., 2008; WHO, 2015). Both vision impairment and hearing loss require change in personal appearance with the addition of visible corrective devices (e.g., eyeglasses, hearing aids), which could alter people perceptions of them. Research has documented the role of dress and appearance in influencing impressions of others (e.g., McCracken, 1990; McDonald & Ma, 2015). Dress is a form of nonverbal communication that can communicate many things about the wearer and their social roles, including personality traits. Clothing style influences the perception of attractiveness when evaluating others, and impression formation studies have already established that attractive people tend to be characterized as models of agreeable personalities and even higher status (Aghaei, Parezzam,
Dimiccoli, Radeva, & Cristani, 2017). Other research has investigated the effects of formal versus casual dress of an individual on a viewer, where positive trait attributions about intelligence, expertise, and competence are credited to the more formally dressed individuals (Howlett, Pine, Orakçıoğlu, & Fletcher, 2013; Paek, 1986). In a sample of 4 and 6-year olds, adolescent participants identified a formally dressed individual as more knowledgeable than a casually dressed one (McDonald & Ma, 2015).

Impression formation and eyeglasses. Traditional research on eyeglasses, which today is considered a fashion accessory, and attribution has found that stimulus/target persons wearing glasses were rated less attractive than when the same stimulus/target persons were not wearing glasses (e.g., Terry & Kroger, 1976; Lundberg, 1994). In Terry and Kroger’s study (1976), these evaluations were particularly true when survey participants did not wear glasses or contacts themselves. A study by Leder and colleagues (2011), confirmed that the use of eyeglasses can reduce attractiveness, but perception was dependent on the type of glasses. Their study found that rimless glasses made faces appear less distinctive, but not necessarily less attractive (Leder et al., 2011). Alternatively, glasses were associated with higher rates of perceived goodness, trustworthiness, and heightened intelligence (Hellström & Tekle, 1994; Leder et al., 2011; Terry & Krantz, 1993). However, Lundberg (1994) found that ratings of intelligence were not affected by the presences of glasses on the stimulus/target person. Although wearing glasses is not as stigmatized as in the past, studies show that younger people still believe they will be subjected to teasing for wearing glasses (Yawn, Kurland, Butterfield, & Johnson, 1998). In a metanalysis of 46 studies on self-concept and vision impairment, Datta (2014) found that adolescents with vision impairment who reported feelings of social isolation and negative feedback from peers
may be at a higher risk for a poor self-confidence and a negative sense of self-competence because the perceptions of others are significant in the development of one’s self-concept.

**Impressions formation and hearing loss.** The hearing aid effect is the term used to describe the attribution of negative characteristics to a person who wears a hearing aid (Rauterkus & Palmer, 2014). Multiple studies in the past have demonstrated the hearing aid effect (e.g., Erler & Garstecki, 2002; Johnson et al., 2005), however Rauterkus and Palmer (2014) believe that the hearing aid effect is not as salient in the 21st century as it has been in previous decades. Their hearing aid effect 2014 report, however, did reveal that the assignment of negative attributes is now based on the type of hearing aid worn (e.g., a standard behind the ear hearing aid versus a completely in the canal aid; Rauterkus & Palmer, 2014). For example, they found that people wearing a behind the ear device were rated more trustworthy than an individual wearing a Bluetooth device. Johnson et al. (2005) also found more stigma associated with visible hearing devices compared with those that are semi-visible and completely invisible (e.g., completely in the canal styles).

Stigma is a fundamental factor that leads to the denial of hearing loss and rejection of hearing treatment (Dawes, Maslin, Munro, 2014; Strange, Johnson, Ryan, & Yonovitz, 2008; Wallhagen, 2009). Many adults refuse to wear a hearing aid because it is embarrassing, and they fear that it will be perceived as a sign of disability (Dawes et al., 2014; Strange et al., 2008). Researchers suggest that hearing aid wearers ultimately need to redefine their self-image before they can come to terms with the stigma of hearing loss, and also understand that shortcomings in communication are not necessarily caused by cognitive decline, but rather hearing loss (Dawes et al., 2014). In this same study (Dawes et al., 2014), some participants claimed that wearing the hearing aid positively affected their self-image by boosting their confidence, which subsequently
allowed them to participate in social situations they had been reticent to partake in prior to adopting the hearing aid.

