Influence of Gender, Ethnicity and Makeup on Age Estimation by Adults in the Community.

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Abstract

Recent history has witnessed an emerging social issue concerning children and teenagers appearing older than their age, reasons for which may include clothing, makeup, false identification, dating websites or social media. This has ramifications for statutory rape, whereby a sexual act takes place involving a person under the age of consent, since many perpetrators claim they were unaware of their sexual partner's age before participating. The current study investigated the ability of adults in the community to estimate the age of Asian and White 12, 14, 16 and 18-year-olds, with reference to the age, gender, and ethnicity of the participant and model, as well as the influence of makeup. Participants were exposed to photographs of 12 models at each age, whilst each female was presented once more with makeup. Participants were required to estimate the models' age in a within-subjects design. Results showed that participants overestimated the age of all age-groups, with an average of 3.07 years older than the actual age. Paired samples *t*-tests found that this was most pronounced for White female and Asian male models, and females between 12 and 16-years-old with makeup on. Results of one-way ANOVA's found that participant gender and age had no effect, but found significant differences between Asian and White participant responses. The study concluded that people cannot accurately estimate age using only facial cues, and that model gender, ethnicity and makeup, and participant ethnicity, significantly impact perceptions. This study has implications for the application of statutory rape laws and victim protection.

Key Words: Statutory Rape, Age Estimation, Makeup, Gender, Ethnicity

Introduction

Young people reportedly possess a natural desire to strive to appear older and to take part in activities considered too old for their age (Myers, 1965). In recent times, with advances in makeup, false identification, underage drinking, social networking and online dating, there is an increasing interest in the potential social, moral and legal ramifications of children appearing older than they are. This has implications for the Criminal Justice System (CJS), since in both the United Kingdom (U.K.) and the United States (U.S.) sexual activity is illegal under the age of 16 (AgeofConsent, 2018), the most common age of consent worldwide (UNICEF, 2018). In the U.S., this offence is termed statutory rape (Troup-Leasure & Snyder, 2005) and in the U.K. as 'causing or inciting a child to engage in sexual activity' (Sexual Offences Act, 2003) (statutory rape herein).

This law is imperative since there are serious implications for children exposed to a relationship with an older partner. The odds of intercourse amongst 13-year-old females with a partner six years older are over six times those with same-age partners (Kaestle, Morisky & Wiley, 2002) and sexual activity at a young age can have detrimental impacts on mental health. Leitenberg and Saltzman (2000) found that females who first had sex when aged 11 or 12 with much older partners had greater problem behaviours, including suicide attempts, alcohol and drug use, and truancy, whilst 13 to 15-year-olds encountered some, and 16 to 18-year-olds none. Notably, between 2016 and 2017 there was a 14% increase in sexual crime compared with the previous year in the U.K., and sexual offences against children contributed to 41% of the increase (Office for National Statistics, 2018). This represents the highest rates of sexual crime since the National Crime Recording Standard began in 2002 (Office for National Statistics, 2018). Research is therefore required to investigate the underlying influences of these offences.

However, statutory rape is, and has consistently been, a source of debate, since the law does not allow for critical evaluation of circumstance, for example the maturity and capacity of the minor (Myers, 1965). Statutory rape is a strict liability crime in the U.S., meaning a perpetrator can be found guilty despite the victim lying about their age, using false identification, initiating the behaviour, or expressing consent (Law Office of David R. Fischer, 2016). The prosecution is only required to prove that the sexual act happened, a regulation which is criticised since many defendants report true attempts at eliciting the age of their sexual partner (Davis, 2013).

Furthermore, researchers claim that stated age is used as a cue when perceiving age (Drouin, Egan, Yergens & Hernandez, *In Prep*) and it has long been accepted that appearance does not provide a precise measure of age (Myers, 1965). Rhodes (2009) suggests that age estimation is not sophisticated enough to make small distinctions, indicating common errors of between one and four years, and since almost three of every five victims is aged 14 or 15 (Troup-Leasure & Snyder, 2005), mistaken age could be contributing to the problem. Leitenberg and Saltzman (2000) have advocated for improvements in enforcement and greater discretion regarding punishment, whilst Myers (1965) called for changes in U.S. law whereby sex with a child under 13 would impose strict liability, but reasonable mistake of age would be considered defence regarding a 13-15-year-old, as observed in the U.K. (Sexual Offences Act, 2003). The U.S. legal system appears at odds with current research, and further investigations are required to understand the psychological context of such crimes and to encourage change.

Although the CJS may assume a certain standard of age determination, there is currently a paucity of research into the ability of community members to accurately estimate age in relation to sexual activity. There is, however, an extensive literature investigating age estimation regarding the purchasing of alcohol. Evidence suggests that 16-year-olds, and girls

as young as 13, do not find it difficult to purchase alcohol in Britain (Willner, Hart, Binmore, Cavendish & Dunphy, 2000) and researchers have therefore frequently recruited shop assistants, who are essential in applying age restriction laws (Vestlund, Langeborg, Sörqvist & Erikkson, 2009). Vestlund et al. (2009) found that alcohol salespersons were prone to overestimating the ages of White 15-19-year-olds, whilst Jason, Porkorny, Sherk, Helzing and Rebus (2008) showed that 34% of sales assistants rated White 16-year-old females as 18 or over. Furthermore, Willner and Rowe (2001) showed shop assistants photographs of 13, 16, 20 and 22-year-olds and found that 18% of 13-year-old girls and 3% of 13-year-old boys were judged as 18 or over. Salespersons are therefore prone to overestimating the ages of those below 20 and are particularly inaccurate for females. Further research is critical since a report by the Federal Bureau of Investigation (FBI) found that 95% of statutory rape victims in the U.S. were female (Troup-Leasure & Snyder, 2005), and there are contradictions in the literature, with some studies demonstrating that sales assistants instead frequently underestimate the age of those below 20-years-old (Eriksson, 2009).

Other biases have been proposed, with Rhodes (2009) claiming that people more accurately estimate the age of those of the same demographic group, however the findings are mixed. Firstly, George and Hole (1995) demonstrated that people are most accurate when estimating ages closer to their own, whilst Egan and Cordan (2009) found that the age of the participant had no effect. Further, Nkengne, Bertin, Stamatas, Giron, Rossi, Issachar and Fertil (2008) found that female participants were more accurate than males in predicting the age of other women, but since there were no male target-persons, it is unclear whether this indicates an own-gender bias or whether women are generally more accurate. Studies such as Voelkle, Ebner, Lindenberger and Riediger (2012) have further found no reliable own-gender bias. Perpetrator age and gender are important since the FBI report that for female victims, 82% of perpetrators were 18 or over, over half were at least six years older than their victims, and 99%

were male (Troup-Leasure & Snyder, 2005). In-group biases may help to explain these ratios. Furthermore, Dehon and Brédart (2001) found that White participants were more accurate at estimating ages of White faces compared with Black faces, however found no own-ethnicity bias for Black participants. The research therefore indicates that age, gender and ethnicity influence accuracy and there may be in-group biases in place, however the findings are varied. Further research is important since it may ascertain victim or perpetrator groups most at risk.

Ethnicity is also of relevance to age estimation, since different cultural backgrounds present alternate views regarding the sexualisation and general representation of children. In Eastern Asia, childlike portrayals in advertisements are met more favourably compared with adult portrayals (Chang & Li, 2010) and Japanese magazines incorporate more 'girlish' (p.46) portrayals of models compared to the U.S. (Maynard & Taylor, 1999). Japanese popular culture has been dominated by a childlike style and idolisation of the innocent and inexperienced, which resulted in the introduction of famous 14-to 16-year-old 'idols' in the 1980's, who dressed, behaved and physically appeared childlike, making this fashionable (Kinsella, 2013).

Further, highly sexualised depictions of schoolgirls appear across Japanese culture, particularly in comic books (Gwynne, 2013), and according to Prough (2016), the schoolgirl has practically embodied itself as a national symbol. Gwynne (2013) draws attention to a comic book series which depicts teenage schoolgirls in sexualised school uniforms, who have seemingly been constructed to please the reader's sexual desire. Japanese censorship focuses on the removal of explicit images, yet sexually suggestive images of children are even encouraged and there appears less of a distinction between adult and underage sexuality compared with European culture, in which a strict moral opposition to child sexuality is enforced (McLelland, 2001). This is further observed in the legal system, since Japan's age of consent is just 13 (AgeOfConsent, 2018). There are therefore clear differences cross-culturally

regarding representations of children and research is necessary to understand whether this can impact age perceptions and in the long term, statutory rape.

Furthermore, both Rhodes (2009) and Drouin et al. (*In Prep*) claim that style cues are taken into account when estimating age. Expanding on this theory, makeup may impact perceptions, since Fabricant and Gould (1993) report that younger females use makeup to look older. Henss' (1991) concluded that the more attractive a female is considered to be, the older she is perceived, and since studies show that males rate women as more attractive with makeup (Mulhern, Fieldman, Hussey, Lévêque & Pineau, 2003), age estimations may increase. This was supported by Egan and Cordan (2009), who found that females with makeup, particularly when young and sexually immature, were rated as older than those without.