**Purpose**

Based on the findings of previous research on disability and impression formation we examined people’s impressions of persons wearing hearing aids and glasses. The following hypotheses are proposed within the framework of the social cognitive perspective, and more specifically, implicit personality theory:

H1: A target wearing glasses will be perceived more negatively than that target not wearing glasses.

H2: A target wearing a hearing aid will be perceived more negatively than that target not wearing a hearing aid.

Given the mixed findings in the literature regarding the judgment of males and females when evaluating others, we question whether the gender of the observer would affect their assessment of a target wearing glasses or a hearing aid. Therefore, the following two questions are posed:

RQ1: Will the gender of the person making the judgment will affect their impressions of a target wearing glasses?

RQ2: Will the gender of the person making the judgment will affect their impression of a target wearing a hearing aid.

Given the lack of literature about judgements of others based on one’s personal physical sight or hearing bias, we further ask:
RQ3: Will a person who wears glasses have a more positive impression of a target wearing glasses, compared to a target not wearing glasses?¹

**Methodology**

**Instruments**

**Impression Formation.** Methodology for this study was based on Kaigler-Evans and Damhorst (1978), in which they showed photographs of 28 female university students (targets) to 28 groups of 50 study participants (1400 total study participants) and asked them to rate their impressions of the targets on 150 descriptive adjectives of personal traits. Each survey participant viewed one photograph and completed the adjective survey (5-point Likert scale) based on their impressions of the person in the photograph. The photographs in the Kaigler-Evans and Damhorst study were taken outdoors, all with similar, neutral backgrounds. No attempt was made to pose the women, except that they were all looking at the camera. “The photographs had the appearance of casual snapshots” (p. 903). Factor analysis was employed, resulting in a final list of 37 trait adjectives.

The purpose of the Kaigler-Evans and Damhorst (1978) study was to determine whether male and female subjects formed different impressions of a single target. Our purpose was to determine whether wearing glasses or a hearing aid affected an impression of a male or female target. Thus, for the present study, a questionnaire was developed ultimately using two targets (one male and one female) and the list of impression adjectives factored in the Kaigler-Evans and Damhorst study. We reduced the number of adjectives from 37 (factored) to 25 based on researcher judgment and redundancy. Further, we made one adjective change -- we changed the adjective, “chic,” to “trendy” after conversation with cohorts of the subject pool. Thus,

¹ We desired to ask the same question regarding impressions of persons wearing hearing aids by survey participants wearing hearing aids. A very low response (n=1) of survey participants wearing hearing aids made this question impractical in the present study.
participants in the present study were asked to rate their agreement with the 25 impression adjectives that described the target in the photograph on each of on a scale from 1 (disagree) to 5 (agree).

In order to limit attractiveness bias for the targets selected for the questionnaire, a pre-test was conducted to assess the impressions of attractiveness of different targets using a shortened version of Kaigler-Evans and Damhorst’s first impression scale. The targets with the most consistent results were chosen for continuation of the study (see Appendix A).

Two styles of glasses were selected for the study. One pair was light in color and, while noticeable, were not a focal point on the face (hereinafter “light”). The second pair was of a darker and bolder frame style that was much more visible on the face (hereinafter “dark”). Two styles of hearing aids were also selected for the study. Again, one style was small and almost completely concealed in the ear (hereinafter “light”) and the second style was flesh colored and larger, clearly visible to the viewer (hereinafter “bulky”). The two targets were photographed wearing each style of glasses and each style of hearing aids. Additional control pictures were also included on the survey, in which the targets were not wearing a hearing aid or glasses. For each of the survey situations, participants saw two treatments, side by side, of the target facing forward mostly and a side view of the target. Poses were manipulated in order to be sure the glasses or the hearing aids were easily visible. Backgrounds were removed from all images, and all poses were casual.

Participants

A total of 569 participants completed usable surveys, of which 72% were female and 27% were male, and 0.4% identified as Transgender; 43% identified their ethnicity as Caucasian, 23% as Hispanic, 16% as Black, 8% as Asian, and the remaining 9.4% as “other.” Ages ranged
from 17 to 56 ($M = 21, SD = 3.42$). Sixty percent of the respondents indicated they wear glasses and 0.5% indicated they wear a hearing aid.

**Results**

**Procedure and Data Analysis**

Following IRB approval, data were collected via an online-based research platform from undergraduate courses at a Southwestern U.S. university. Participants provided consent and then proceeded to the survey, which was done anonymously and took approximately fifteen minutes to complete. Because the survey was self-administered, there was no time limit. The participants received extra course credit for their participation. In order to reduce survey fatigue, four web-based surveys were deployed for data analysis. Each participant completed only one of the four surveys. Each version of the survey was identical except for the treatments in the photographs. The control photograph of the female target was included on two of the surveys, and the control photograph of the male was included on the remaining two surveys.

Each participant was first shown a screen with a target in glasses. A matrix table of the 25 impression adjectives and Likert scale was placed beneath the image so that the participant could refer back to image as they completed the measure. The next screen was a target in a hearing aid, and the third screen was a control in neither glasses nor hearing aid. The composition of the four surveys were as follows:

1. Female target with dark frames, male target with light hearing aid, female control ($N = 157, 27.59\%$).

2. Female target with light hearing aid, male target with dark frames, male control ($N = 137, 24.08\%$).

4. Male target with bulky hearing aid, female target with light frames, male control ($N = 183, 32.16\%$).

In order to randomize the distribution of the survey and attempt to keep the number of participants fairly consistent, the four different survey versions were deployed to different courses. One of the authors kept track of which classes posted which survey along with the number of students (potential participants) in each course. As surveys were completed, this author then tracked the usable responses. Students who were enrolled in multiple courses in which the survey was deployed were instructed that they could receive extra credit in all participating courses simply by listing them on a separate, linked attached survey on the final screen of the questionnaire.

A principle components factor analysis with varimax rotation was conducted on the 25 impression descriptors for the male control and for the female control. An Eigenvalue of one and items loading above .50 on a factor yielded seven impression factors for the male control target ($\alpha=.894$ to $.566$) and six impression factors for the female control ($\alpha=.879$ to $.603$).

For the male control, two of the descriptors, “knowledgeable” and “classy,” did not load on any of the factors, so they were eliminated from further analysis. Two factors yielded alpha reliability values below .70 (one containing the descriptors, “mild,” “innocent,” and “conservative ($\alpha=.566$) and the other containing the descriptors, “conventional,” and “perky” ($\alpha=.641$)) and were also eliminated from further analysis. For a third factor, eliminating the descriptor “inexperienced” increased the reliability alpha from .556 to .784, so this descriptor was removed from further analysis leaving the factor with two of the three original descriptors
(“sexy” and “attractive”). These adjustments resulted in five factors for analysis for the male target which were labeled: Reliable, Fashionable, Jovial, Provocative, and Good-looking.

For the female control, one of the descriptors, “active,” did not load on any of the factors, so it was eliminated from further analysis. One factor yielded an alpha reliability value below .70 (containing the descriptors, “conservative,” “mild,” “innocent,” and “conventional”) and it was likewise eliminated from further analysis. The final factor in the analysis was computed with a single variable, “sexy.” Given the relatively close alignment of the factors between both genders, this variable was retained and named similarly. Since the composition of the factors had an overall similarity to the male control and to the findings of Kaigler-Evans and Damhorst (1978), the female factors were given the same names as the male factors: Reliable, Fashionable, Jovial, Provocative, and Good-looking (see Appendix B for factor statistics).