This is particularly relevant to the 21st Century, since society is heavily focused on celebrity influence, who have become a major source for makeup trends (Caravelli, 2008) and the object of imitation for young girls (Furedi, 2010). The popularity of makeup is spread by the beauty industry, popular culture and the media (Danesi, 2018) and in recent years social media has become a platform for makeup brands to promote products, with some users gaining so many followers that they are considered 'makeup gurus' (Riboni, 2017. p.117). Therefore, with improvements in and increased popularity of makeup, estimating age is becoming increasingly difficult and research is required to understand the implications of makeup on children.

Current Study

The rationale of this study was to extend findings from alcohol salespersons to a wider group of community members, to investigate which factors influence abilities of White and Asian adults to estimate the age of White and Asian children and teenagers, and to

discuss these findings regarding statutory rape implications. Further research is necessary since there are contradictions in the alcohol salespersons literature and a lack of data supporting in-group biases (Rhodes, 2009), which is not considered a robust phenomenon (Vestlund et al., 2009). This research fills a gap in the literature in understanding the factors which contribute to mistaken age in order to inform future legislation.

The study built upon Willner and Rowe's (2001) procedure, whereby photographs of models were presented at 4 different ages, and participants were required to estimate their age. Only facial images were used since the full body would provide biological cues such as breasts and muscles. Since children reach puberty any time between ages eight and 14 (NHS, 2016), these cues would confound the results and provide information specific to that model.

Research Aims

The study evaluated whether:

1. Average age estimates were more accurate for male or female models, important since female children are primarily involved in underage sex cases.
2. Male or female participants were more accurate, important since male adults are primarily involved in these cases.
3. There were differences in accuracy depending on whether the participant was the same gender as the model and therefore if there was an own-gender bias, which may explain high numbers of male perpetrators and female victims.
4. There were differences in accuracy between female images with and without makeup, important since females may be more difficult to estimate the age of due to makeup, rather than being naturally more difficult.
5. Ethnicity influenced accuracy, including whether responses for Asian or White models were less accurate, and whether there was an in-group ethnicity bias, where

Asian participants were more accurate with Asian children, and White participants with White children. This will inform whether cultural representations of children impact perceptions.

6. There was an own-age bias, where individuals were less accurate as age difference increased, which may elucidate why there are often large age gaps between perpetrators and victims.

Hypotheses

The study hypothesised that:

1. Participants would overestimate age for every age group.
2. Estimations would be higher for female models than males.
3. Estimations would be higher for females wearing makeup than those without.
4. Female participants would be more accurate than males.
5. Participants would be more accurate if the same gender as the model.
6. Older participants would be less accurate than the younger group, indicating an own-age bias.
7. There would be differences between estimations of White and Asian models.
8. Participants would be more accurate if the same ethnicity as the model.

Method

Design. This experiment investigated whether there were significant differences between actual model ages (Independent Variable 1 (IV1)) and average age estimations (Dependent Variable (DV)). The study further investigated whether there were effects of model gender (IV2), ethnicity (IV3) and makeup (IV4) and participant gender (IV5), age (IV6) and ethnicity (IV7) on the DV.

IV1 had four levels of ages 12, 14, 16 and 18, IV2 two levels of male and female, IV3 two levels of Asian and White, IV4 two levels of makeup and no makeup, IV5 two levels of male and female, IV6 two levels of ages 18-24 and 25-65 and IV7 two levels of Asian and White. A within-subjects design was used.

Participants. One hundred and twenty-one participants took part, with reference to a power analysis (*alpha=.05*, effect size=*.5*, power=*.8)*. Three participants were removed for not consenting, and nine for not matching the intended demographic; eight 'Other' ethnicity and 1 'Other' gender. This resulted in 109 participants between ages 18 and 65 (M=28.51, SD=10.55), with 71 females (65.1%) and 38 males (34.9%), 93 of whom were White (85.3%) and 16 Asian (14.7%). Participants over age 18 were recruited using social media and word of mouth. Opportunity sampling was used to gather friends and family of the researcher and convenience sampling by means of social media. All participants were naïve to the true purpose of the experiment.

Materials. Laptops, computers and smart phones were used to complete the questionnaire. Images of Asian and White child-stars were found using search engines and fan pages, which detailed the ages of the models. These individuals were chosen because they were famous as children but are not commonly seen in the media now. All images of the same model

had the same facial expression. The questionnaire was created using Bristol Online Surveys (BOS) (Jisc, 2018) and the phone application 'Perfect365' (ArcSoft, 2017) was used to add the same frame of makeup onto each female, which consisted of lip, cheek and eye makeup.

Procedure. Participants were sent an online link to the software BOS (Jisc, 2018). They were presented with an information sheet (See *Appendix A*), which detailed requirements and ethical rights, and claimed that the study was investigating cognitive abilities and ethnic differences in age estimation. This was necessary since if given the true aims participants may have been biased to a younger age-group or demonstrated a social desirability bias so as to appear safe to children. After reading the information sheet, participants were presented with a consent form (See *Appendix B*) and if they did not consent their results were excluded. Participants were then required to provide their gender, ethnicity, and age (See *Appendix C*), and were presented with the study questions (See *Appendix D*).

The questionnaire consisted of 72 images, comprised of 6 White and 6 Asian females and 6 White and 6 Asian males (See *Appendix E*). Each of the males was presented at ages 12, 14, 16 and 18. The females were presented twice at each age, once without superimposed makeup and once with (See *Appendix F*). Each page consisted of one image of each model so that participants could not compare two images of the same person, and every participant viewed the same order. This resulted in four pages with twelve images on each, and four pages with six images on each. On the first page, above each picture participants were asked 'do you recognise this person?' and if they answered 'yes', they were asked to name them. If they correctly identified a model, their responses for all images of this model were excluded to prevent bias. All participants then answered the question 'how old do you think this person is?' by typing a number, for all images. Participants were then presented with a debrief form (See

Appendix G), providing the true aims and the ethics committee details. They were asked not to share any of the study details.

Results

Data Preparation.

Two individual responses were removed since they were over 5 standard deviations (SD) above or below the mean of that age-group. Seven participants correctly identified 5 models between them, which resulted in the removal of 56 individual responses. These cells were left blank. For all comparisons excepting the makeup condition, only females without makeup were analysed.

Analysis.

SPSS Version 23.0 (IBM Corp, 2015) was used for all analysis. Means were calculated for the responses of all participants for White and Asian 12, 14, 16 and 18-year-old female models, with and without makeup (See *Table 1*), and for White and Asian 12, 14, 16 and 18-year-old males (See *Table 2*). On average, females without makeup were estimated as above the age of consent from age 14, females with makeup from age 12 and males from age 16. Overall, participants estimated the average age of males and females without makeup to be 18.07 years, compared to the actual average of 15-years-old.

Table 1.

Means (SDs) of all Participants for White and Asian Female Models With and Without makeup, Including Averages across Model Ethnicity.

	Female Models (*N*=12)					
	White (*N*=6)		Asian (*N*=6)		Average (*N*=12)	
Age	Makeup	No makeup	Makeup	No makeup	Makeup	No makeup
	(*N*=3)	(*N*=3)	(*N*=3)	(*N*=3)	(*N*=6)	(*N*=6)
12 (*N*=12)	17.13	14.81	17.55	14.59	17.34	14.70
	(3.07)	(2.56)	(3.93)	(3.19)		
14 (*N*=12)	19.72	19.16	18.75	17.07	19.24	18.12
	(2.95)	(2.45)	(3.84)	(3.28)		
16 (*N*=12)	21.98	20.93	20.41	19.13	21.20	20.03
	(3.40)	(3.34)	(4.01)	(3.46)		
18 (*N*=12)	22.74	22.61	20.45	20.07	21.60	21.34
	(3.76)	(3.68)	(3.88)	(3.12)		

Table 2.

Means (SDs) of all Participants for White and Asian Male Models, Including Averages across Model Ethnicity.

Male models (*N*=6)			
Age	White (*N*=3)	Asian (*N=3*)	Average (*N*=6)
12 (*N*=6)	12.14 (1.88)	16.39 (3.94)	14.27
14 (*N*=6)	13.42 (2.57)	17.45 (3.42)	15.44
16 (*N*=6)	18.66 (2.71)	20.13 (3.30)	19.40
18 (*N*=6)	21.13 (2.96)	21.35 (3.53)	21.24

Bivariate Analysis.

A one-way ANOVA testing for participant gender revealed no significant differences between male and female participants (See *Appendix H*). A second one-way ANOVA testing for participant age revealed one significant difference for male Asian 12-year-olds ($F(1,107)=6.32$, $p=.01$) between participants aged 18-24 ($M=15.50$, $SD=3.50$) and 25 and over ($M=17.36$, $SD=4.20$) (See *Appendix I*). However, as only one significant result was found across 24 comparisons, this had a high likelihood of being due to chance, and no further analysis was conducted.

A third one-way ANOVA (See *Appendix J*) tested for participant ethnicity. As a Levine's test for homogeneity was significant for some comparisons, Welch's *F* statistic was used (See *Appendix K*). This revealed significant differences between Asian and White participants for female Asian 12-year-olds with makeup ($F(1,107)=4.28$, $p=.04$), female Asian

14-year-olds with makeup ($F(1,107)=6.38$, $p=.01$), female Asian 14-year-olds without makeup ($F(1,107)=4.11$, $p=.045$), female White 16-year-olds with makeup ($F(1,107)=5.16$, $p=.03$), female Asian 16-year-olds without makeup ($F(1,107)=5.29$, $p=.02$), female Asian 18-year-olds with makeup ($F(1,107)=4.38$, $p<.04$), female Asian 18-year-olds without makeup *Welch's* $F(1,20.59)=5.32$, $p=.03$) and male White 18-year-olds ($F(1,107)=9.32$, $p=.003$). All significant effects were in the direction of Asian participants estimating older than White participants (See *Table 3)*. White and Asian participants were therefore analysed separately.

Table 3.

Means (SDs) of White and Asian Participants across all Model Conditions, Including Significance Levels of a One-Way ANOVA.

Model Age	Participant Ethnicity	White Model (*N*=36)			Asian Model (*N*=36)		
		Female (No Makeup) (*N*=12)	Female (Makeup) (*N*=12)	Male (*N*=12)	Female (No Makeup) (*N*=12)	Female (Makeup) (*N*=12)	Male (*N*=12)
12 (*N=3*)	White (*N=93*)	14.80 (2.59)	17.02 (3.08)	12.07 (1.86)	14.45 (3.15)	**17.23 (3.82)**	16.11 (3.88)
12 (*N=3*)	Asian (*N=16*)	14.98 (2.40)	14.93 (2.78)	12.44 (2.10)	15.48 (3.34)	**19.40 (4.18)**	18.02 (4.04)
	Significance	.80	.27	.48	.23	**.04**	.07
14 (*N=3*)	White (*N=93*)	18.97 (2.39)	19.63 (3.02)	13.14 (1.94)	**16.81 (3.34)**	**18.38 (20.94)**	17.18 (3.36)
14 (N=3)	Asian (*N=16*)	20.21 (2.36)	20.21 (2.56)	14.09 (1.40)	**18.58 (2.50)**	**20.94 (2.85)**	19.02 (3.43)
	Significance	.06	.47	.06	**.05**	**.01**	**.06**
16 (*N=3*)	White (*N=93*)	20.72 (3.4)	**21.68 (3.43)**	18.51 (3.21)	**18.82 (3.51)**	20.20 (4.20)	19.93 (3.34)
16 (*N=3*)	Asian (*N=16*)	22.10 (2.81)	**23.67 (2.74)**	19.60 (1.76)	**20.94 (2.57)**	21.58 (2.39)	21.44 (2.69)
	Significance	.13	**.03**	.19	**.02**	.21	.09
18 (*N=3*)	White (*N=93*)	22.47 (3.8)	22.48 (3.74)	**20.82 (2.87)**	**19.79 (3.06)**	**20.13 (3.89)**	21.10 (3.62)
18 (*N=3*)	Asian (*N=16*)	23.44 (2.77)	24.27 (3.5)	**23.15 (2.81)**	**21.69 (3.04)**	**22.29 (3.34)**	22.83 (2.54)
	Significance	.33	.08	**.003**	**.02**	**.04**	.07

*No*te. Significant effects at the $p<.05$ level are shown in bold.

White Respondents

A Bonferroni Post-Hoc Correction was conducted and the accepted alpha value was $p<.002$.

Model Gender

Paired samples *t*-tests were conducted to test for differences between female and male models (See *Table 4)* (See *Appendix L*). For White models, all females were rated as older than males, reaching significance for 12-year-olds ($t(92)=9.49$, $p<.001$), 14-year-olds ($t(92)=18.49$, $p<.001$), 16-year-olds ($t(92)=6.80$, $p<.001$) and 18-year-olds ($t(92)=5.23$, $p<.001$). For Asian models, all male models were rated as older than females, reaching significance for 12-year-olds ($t(92)=-5.50$, $p<.001$), 16-year-olds ($t(92)=-4.30$, $p<.001$) and 18-year-olds ($t(92)=-3.89$, $p<.001$), but not for 14-year-olds ($t(92)=-1.24$, $p=.22$).

Table 4.

Means (SDs) of White respondents for White and Asian Male and Female Models.

	White models (*N*=6)		Asian models (*N*=6)	
Age	Female	Male	Female	Male
	(*N*=3)	(*N*=3)	(*N*=3)	(*N*=3)
12 (*N*=12)	**14.78 (2.59)**	**12.09 (1.85)**	**14.44 (3.16)**	**16.11 (3.16)**
14 (*N*=12)	**18.98 (2.43)**	**13.30 (2.71)**	16.81 (2.71)	17.18 (3.36)
16 (*N*=12)	**20.72 (3.40)**	**18.50 (2.82)**	**18.82 (3.51)**	**19.91 (3.36)**
18 (*N*=12)	**22.45 (3.81)**	**20.79 (2.86)**	**19.79 (3.06)**	**21.10 (3.62)**

Note. Significant effects at the $p<.002$ level are shown in bold.

Makeup

Paired samples *t*-tests were conducted to test for differences between female models with and without makeup (See *Appendix M*). All models wearing makeup were rated as older than those without (See *Table 5*), reaching significance for White 12-year-olds ($t(92)=9.70$, $p<.001$), 14-year-olds ($t(92)=3.44$, $p<.001$) and 16-year-olds ($t(92)=4.43$, $p<.001$), and for Asian 12-year-olds ($t(92)=11.93$, $p<.001$), 14-year-olds ($t(92)=5.93$, $p<.001$), and 16-year-olds ($t(92)=6.07$, $p<.001$), but not for White ($t(92)=.02$, $p=.98$) or Asian ($t(92)=.87$, $p=.39$) 18-year-olds.

Table 5.

Means (SDs) of White Respondents for White and Asian Female Models With and Without Makeup.

	White Models (N=6)		Asian Models (N=6)	
Age	With Makeup	Without Makeup	With Makeup	Without Makeup
	(N=3)	(N=3)	(N=3)	(N=3)
12 (N=12)	**17.01 (3.09)**	**14.78 (2.59)**	**17.23 (3.82)**	**14.44 (3.16)**
14 (N=12)	**19.65 (3.01)**	**18.98 (2.43)**	**18.38 (3.87)**	**16.81 (3.34)**
16 (N=12)	**21.68 (3.42)**	**20.72 (3.40)**	**20.20 (4.20)**	**18.82 (3.51)**
18 (N=12)	22.46 (3.77)	22.45 (3.81)	20.13 (3.89)	19.79 (3.06)

Note. Significant effects at the $p<.002$ level are shown in bold.

Model Ethnicity

Paired samples *t*-tests were conducted to test for differences between White and Asian models (See *Appendix N*). All female White models were rated as older than Asian models (See *Table 6*), reaching significance for 14-year-olds ($t(92)=6.56$, $p<.001$), 16-year-olds ($t(92)=5.90$, $p<.001$) and 18-year-olds ($t(92)=7.94$, $p<.001$), but not for 12-year-olds ($t(92)=1.11$, $p=.27$). All male Asian models were rated as older than White models, reaching significance for 12-year-olds ($t(92)=-10.44$, $p<.001$), 14-year-olds ($t(92)=-10.15$, $p<.001$) and 16-year-olds ($t(92)=-4.08$, $p<.001$), but not for 18-year-olds ($t(92)=-.87$, $p=.39$).

Table 6.

Means (SDs) of White respondents for White and Asian Male and Female Models.

	Female models (*N*=6)		Male models (*N*=6)	
Age	White (*N*=3)	Asian (*N*=3)	White (*N*=3)	Asian (*N*=3)
12 (*N*=12)	14.78 (2.59)	14.44 (3.16)	**12.09 (1.85)**	**16.11 (3.88)**
14 (*N*=12)	**18.98 (2.43)**	**16.81 (3.34)**	**13.30 (2.71)**	**17.18 (3.36)**
16 (*N*=12)	**20.72 (3.40)**	**18.82 (3.51)**	**18.50 (2.82)**	**19.91 (3.36)**
18 (*N*=12)	**22.45 (3.81)**	**19.79 (3.06)**	20.79 (2.86)	21.10 (3.62)

Note. Significant effects at the $p<.002$ level are shown in bold.

Asian Respondents

A Bonferroni Post-Hoc Correction was conducted and the accepted alpha value was $p<.002$.