Since only two versions of the surveys contained the control measurement for the female target and the other versions contained the control measurement for the male target, ANOVA was computed to determine whether differences exist between the responses on the male and female control instruments among the versions. ANOVA indicated there were no significant differences between the responses on the male control items on Survey Groups 2 and 4 for the factors labeled Reliable ($F(1, 298) = 0.48, p > .490, \eta^2 = 0.00$), Fashionable ($F(1, 297) = 0.32, p > .857, \eta^2 = 0.00$), Jovial ($F(1, 294) = 0.47, p > .496, \eta^2 = 0.00$), or Provocative ($F(1, 296) = 0.02, p > .890, \eta^2 = 0.00$). However, Survey Group 2 found the male control to be more Good-looking ($M = 2.98, SD = 1.07$) than did Survey Group 4 ($M = 2.64, SD = 0.92$) ($F(1, 298) = 8.68, p > .003, \eta^2 = 0.03$). For the female control factors, ANOVA did not indicate any significant differences between Survey Groups 1 and 3 (Reliable ($F(1, 239) = 0.57, p > .451, \eta^2 = 0.00$), Fashionable ($F(1, 238) = 2.75, p > .099, \eta^2 = 0.01$), Jovial ($F(1, 238) = 0.14, p > .710, \eta^2 =
0.00), Provocative ($F(1, 237) = 0.07, p > .796, \eta^2 = 0.00$), and Good-looking ($F(1, 240) = 0.43, p > .514, \eta^2 = 0.00$).

**H1: Perceptions Regarding Glasses**

Each of the two different glasses treatments was tested against a control photograph that featured the (male or female, as appropriate) target with no glasses. Given this methodology of ten t-tests for males and ten t-tests for females on five dependent variables (2 glasses treatments x 5 impression factors for each target gender), the Bonferroni Adjustment was applied to reduce the possibility of a Type I error. Thus, for this hypothesis, the comparison on each dependent variable had to produce a $p$ equal to or smaller than .01 for the means to be deemed significantly different.

**Male Target.** $T$-tests were computed between the factor means for the male target in each of the two glasses treatments (light and dark) using the means for the control factors from Group 2 as the test value. The control responses from Survey Group 2 was chosen because the number of survey participants was more similar to the survey groups for male glasses and because the dark glasses treatment was on Survey Group 2.²

Generally, similar findings were computed when the male target wearing the dark frames and the lightweight frames were compared to the male control target. Significant differences were computed for all treatments except for the dark frames on the factor, Jovial ($p = .435$). For all of the remaining factors except Reliable on the target with dark frames, the control (without

² Since a significant difference was computed between the male control groups for the factor, Good Looking, statistics were computed between the means for the glasses factors and the control factors for Group 4. Results were very similar. For the dark frames, $t(127)= 26.35, p < .001, d = 0.34$. For the lightweight frames, $t(88) = 32.60, p < .001, d = 0.10$. In both cases, the control target without glasses was rated higher.
the glasses) was rated more favorably at the $p > .001$ level (see Table 1). Specifically, the male target wearing glasses was judged to be less Fashionable, less Provocative, and less Good-looking than the male target with no glasses. The male target in the lighter frames was also judged as less Reliable, and less Jovial, than the male target without glasses. In summary, the target wearing the dark frames was rated higher on the factor, Reliable, but was judged more negatively on the factors, Fashionable, Provocative and Good-looking. Therefore, for the male target, H1 is accepted for Fashionable, Provocative, and Good-looking.

**Female Target.** As with the male target, $t$-tests were computed between the factor means for the female target in each of the two glasses treatments (light and dark) and the means for the control factors from Survey Group 1 as the test value. The control responses from Survey Group 1 was chosen because the number of survey participants was more similar to the survey groups for female glasses and because the dark glasses treatment was on Survey Group 1.

The results for the female target were not as straightforward as for the male target. The female target was rated more Reliable and more Jovial while wearing glasses ($p < .001$). On the other hand, the target was rated less Fashionable, less, and less Good-looking ($p < .001$) when wearing glasses (Table 1). For the female target, H1 is accepted only for the factors, Fashionable, Provocative, and Good-looking.

Impressions were generally different for the target wearing glasses and the control subject without glasses. The data indicates that wearing glasses creates an impression different from not wearing glasses, and that the type of glasses worn also creates an impression different from not wearing glasses. Generally, the male target was considered more Reliable with glasses, but more
Fashionable, Provocative and Good-looking without glasses. The female target was considered more Reliable and Jovial with glasses, but more Fashionable, Provocative and Good-looking without them.

**H2: Perceptions Regarding Hearing Aids**

Similar to the methodology for H1, impression means for each of the two different hearing aid treatments were tested against impression means for a control photograph that featured the (male or female, as appropriate) target with no hearing aid. Again, as with H1, this methodology of multiple t-tests on five impression factors and two hearing aid styles for each gender, an adjustment was needed to reduce the possibility of a Type I error. Therefore, the Bonferroni Adjustment was applied. For this hypothesis, the comparison on each dependent variable had to produce a $p$ equal to or smaller than .01 for the means to be deemed significantly different.

**Male Target.** $T$-tests were computed between the impression factor means for the male target in each of the two hearing aid treatments (bulky and light) and the impression means for the control factors from Group 4 as the test value. The control responses from Survey Group 4 was chosen because the number of survey participants was more similar to the survey groups for male target with a hearing aid and because the bulky hearing aid treatment was on Survey Group 4.3

Significant differences were computed for both of the hearing aid treatments for each of the impression factors. The male target wearing the bulky hearing aid and wearing the light

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3 Since a significant difference was computed between the male control groups for the factor, Good Looking, statistics were conducted between the means for the hearing aid factors and the control factors for Group 2. Results were very similar. For the bulky hearing aid, $t(173) = 34.58, p < .001, d = 0.59$, and for the light hearing aid, $t(173) = 31.82, p < .001, d = 0.38$. In both cases, the control target without a hearing aid was rated higher.
A hearing aid was judged to be more Reliable than the control target \((p < .001)\) as shown in Table 2. On the other hand, the male control target wearing no hearing aid was judged to be more Fashionable, more Jovial, more Provocative, and more Good-looking than the target wearing the hearing aid \((p < .001)\). The male target who was wearing the hearing aid was judged more negatively on most of the impression factors, therefore, H2 is accepted for the factors, Fashionable, Jovial, Provocative, and Good-looking.

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**Female Target.** As with the male target, \(t\)-tests were computed between the impression factor means for the female target in each of the two hearing aid treatments (bulky and light) and the impression means for the control factors. The hearing aid factors were compared to the control factors from Survey Group 3 as the test value because the bulky hearing aid treatment was in Survey Group 3.

With both hearing aid treatments, the female control target was rated higher on the factors, Fashionable and Provocative \((p < .001)\). The control target was also rated higher on Good-looking when compared with the target in the bulky hearing aid \((p < .001)\). On the other hand, the target in both hearing aid treatments was rated more Reliable and more Jovial \((p < .001)\) than the control target. The female target wearing the light hearing aid was also rated more Good-looking \((p < .001)\) than the control target with no hearing aid (see Table 2). Significant differences were computed for each of the impression factors when the female control target was compared to a female target with a hearing aid. The female target with a hearing aid was judged more negatively on the impression factors, Fashionable, Provocative, and Good-looking, therefore H2 is accepted for these impression factors.
Impressions were different for the target wearing hearing aids and the control target without a hearing aid. The data indicates that wearing a hearing aid creates an impression different from not wearing one, and that the type of hearing aid worn also creates an impression different from not wearing a hearing aid. Generally, the male target was considered more Reliable with a hearing aid, but more Fashionable, Jovial, Provocative and Good-looking without a hearing aid. The female target was considered more Reliable and Jovial with a hearing aid, but more Fashionable and Provocative without a hearing aid.

**RQ1: Perception Differences for Glasses by Gender of Survey Participant**

One-way ANOVA was computed to determine whether male and female survey participants rated the targets wearing glasses differently. Means of the impression factors for each glasses treatment (dark frames / light frames for males and for females) were compared with the survey participant’s gender as the independent variable. The mean scores and standard deviations are presented in Table 3.