Model Gender

Paired samples *t*-tests were conducted to test for differences between male and female models (See *Appendix O*). All White females were rated as older than males (See *Table 7*), reaching significance for 12-year-olds ($t(15)=3.71$, $p=.002$), 14-year-olds ($t(15)=8.07$, $p<.001$) and 16-year-olds ($t(15)=3.67$, $p=.002$), but not for 18-year-olds ($t(15)=.51$, $p=.62$). All Asian males were rated as older than females, but this did not reach significance for 12-year-olds ($t(15)=-2.78$, $p=.01$), 14-year-olds ($t(15)=-.56$, $p=.59$), 16-year-olds ($t(15)=-.71$, $p=.49$) or 18-year-olds ($t(15)=-1.20$, $p=.25$).

Table 7.

Means (SDs) of Asian Respondents for Male and Female White and Asian Models.

	White models (*N*=6)		Asian models (*N*=6)	
Age	Female	Male	Female	Male
	(*N*=3)	(*N*=3)	(*N*=3)	(*N*=3)
12 (*N*=12)	**14.95 (2.43)**	**12.44 (2.10)**	15.48 (3.34)	18.02 (4.04)
14 (*N*=12)	**20.17 (2.41)**	**14.09 (1.40)**	18.58 (2.50)	19.02 (3.43)
16 (*N*=12)	**22.18 (2.78)**	**19.60 (1.76)**	20.94 (2.57)	21.44 (2.69)
18 (*N*=12)	23.50 (2.72)	23.15 (2.81)	21.69 (3.04)	22.83 (2.54)

Note. Significant effects at the $p<.002$ level are shown in bold.

Makeup

Paired samples *t*-tests were conducted to test for differences between female models with and without makeup (See *Appendix P*). All models wearing makeup excepting one were

rated as older than those without (See *Table* 8), reaching significance for White 12-year-olds ($t(15)=7.13$, $p<.001$) and 16-year-olds ($t(15)=3.80$, $p=.002$), and Asian 12-year-olds ($t(15)=6.40$, $p<.001$) and 14-year-olds ($t(15)=4.96$, $p<.001$), but not for White 14-year-olds ($t(15)=-.09$, $p=.93$) or 18-year-olds ($t(15)=1.59$, $p=.13$), or Asian 16-year-olds ($t(15)=1.46$, $p=.16$) or 18-year-olds ($t(15)=1.01$, $p=.33$).

Table 8.

Means (SDs) of Asian Respondents for White and Asian Female Models With and Without Makeup.

	White models (N=6)		Asian models (N=6)	
Age	With makeup (N=3)	Without makeup (N=3)	With makeup (N=3)	Without makeup (N=3)
12 (N= 12)	**17.81 (2.95)**	**14.95 (2.59)**	**19.40 (4.18)**	**15.48 (3.34)**
14 (N=12)	20.14 (2.59)	20.17 (2.41)	**20.94 (2.85)**	**18.58 (2.50)**
16 (N=12)	**23.73 (2.74)**	**22.18 (2.78)**	21.58 (2.39)	20.94 (2.57)
18 (N=12)	24.36 (3.43)	23.50 (2.72)	22.29 (3.34)	21.69 (3.04)

Note. Significant effects at the $p<.002$ level are shown in bold.

Model Ethnicity

Paired samples *t*-tests were conducted to test for differences between White and Asian models (See *Appendix Q*). All White female models excepting one were rated as older than Asian females (See *Table* 9), but this did not reach significance for 12-year-olds ($t(15)=-.52$, $p=.61$), 14-year-olds ($t(15)=1.88$, $p=.08$), 16-year-olds ($t(15)=1.89$, $p=.08$) or 18-year-olds ($t(15)=2.06$, $p=.06$). All Asian male models excepting one were rated as older than White males, reaching significance for 12-year-olds ($t(15)=-5.43$, $p<.001$), 14-year-olds ($t(15)=-4.66$, $p<.001$) and 16-year-olds ($t(15)=-3.18$, $p<.001$), but not for 18-year-olds ($t(15)=.43$, $p=.67$).

Table 9.

Means (SDs) of Asian Respondents for Male and Female White and Asian Models.

	Female models (*N*=6)		Male models (*N*=6)	
Age	White	Asian	White	Asian
	(*N*=3)	(*N*=3)	(*N*=3)	(*N*=3)
12 (*N*=12)	14.95 (2.43)	15.48 (3.34)	**12.44 (2.1)**	**18.02 (4.04)**
14 (*N*=12)	20.17 (2.41)	18.58 (2.50)	**14.09 (1.4)**	**19.02 (3.43)**
16 (*N*=12)	22.18 (2.78)	20.94 (2.57)	**19.60 (1.76)**	**21.44 (2.69)**
18 (*N*=12)	23.50 (21.69)	21.69 (3.06)	23.15 (2.81)	22.83 (2.54)

Note. Significant effects at the $p<.002$ level are shown in bold.

Summary of Results

Research Aims

1. Average age estimations were more accurate for White male models compared with White females and for Asian female models compared with Asian males.
2. There were no differences between male and female participant responses.
3. There were no differences in responses when the participant was the same gender as the model.
4. Participants were less accurate for females wearing makeup than those without, however this became less prominent as the models got older.
5. Participants were less accurate for White females compared with Asian females, and Asian males compared with White males. There was no in-group ethnicity bias, however Asian participants were less accurate than White participants.
6. There were no differences between the older and younger participant responses and therefore no own-age bias.

Hypotheses

1. Participants overestimated the ages of every age group.
2. Estimations were higher for White female models than males, but higher for Asian male models than females.
3. Estimations were higher for females wearing makeup than those without.
4. Female participants were no more accurate than males.
5. Participants were no more accurate when the same gender as the model.
6. Older participants were no less accurate compared with the younger group and there was therefore no own-age bias.

7. Estimations were higher for Asian male models than White males, but higher for White female models than Asian females.
8. Participants were no more accurate when the same ethnicity as the model.

Discussion

Key Findings

This study found that individuals cannot accurately estimate age, with highest inaccuracies for White female and Asian male models and females wearing makeup. Participants overestimated for every age-group and on average by 3.07 years, supporting the hypothesis that participants would overestimate for each group. Furthermore, White females were estimated as older than White males, and Asian males as older than Asian females, supporting the hypothesis that females would be rated as older for White models yet opposing for Asian models. Females with makeup were estimated as older than those without, although this was most pronounced for 12-year-olds and became less evident as the models increased in age. This supports the hypothesis that females with makeup would be estimated as older, and Egan and Cordan's (2009) findings, however only for younger models.

No main effects of participant gender, age or interactions with model gender and age were found, opposing the hypotheses that female and younger participants would be more accurate than male and older participants, and that there would be fewer inaccuracies when the model and participant were the same gender or age. This further opposes Nkengne et al.'s (2008) and George and Hole's (1995) findings. Finally, although Asian participants were less accurate, both ethnicities perceived Asian males as older than White males and White females as older than Asian females. This supports the hypotheses that there would be differences between White and Asian participants and models, and both supports and opposes Dehon and

Brédart's (2001) mixed findings regarding in-group ethnicity bias. The results oppose the hypothesis that participants would be more accurate when the same ethnicity as the model, and support Vestlund et al.'s (2009) findings against in-group biases.

These results are consistent with the sales assistant literature which has demonstrated that people overestimate age for those under 20, predominantly for White females. This is particularly important since the majority of U.S. victims are female. Research suggests that this ratio could be linked to a sexual preference for young looking females, including for thinner female bodies (Polivy, Garner & Garfinkel, 1986) and neotenous facial features (Jones, 1995). Keating (1985) demonstrated that juvenile features, such as large eyes, are considered attractive on women, whilst mature features are on men. Since higher perceptions of attractiveness have been shown to increase age estimations (Henss, 1991), it is possible that male participants found these features more attractive and therefore rated models older. Makeup may also contribute to the issue, since females with makeup were perceived as older, primarily for younger children. Since research suggests that eye makeup exaggerates neoteny (DiDonato, 2015), this supports the theory that sexual preferences are targeted towards young looking females.

Further, female faces reportedly show fewer age related differences than males (Jones, 1995), meaning it may be more difficult to distinguish between female adults and children. Since makeup effected older models less, this supports the theory that it is harder to differentiate between female children and adults as makeup minimises these differences, and further corroborates the theory that young girls wear makeup to look older and older women to look younger (Fabricant & Gould, 1993). High rates of female victims and male perpetrators may therefore be explained by an attraction to neotenous features, difficulties distinguishing between female adults and children, and the influence of makeup. Further

research should clarify whether results are explained by females looking older with makeup, or whether there is an assumption that older females wear makeup. The theoretical implications of this research are with regards to the sexual attraction literature, indicating that people perceive young females as older, which has in the past been linked to attractiveness. Future research should combine these findings with an attractiveness condition, in order to understand whether higher age perceptions of neotenous features translate to attraction.