For the male target wearing dark frames, ANOVA indicated significant differences for two of the factors. Female participants rated the male target higher on Reliable ($p < .05$) and male participants rated the male target higher on Provocative ($p < .01$). No significant differences were computed for the light frames.

For the female target, ANOVA indicated significant differences in impression ratings between the genders of the survey participants on three of the factors for dark frames and for two factors on light frames. In the dark frames, male participants rated the female target higher on Fashionable ($p < .05$) and Good-looking ($p < .001$) and female participants rated her higher on
Provocative ($p < .05$). For the lighter frames, the male participants rated the female target higher on Provocative ($p < .01$) and Good-looking ($p < .001$).

In summary, when the gender of the survey participant was considered as an independent variable, females rated the male target wearing dark frames as more Reliable and males rated him more Provocative. Males participants found the female target more Fashionable and Good-looking in glasses (both styles). The female participants found the female target in dark frames to be more Provocative and the male participants found the female target in light frames to be more Provocative. No significant differences were computed for the factor, Jovial, in any of the treatments.

RQ2: Perception Differences for Hearing Aids by Gender of Survey Participant

One-way ANOVA tests were computed to determine whether male and female participants rated the targets wearing hearing aids differently. The four hearing aid treatments were compared with the survey participant’s gender as the independent variable. The mean scores and standard deviations are shown in Table 4.

When the gender of the survey participant was considered as an independent variable, ANOVA tests indicated significant differences for three factors: Provocative, Good-looking, and Fashionable at the $p<.05$ level of significance. Male participants found the male target to be more Provocative in both hearing aid treatments ($p < .05$). Male participants also found the female target to be more Good-looking ($p < .05$) in the bulky hearing aid, and more Fashionable
(\(p < .01\)) and Good-looking (\(p < .05\)) in the light hearing aid than did their female participant cohorts.

Generally, the male and female participants were in agreement with their impressions of a person wearing a hearing aid. When there were significant differences, the male participants regarded both the male and female control target more favorably on three of the factors.

**RQ3: Perception Differences for Glasses by Survey Participants Who Wear Glasses**

On the survey, 172 of 569 total participants (30\%) indicated they wear glasses themselves. To determine whether participants who wear glasses themselves rated the targets wearing glasses more positively, the four glasses treatments were compared with the survey participant’s glasses status as the independent variable. ANOVA did not compute any significant differences at the \(p < .05\) level of significance for the subjects in either glasses treatment between participants who indicated they currently wear glasses and those who indicated they do not (See Table 5 for statistics).

Insert Table 5 about here

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**Discussion**

Findings from this study are important in expanding the general knowledge of how nonverbal codes (i.e., glasses and hearing aids) affect impressions of others, including gender differences in the impression formation process. Overall, our results are consistent with our hypotheses, which were based in implicit personality theory and underscore the importance of appearance on impression formation of individuals with disabilities (e.g., myopia, hearing loss). The data indicates that wearing glasses creates an impression different from not wearing glasses,
and that the type of glasses worn also creates an impression different from not wearing glasses. Generally, the male target was considered more Reliable with glasses, but more Fashionable, Provocative and Good-looking without glasses. The female target was considered more Reliable and Jovial with dark frames, but more Provocative and Good-looking without glasses. Through the lens of implicit personality theory, these findings support the literature, and common stereotype, that people who wear glasses are presumed to be more intelligent and dependable (i.e., Reliable), yet not necessarily attractive (Hellström & Tekle, 1994; Leder et al., 2011; Terry & Krantz, 1993).