Regarding the ethnicity results, research indicates marked differences between East Asian and White cultures concerning the portrayal of children. Japanese culture enables the regular exposure and sexualisation of children, and encourages older females to dress and act childlike. Therefore, Asian participants may be more prone to confusion due to increased similarities between Asian children and adults. This may also explain why Asian males were perceived as older than Asian females, since the sexualisation of boys is not so notable and the fashion to appear childlike seemingly only applies to females, advocating a cultural preference for 'girlishness' (Maynard & Taylor, 1999, p. 46). Historically, Japanese men have been represented as older, being taught to dominate children and women, whilst women are taught to behave like their children as they age (Sugihara & Katsurada, 1999). Therefore, cultural differences in the portrayal of children and gender may explain why Asian female were perceived as younger than White females and Asian males as older than White males, and why Asian participants were less accurate.

Implications

The practical implications of this study are within the CJS regarding statutory rape laws. The results support researchers such as Myers (1965) who have criticised the strict liability nature of these laws, since community members cannot accurately estimate age. However, it must be considered that in an everyday situation, an individual would access

other cues such as voice, clothes and behaviour. This research is therefore not to claim that statutory rape should go unpunished, but instead questions whether the same laws can be applied in every situation, and recommends that the evidence as to whether the perpetrator could have realistically identified age is reflected upon. This is particularly significant for the U.S., since the law does not distinguish between victims under 13 and 16, however also applies to the U.K. system, since 12-year-olds with makeup were perceived as above consent. The results do not, however, indicate inaccuracies in estimating the age of males, and contributing factors may therefore be an important consideration for female victims from age 12, such as makeup and the environment in which the incident took place. This will clarify whether perpetrators can be considered as paedophilic (sexually attracted to children (Seto, 2012)), hebephilic (attracted to sexually mature, pubescent children under the age of consent (Blanchard et al., 2009)), or as simply naïve.

This research is crucial both in protecting the victim, since they may be unaware of the risks of appearing older, and perpetrators, since they may be unaware that children can look significantly older than they are. The results indicate a risk to young females in particular, and it is important that schools, parents and children are educated regarding the dangers of wearing makeup and putting oneself in an older situation, and the associated mental health risks. Furthermore, although this research provides no evidence of clothing implications, researchers such as Rhodes (2009) have claimed that outfit choice impacts perceptions, and future research is advised to investigate this by presenting models in different clothing. This may again identify dangers for children and at their discretion, may encourage parents to challenge their children's clothing or behaviour. Awareness should also be raised to adults who may be exposed to this situation, for example by introducing posters into nightclubs which encourage refrainment from sexual relations when unsure of age. Although this might not always prevent statutory rape, it will raise awareness that an underage person could be in this environment and

encourage re-evaluation. It would also be beneficial to educate and train staff in these environments, since Sörqvist and Eriksson (2009) have demonstrated that training can improve accuracy of age estimation.

Limitations & Future Research

There are a number of reasons to explain why different results were found compared with previous literature regarding demographics and in-group biases. Firstly, this study consisted of community participants instead of alcohol salespersons, who have frequent training in age estimation. The results support Egan and Cordan (2009), the only researchers to recruit community participants, indicating that participant group may influence results. However, Egan and Cordan (2009) suggested that their results might have been impacted by a lack of older participants, and the demographics of the current study were biased towards young, female, White participants. Only a small proportion of older participants took part, who were split into a large range of 25-65 years, perhaps affecting the own-age condition, and small numbers of male participants, perhaps affecting the own-gender bias. Future research is advised to recruit equal numbers of participants across age and gender.

Furthermore, the study had limited numbers of Asian participants, and used only East Asian models, whereas the demographic questions offered only 'Asian'. Since different Asian regions have diverse facial features and cultural values, this may have influenced the own-ethnicity bias. Future research would benefit from conducting research using participants living in Asia, as the Asian participants most likely lived in the U.K. and therefore shared this culture. It is therefore not clear whether the results of the ethnicity condition are due to cultural biases or instead are linked to the fact that Asian people are a minority in the U.K., and so British participants would be exposed to these faces less often.

Future research is advised to split participants into different countries rather than ethnicity in order to control for cultural differences.

Moreover, the results may have been influenced by a lack of ecological validity. Only static faces were presented, which are not realistic since age estimations are influenced by factors such as clothes, voices, facial expressions (Vestlund et al., 2009) and behaviour (Egan & Cordan, 2009). Furthermore, participants viewed multiple images of models, meaning their estimations could have been biased towards their previous appraisals. This reduced validity since a person is unlikely to encounter multiple images of someone in real life. However, in Vestlund et al.'s (2009) critique of their own study, they state that their findings still stand despite this limitation since participants were all exposed to the same stimuli and the results remained significantly different. Therefore, differences between conditions can be considered valid, although these are likely less pronounced in real life. Future research is advised to use models in person and provide vocal, facial expression and behavioural cues.

Future research is further advised to counterbalance pages, since the questions were repetitive, meaning participants may have experienced boredom effects. Research shows that fatigue and boredom result in reduced effort and faster responses for later questions (Galesic & Bosnjak, 2009) and since the study was not counterbalanced, this may have affected the same questions repeatedly. A strength of this study was that participants were asked to identify the models and where they correctly named the model, responses were removed, since they may be more accurate at estimating their age for this reason. This increased the internal validity of the study. However, future research is advised to recruit unknown models since participants could sometimes recognise but not identify the individuals, meaning their results were included.

A final limitation of the study is that there were no questions investigating sexual preference or likelihood of a sexual relationship. Future research is advised to question participants on the likelihood they would enter a sexual relationship based solely on the model's age. This is important since Egan and Cordan (2009) found that perceiving someone as above the age of consent does not automatically translate into a sexual attraction, and that sexual attraction is instead rooted in biological age cues. There is therefore no solid link between age overestimations and statutory rape, and research should directly investigate this. It may, however, be problematic to control for attractiveness factors and for participants to focus only on age.

Conclusions

In conclusion, the results of the present study indicate that people have difficulties in estimating the age of minors, and tend to perceive 14-year-old females without makeup and females of 12 with makeup to be of legal consent. This has serious implications for the CJS and for both perpetrator and victim protection, since inaccurate age estimation may be impacting statutory rape cases worldwide. The present research advises that awareness is raised in the community regarding the ease that errors can be made, particularly regarding makeup, and that U.S. law revises their understanding of these criminal cases. Worldwide, including the U.K., careful consideration of the facts prior to sentencing should be allowed, such as the environment the offence occurred in and the cues presented to the perpetrator. Future research is advised to investigate this matter with the addition of clothing and sexual relationship conditions and the reduction of ecological and internal validity confounds.

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Appendices

Appendix A: The information sheet that was presented to participants.

PARTICIPANT INFORMATION

Centre for Forensic & Family Psychology

Division of Psychiatry & Applied Psychology

School of Medicine, Faculty of Medicine & Health Sciences

Project Title: Investigating Accuracy of Age Estimation.

Researcher: Rosalind Barnett (msxrmb@exmail.nottingham.ac.uk)

Supervisor: Professor Kevin Browne (lwzkdb@exmail.nottingham.ac.uk)

Ethics Reference Number: *[236-1802]*

You are being invited to participate in a research study titled **Investigating Accuracy of Age Estimation** as part of a community sample between the ages of 18-65.

This study is being conducted by Rosalind Barnett and Professor Kevin Browne, both from The School of Medicine at The University of Nottingham. The information we gain from this study may help inform on cognitive abilities to recognize age, as well as whether an in-group ethnicity bias can be applied to age recognition.

The purpose of this research study is to help inform on the cognitive ability to recognize age. It is expected that Asian participants will be more accurate at determining the age of other Asian individuals, and that White participants will be more accurate at determining the age of White individuals. It will take you approximately 15 minutes to complete with a total of 72 questions.

The information that the researcher gets from this study will inform on biases in relation to age estimation. This will have impacts for society and situations where individuals are required to estimate age, for example when providing alcohol and tobacco.

If you do decide to take part you will be asked to sign a consent form. Your participation is voluntary, and you may decline to answer a particular question, and without giving a reason. You are free to withdraw (i.e. pull out) at any point before or during the study by closing the browser window. It will not affect you in anyway. The data will only be uploaded on completion of the questionnaire by clicking the SUBMIT button.

However, because this study uses anonymous questionnaires, once you have finished the questionnaire and submitted your answers, it will not be possible to withdraw the data.

All of the information that you provide during the research study will be kept confidential and anonymous. Any identifying information will be removed when reporting, and you will not be asked for your name or any other personal details, so it will not be possible for you to be linked with the data. The current UK Data Protection will apply to all information gathered within the questionnaires.

We believe there are no known risks associated with this research study. However, as with any online activity, the risk of breach is possible. We will reduce any risks by doing everything possible to minimise possibility of breach and maintain confidentiality by keeping all data on password-locked computers so that no data can be accessed by anyone other than the researcher and supervisor. The survey tool is being set up so that your IP address cannot be seen, uploaded or stored by the researcher. All of the data will be stored and held by the Research Supervisor Professor Kevin Browne for a period of 7 years before being destroyed.