The impression variation based on type of frames also supports existing literature and further confirms that glasses have become accessories with styles that cycle in and out of fashion (Leder et al., 2011). As glasses have gained visibility in the fashion world, wearing glasses is no longer viewed disparagingly as a disability, but rather an impairment. For the past few years, eyeglasses have turned from necessity to fashion accessory, functional and trendy at the same time (Rhodes, 2017). In fact, some people even wear glasses without prescription lenses simply for the fashion effect. A study by the College of Optometrists revealed that 43% of people believe glasses make them look intelligent. For another 36%, they wear glasses to appear more professional and businesslike (Sims, 2016). According to Sims (2016) two out of five people admitted that they would wear frames “to get ahead at work and look fashionable at the same time” even if they medically do not require them (p. 6). Glasses obviously still communicate competence, and people sport them to enhance their appearance by constructing a familiar image of intelligence. Popularity and demand for eyewear has spurred new designs that allow the wearer to tailor the uniqueness of their appearance with a simple change of glasses.
With hearing aids, the heavier, more visible style has a less positive impression overall than the control target without a hearing aid. The findings of this study support others that suggest a visible device is stigmatized and identifies the wearer with a disability (Hindhede, 2011; Rauterkus & Palmer, 2014; Strange et al., 2008). The hearing aid symbolizes a failing part of the body, and by extension, a failure of the person as a whole, especially with respect to mental functioning. Vanity and the fear of appearing weak and old prevents others from tarnishing their images with a hearing device. Hearing devices have also historically communicated ignorance because children with hearing loss also had trouble learning, and older adults with hearing loss are often misperceived as suffering from dementia (Hindhede, 2011; Rauterkus & Palmer, 2014).

Notably, the female target was rated more Reliable and Jovial with both of the hearing aid treatments when compared with the control target. The male target was rated more Reliable with the bulky hearing aid treatment. This finding is encouraging, as hearing aid use has historically been associated with an impression of lower cognitive function. The fact that participants did not indicate a significant difference between the hearing aid use and the control on some of the impression factors may indicate stronger social acceptance, which supports reports that recognize Millennials as generally more socially accepting compared to older generations (e.g., Pew Research Center, 2010; Taylor & Keeter, 2010).

When we explored the effect of the gender of the participant, we found few differences regarding impressions of persons with glasses. Given the number of test variables and the limited number of significant differences between the treatment and control, the lack of significant differences is the interesting finding. While there was no significant difference between male participants in judging a target with or without glasses, female participants
identified more differences between the control and the target with glasses, generally rating the male target more positively when wearing glasses. These findings support other studies that demonstrate a relationship between gender of the stimulus/target person, gender of the observer/participant and impression formation (e.g., Gonçalves et al., 2015; Hack 2014; Harris et. al., 1991), specifically that females are more efficient in attribute perception and more likely to report positive impressions of others.

The findings indicated even fewer gender differences regarding the target with the hearing aid. Male and female participants were generally in agreement with respect to their ratings of the stimuli person wearing the hearing aid. These findings further strengthen our argument and previous studies that argue that people, especially younger individuals, are becoming more socially accepting of disabilities, and appearance differences in others (Christman & Slatman, 1991; Erler & Garstecki, 2002; Harris et al., 1991; Palmer & Rauterkraus, 2014; Taylor & Keeter, 2010), and perhaps that gender of the observer and stimulus person is not a significant factor in participants’ assessments of others. Perhaps the age of the observer and the stimulus is a more significant variable for impression formation of people with visible disabilities, especially hearing loss, which has an age-related stigma.

Many Americans are reluctant to adopting hearing healthcare, which often times results in negative psychological and psychosocial behaviors, as well as impaired physical well-being and increased potential for cognitive deficiency (Ciobra et al., 2012; Lin et al., 2013). Therefore, it is imperative to understand the relationship of person perception and one’s reluctance to adopting a hearing device. The results from this study may help with the development and evaluation of interventions approaches that seek to promote the use of hearing devices. For example, interventions can encourage people to redirect their focus from the
utilitarian value to the hedonic value (i.e., fashion), as we have witnessed already happen with glasses. This is especially important when advising potential hearing aid users who are disinclined to wear a device for cosmetic reasons. As with clothing, people like products, even functional products, to maintain or enhance their self-image (Ekinci & Riley, 2003; Freitas, Kaiser, Chandler, Hall, Kim, & Hammidi, 1997; Rosa, Gabarino, & Malter, 2006). Hearing healthcare providers should approach hearing aids like glasses (i.e., fashion accessories) and encourage the discerning patient to use more discreet devices that can be hidden rather than avoiding adoption. Treating hearing loss with trendy, wireless earbuds, such as those made by Apple (the makers if iPhones), may interpersonally diminish the stigma of aging and mortality. It is especially important to address this now as the Boomer population ages and hearing loss becomes and even bigger problem. Justin Golub of the National Review keenly summarized the reluctance to try hearing amplification with the following statement: “…it [the OTC Act] would destigmatize age-related hearing loss by making hearing aids an everyday sight. Wearing them should be as ordinary as putting on a pair of glasses. The best way to make this happen is to put them within easy reach — for example, at the corner drugstore, down the aisle from the over-the-counter reading glasses” (Golub, 2017, ¶ 8).