The data will contribute to the researcher's MSc thesis. The results of the study may be published in scientific journals and presented at scientific conferences. The overall anonymous data from this study may also be used by other researchers in the future for research and teaching purposes (with research ethics approval). The data will be reported anonymously, with any identifying information removed. If you would like a summary of the results then you can contact the researchers using the contact details above.

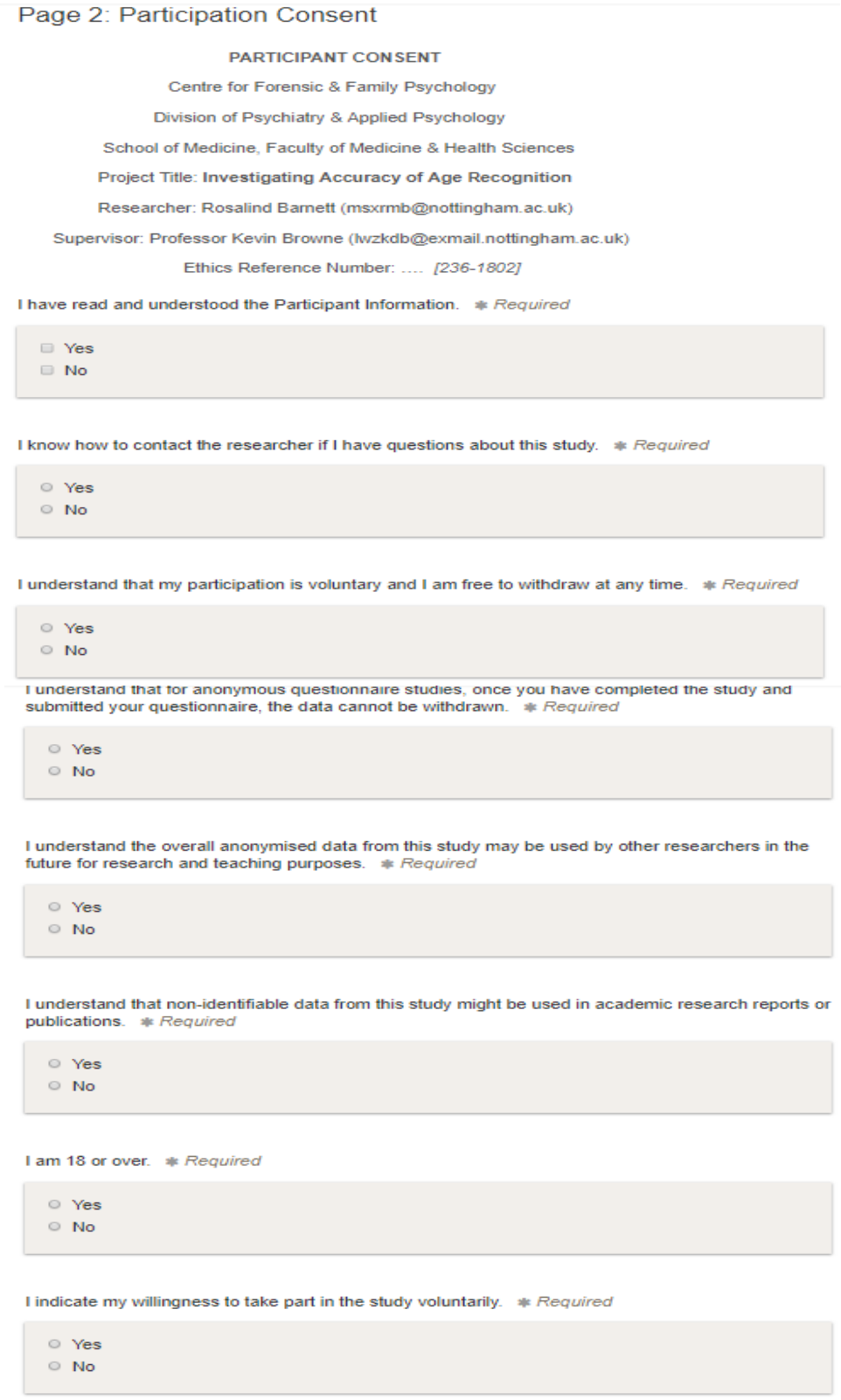
If you have any questions or concerns, please don't hesitate to contact us at the above email addresses.

This study has been approved by the FMHS Research Ethics Committee (reference number: 236-1802), University of Nottingham, Faculty PVC Office, B Floor, Medical School, Queen's Medical Centre Campus, Nottingham University Hospitals, Nottingham, NG7 2UH (email: fmhs-researchethics@nottingham.ac.uk).

THANK YOU FOR YOUR PARTICIPATION

Next >

Appendix B: The consent form that was presented to participants.



Page 2: Participation Consent

PARTICIPANT CONSENT

Centre for Forensic & Family Psychology

Division of Psychiatry & Applied Psychology

School of Medicine, Faculty of Medicine & Health Sciences

Project Title: **Investigating Accuracy of Age Recognition**

Researcher: Rosalind Barnett (msxrmb@nottingham.ac.uk)

Supervisor: Professor Kevin Browne (lwzkdb@exmail.nottingham.ac.uk)

Ethics Reference Number: .... *[236-1802]*

I have read and understood the Participant Information. * *Required*

- Yes
- No

I know how to contact the researcher if I have questions about this study. * *Required*

- Yes
- No

I understand that my participation is voluntary and I am free to withdraw at any time. * *Required*

- Yes
- No

I understand that for anonymous questionnaire studies, once you have completed the study and submitted your questionnaire, the data cannot be withdrawn. * *Required*

- Yes
- No

I understand the overall anonymised data from this study may be used by other researchers in the future for research and teaching purposes. * *Required*

- Yes
- No

I understand that non-identifiable data from this study might be used in academic research reports or publications. * *Required*

- Yes
- No

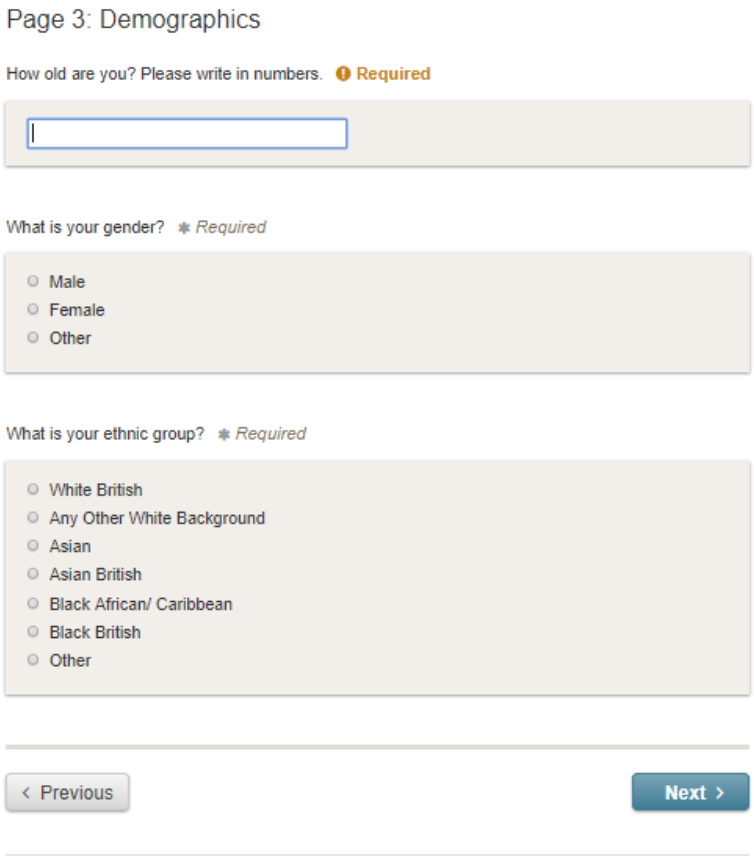
I am 18 or over. * *Required*

- Yes
- No

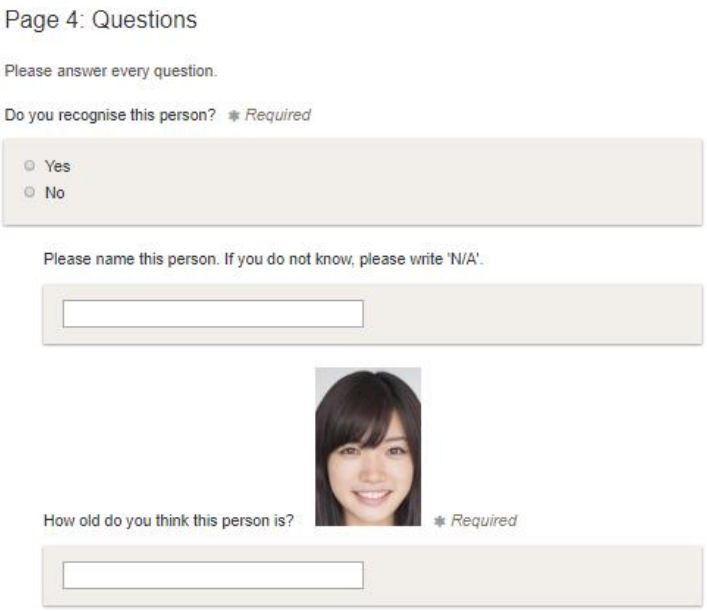
I indicate my willingness to take part in the study voluntarily. * *Required*

- Yes
- No

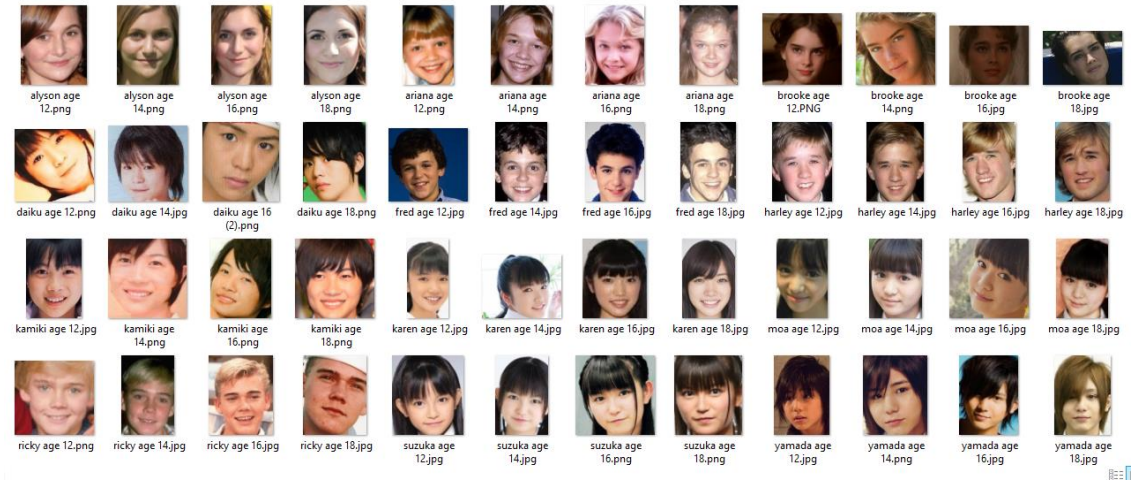
Appendix C: The demographic questions that were presented to participants.



Appendix D: An example question presented to participants.



Appendix E: The 48 images that were presented to participants of male and female models without makeup.



Appendix F: The 24 images that were presented to participants of female models with makeup.

Appendix G: The debrief form that was presented to participants.

DEBRIEF FORM

Centre for Forensic & Family Psychology

Division of Psychiatry & Applied Psychology

School of Medicine, Faculty of Medicine & Health Sciences

Project Title: Investigating Accuracy of Age Recognition.

Researcher: Rosalind Barnett (msxrmb@exmail.nottingham.ac.uk)

Supervisor: Professor Kevin Browne (lwzkdb@exmail.nottingham.ac.uk)

Ethics Reference Number: .... *[236-1802]*

Thank you for your participation.

Hypothesis:

Past research has shown that shop assistants find it difficult to correctly estimate the age of adolescents when selling tobacco or alcohol, and frequently overestimate this. It has also been shown that this overestimation is particularly prominent in relation to female children or adolescents, in comparison with males. The aim of this research study was to investigate whether this bias is seen on a larger scale using community participants, and whether gender, ethnicity and age of the individual, as well as makeup and recognition of the models, influences how old participants estimate a child to be. To the researcher's knowledge, there is currently no literature investigating the accuracy of age estimation in relation to underage sex.

Design and Dependent Measures:

Each participant estimated the age of 6 Asian (3 boys and 3 girls) and 6 White child-stars (3 boys and 3 girls), across 72 images. All of the male models were presented four times, at ages 12, 14, 16 and 18. The females were all presented 8 times, at ages 12, 14, 16 and 18, once with makeup artifically added on using the Application 'Perfect365', and once without. The first time a different model was used, participants were asked a question to check whether they had seen this individual before, and whether they could name them, so as not to bias estimations.

Participants were not informed of the true aims of the study in order to prevent estimations being directed towards a younger age group, and therefore to prevent any bias. In this research study, we were investigating whether people are able to accurately estimate the age of children and adolescents between the ages of 12-18, and whether certain factors influence this.

These included whether there is a gender bias, meaning female participants are more accurate at determining the age of female children, and males with male children, and an ethnicity bias, meaning White participants would be more accurate at determining the age of White children, and Asian participants with Asian children. We are also investigating whether the extent of the age gap between participants and children influences the accuracy of age estimations. Finally, we are investigating whether makeup on female children influences estimations.

This has wider implications for underage sex criminal cases, as in these cases it is frequently claimed that the adult had no knowledge of the age of the child.

We would like to ask you not to discuss the details of this experiment with anyone else. It is important that future participants remain unaware of the hypothesis of the study.

Thank you again for your participation.

Appendix H. The results of the one-way ANOVA conducted to test for differences between male and female participants.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
FW12M	Between Groups	24.387	1	24.387	2.632	.108
	Within Groups	991.400	107	9.265		
	Total	1015.786	108			
FW12nM	Between Groups	3.554	1	3.554	.540	.464
	Within Groups	704.641	107	6.585		
	Total	708.195	108			
FA12M	Between Groups	.001	1	.001	.000	.995
	Within Groups	1667.671	107	15.586		
	Total	1667.672	108			
FA12nM	Between Groups	6.385	1	6.385	.626	.431
	Within Groups	1092.144	107	10.207		
	Total	1098.530	108			
FW14M	Between Groups	.063	1	.063	.007	.932
	Within Groups	937.687	107	8.763		
	Total	937.750	108			
FW14nM	Between Groups	2.855	1	2.855	.472	.494
	Within Groups	647.716	107	6.053		
	Total	650.571	108			
FA14M	Between Groups	14.463	1	14.463	.981	.324
	Within Groups	1576.738	107	14.736		
	Total	1591.201	108			
FA14nM	Between Groups	6.036	1	6.036	.557	.457
	Within Groups	1159.248	107	10.834		
	Total	1165.284	108			
FW16M	Between Groups	5.056	1	5.056	.435	.511
	Within Groups	1243.172	107	11.618		
	Total	1248.228	108			
FW16nM	Between Groups	11.984	1	11.984	1.073	.303
	Within Groups	1194.689	107	11.165		
	Total	1206.673	108			
FA16M	Between Groups	9.239	1	9.239	.573	.451
	Within Groups	1725.952	107	16.130		
	Total	1735.191	108			
FA16nM	Between Groups	1.510	1	1.510	.125	.724
	Within Groups	1291.628	107	12.071		

	Total	1293.138	108			
FW18M	Between Groups	2.552	1	2.552	.179	.673
	Within Groups	1528.182	107	14.282		
	Total	1530.734	108			
FW18nM	Between Groups	.540	1	.540	.040	.843
	Within Groups	1461.052	107	13.655		
	Total	1461.592	108			
FA18M	Between Groups	19.494	1	19.494	1.301	.257
	Within Groups	1603.666	107	14.988		
	Total	1623.160	108			
FA18nM	Between Groups	4.502	1	4.502	.461	.499
	Within Groups	1045.004	107	9.766		
	Total	1049.507	108			
MW12	Between Groups	4.782	1	4.782	1.358	.246
	Within Groups	376.747	107	3.521		
	Total	381.529	108			
MA12	Between Groups	1.574	1	1.574	.100	.752
	Within Groups	1678.318	107	15.685		
	Total	1679.892	108			
MW14	Between Groups	1.213	1	1.213	.182	.671
	Within Groups	713.265	107	6.666		
	Total	714.478	108			
MA14	Between Groups	10.449	1	10.449	.892	.347
	Within Groups	1253.412	107	11.714		
	Total	1263.861	108			
MW16	Between Groups	15.614	1	15.614	2.148	.146
	Within Groups	777.634	107	7.268		
	Total	793.248	108			
MA16	Between Groups	9.432	1	9.432	.865	.355
	Within Groups	1167.205	107	10.908		
	Total	1176.638	108			
MW18	Between Groups	1.509	1	1.509	.171	.680
	Within Groups	946.590	107	8.847		
	Total	948.099	108			
MA18	Between Groups	1.636	1	1.636	.130	.719
	Within Groups	1344.105	107	12.562		
	Total	1345.741	108			