Limitations

There are a few limitations to consider with this study. Methodologically, with the selection of the traits that we provided, correlations among traits differ as a function of both stimulus person and relevance of trait (see Schneider, 1973). In an attempt to manage this limitation, a single male target and a single female target were used, and data were analyzed for each gender separately. For example, the trait, “Reliable” for the female target with dark frames was compared to the same female target without glasses. We did not regard the mean value of
“Reliable” in the analysis. In other words, whether or not she was determined to be a “reliable” person was irrelevant; we were looking at the difference between the judgment of the traits that comprise the “reliable” factor between the test and the control.

Although using a single male and a single female target was a strategic decision in the current methodology, it also presents a limitation to the study. The responses reported by our subject pool represent their views about a single male and a single female target. Again, we were interested in the impression differences between the target with glasses or hearing aid and the target without the glasses or hearing aid. Kaigler-Evans and Damhorst (1978), the study which inspired the present methodology, used 28 targets and had a sample size of 1400 participants. We anticipated a smaller sample size and sought to control as much target variation as possible. The results from the present study provide a baseline for future research. Follow-up work should explore a more universal impression outcome by increasing both the number of targets and the sample size.

Another potential limitation was the cognitive complexity potentially created by the number of dimensions used for trait implications. Given the overwhelming and unrealistic possibility of using a comprehensive list of traits, for the present study we used traits already factored in a similar study. Given that little work has been published in recent years with a socially accepting Millennial generation, we recommend exploring relevant trait assignment behaviors more thoroughly.

The current study broadly explores the idea of gender effect in perception of people who wear glasses and/or hearing aids. However, future studies could expand upon the analysis by examining specific impressions formed by male and female research participants in relation to the gender of the stimuli/target individual. Future studies should also examine other
demographic variables, such as ethnicity/race and age, at a greater depth and breadth to better generalize the results. Further study should address impressions of persons wearing hearing aids and glasses using a larger stimuli/target pool, including individuals of varying age cohorts. This is especially important because hearing loss predominantly affects individuals over the age of 65, making them the primary users of hearing devices (Oyler, 2012). Different facial expressions on the target individual could also be included in future studies to determine if individual facial characteristics moderate the relationship between person perception and the presence of glasses and/or hearing aids. Finally, future studies should include a wider array of glasses and hearing aid styles for evaluation. The current study was limited by the use of two broad categories of glasses (i.e., thin rim versus thick rim) and two basic styles of hearing device. Perceptions of the target individuals could vary significantly with the inclusion of fashion frames and newer, more conspicuous hearing devices, such as Bluetooth earbuds.

In spite of the limitations of the current study, the findings offer valuable insights that may be useful in future research. This study expands upon the understanding the role of visible disability (e.g., myopia, hearing loss) in impression formation of individuals who wear eyeglasses and hearing aids. The present data indicate that people with visible disabilities, such as hearing aids, stimulate varying impressions, as implied by the tenets of implicit personality theory. However, the current study also supports those (e.g., Rauterkus & Palmer, 2014) that suggest the stigma associated with wearing a hearing aid has significantly reduced over the past several decades partly because of the availability of more discrete designs and changing views about visible devices. Furthermore, the disappearance of the hearing aid effect is potentially more salient amongst Millennials because they are on the frontlines of social progress and acceptance.
References