Appendix I. The results of the one-way ANOVA conducted to test for differences between participant age-groups 18-24 and 25-65.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
FW12M	Between Groups	2.542	1	2.542	.268	.605
	Within Groups	1013.245	107	9.470		
	Total	1015.786	108			
FW12nM	Between Groups	1.507	1	1.507	.228	.634
	Within Groups	706.688	107	6.605		
	Total	708.195	108			
FA12M	Between Groups	8.498	1	8.498	.548	.461
	Within Groups	1659.173	107	15.506		
	Total	1667.672	108			
FA12nM	Between Groups	10.806	1	10.806	1.063	.305
	Within Groups	1087.723	107	10.166		
	Total	1098.530	108			
FW14M	Between Groups	.419	1	.419	.048	.827
	Within Groups	937.331	107	8.760		
	Total	937.750	108			
FW14nM	Between Groups	6.758	1	6.758	1.123	.292
	Within Groups	643.812	107	6.017		
	Total	650.571	108			
FA14M	Between Groups	11.758	1	11.758	.797	.374
	Within Groups	1579.443	107	14.761		
	Total	1591.201	108			
FA14nM	Between Groups	23.916	1	23.916	2.242	.137
	Within Groups	1141.369	107	10.667		
	Total	1165.284	108			
FW16M	Between Groups	9.351	1	9.351	.808	.371
	Within Groups	1238.876	107	11.578		
	Total	1248.228	108			
FW16nM	Between Groups	40.044	1	40.044	3.673	.058
	Within Groups	1166.629	107	10.903		
	Total	1206.673	108			
FA16M	Between Groups	10.032	1	10.032	.622	.432
	Within Groups	1725.158	107	16.123		
	Total	1735.191	108			
FA16nM	Between Groups	31.649	1	31.649	2.684	.104
	Within Groups	1261.488	107	11.790		
	Total	1293.138	108			

FW18M	Between Groups	12.936	1	12.936	.912	.342
	Within Groups	1517.798	107	14.185		
	Total	1530.734	108			
FW18nM	Between Groups	13.529	1	13.529	1.000	.320
	Within Groups	1448.063	107	13.533		
	Total	1461.592	108			
FA18M	Between Groups	4.544	1	4.544	.300	.585
	Within Groups	1618.616	107	15.127		
	Total	1623.160	108			
FA18nM	Between Groups	2.870	1	2.870	.293	.589
	Within Groups	1046.636	107	9.782		
	Total	1049.507	108			
MW12	Between Groups	.184	1	.184	.052	.821
	Within Groups	381.345	107	3.564		
	Total	381.529	108			
MA12	Between Groups	93.677	1	93.677	6.319	.013
	Within Groups	1586.215	107	14.824		
	Total	1679.892	108			
MW14	Between Groups	3.533	1	3.533	.532	.467
	Within Groups	710.945	107	6.644		
	Total	714.478	108			
MA14	Between Groups	.019	1	.019	.002	.968
	Within Groups	1263.843	107	11.812		
	Total	1263.861	108			
MW16	Between Groups	.137	1	.137	.018	.892
	Within Groups	793.111	107	7.412		
	Total	793.248	108			
MA16	Between Groups	5.597	1	5.597	.511	.476
	Within Groups	1171.041	107	10.944		
	Total	1176.638	108			
MW18	Between Groups	1.436	1	1.436	.162	.688
	Within Groups	946.663	107	8.847		
	Total	948.099	108			
MA18	Between Groups	33.939	1	33.939	2.768	.099
	Within Groups	1311.802	107	12.260		
	Total	1345.741	108			

Appendix J. The results of the one-way ANOVA conducted to test for differences between Asian and White participants.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
FW12M	Between Groups	8.854	1	8.854	.941	.334
	Within Groups	1006.933	107	9.411		
	Total	1015.786	108			
FW12nM	Between Groups	.379	1	.379	.057	.811
	Within Groups	707.817	107	6.615		
	Total	708.195	108			
FA12M	Between Groups	64.072	1	64.072	4.275	.041
	Within Groups	1603.599	107	14.987		
	Total	1667.672	108			
FA12nM	Between Groups	14.819	1	14.819	1.463	.229
	Within Groups	1083.710	107	10.128		
	Total	1098.530	108			
FW14M	Between Groups	3.281	1	3.281	.376	.541
	Within Groups	934.469	107	8.733		
	Total	937.750	108			
FW14nM	Between Groups	19.156	1	19.156	3.246	.074
	Within Groups	631.415	107	5.901		
	Total	650.571	108			
FA14M	Between Groups	89.546	1	89.546	6.381	.013
	Within Groups	1501.654	107	14.034		
	Total	1591.201	108			
FA14nM	Between Groups	43.102	1	43.102	4.110	.045
	Within Groups	1122.183	107	10.488		
	Total	1165.284	108			
FW16M	Between Groups	57.468	1	57.468	5.164	.025
	Within Groups	1190.760	107	11.129		
	Total	1248.228	108			
FW16nM	Between Groups	29.037	1	29.037	2.638	.107
	Within Groups	1177.636	107	11.006		
	Total	1206.673	108			
FA16M	Between Groups	25.961	1	25.961	1.625	.205
	Within Groups	1709.229	107	15.974		
	Total	1735.191	108			
FA16nM	Between Groups	60.958	1	60.958	5.293	.023
	Within Groups	1232.180	107	11.516		
	Total	1293.138	108			

FW18M	Between Groups	49.770	1	49.770	3.596	.061
	Within Groups	1480.964	107	13.841		
	Total	1530.734	108			
FW18nM	Between Groups	15.004	1	15.004	1.110	.294
	Within Groups	1446.588	107	13.520		
	Total	1461.592	108			
FA18M	Between Groups	63.847	1	63.847	4.381	.039
	Within Groups	1559.313	107	14.573		
	Total	1623.160	108			
FA18nM	Between Groups	49.228	1	49.228	5.266	.024
	Within Groups	1000.279	107	9.348		
	Total	1049.507	108			
MW12	Between Groups	1.669	1	1.669	.470	.494
	Within Groups	379.859	107	3.550		
	Total	381.529	108			
MA12	Between Groups	49.974	1	49.974	3.281	.073
	Within Groups	1629.918	107	15.233		
	Total	1679.892	108			
MW14	Between Groups	8.500	1	8.500	1.288	.259
	Within Groups	705.977	107	6.598		
	Total	714.478	108			
MA14	Between Groups	46.300	1	46.300	4.069	.046
	Within Groups	1217.562	107	11.379		
	Total	1263.861	108			
MW16	Between Groups	16.644	1	16.644	2.293	.133
	Within Groups	776.604	107	7.258		
	Total	793.248	108			
MA16	Between Groups	31.836	1	31.836	2.976	.087
	Within Groups	1144.802	107	10.699		
	Total	1176.638	108			
MW18	Between Groups	75.974	1	75.974	9.321	.003
	Within Groups	872.124	107	8.151		
	Total	948.099	108			
MA18	Between Groups	41.168	1	41.168	3.377	.069
	Within Groups	1304.573	107	12.192		
	Total	1345.741	108			

Appendix K. The results of the Welch's ANOVA conducted to test for differences between Asian and White participants.

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
FW12M	Welch	1.405	1	21.842	.249
FW12nM	Welch	.075	1	21.475	.787
FA12M	Welch	3.764	1	19.561	.067
FA12nM	Welch	1.314	1	19.854	.265
FW14M	Welch	.659	1	22.855	.425
FW14nM	Welch	3.715	1	20.665	.068
FA14M	Welch	9.794	1	25.601	.004
FA14nM	Welch	6.196	1	25.301	.020
FW16M	Welch	6.617	1	23.881	.017
FW16nM	Welch	3.074	1	23.258	.093
FA16M	Welch	3.484	1	33.694	.071
FA16nM	Welch	8.171	1	25.697	.008
FW18M	Welch	3.495	1	21.329	.075
FW18nM	Welch	1.490	1	25.867	.233
FA18M	Welch	5.428	1	22.593	.029
FA18nM	Welch	5.319	1	20.588	.032
MW12	Welch	.429	1	19.272	.520
MA12	Welch	3.093	1	20.046	.094
MW14	Welch	5.533	1	26.099	.026
MA14	Welch	3.956	1	20.282	.060
MW16	Welch	3.930	1	35.030	.055
MA16	Welch	3.989	1	23.797	.057
MW18	Welch	9.327	1	20.785	.006
MA18	Welch	5.535	1	26.789	.026

a. Asymptotically F distributed.

Appendix L. The results of the paired samples t-tests conducted to test for differences between male and female models for White participants.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	FW12nM - MW12	2.69354837096772	2.73798322585966	.28391563 4280399	2.12966743068409 1	3.25742934350945 4	9.487	92	.000
Pair 2	FA12nM - MA12	-1.67025089605734 9	2.92777166408913 5	.30359577 8886095	-2.27321833873870 14	-1.06728347372768 4	-5.502	92	.000
Pair 3	FW14nM - MW14	5.67741935483871 2	2.96057084720365 1	.30699689 5737732	5.06769702086766 0	6.28714168880976 4	18.493	92	.000
Pair 4	FA14nM - MA14	-.37275985663082	2.89337468345426 8	.30002897 8149801	-.96864330482284 1	.22312359156120 5	-1.242	92	.217
Pair 5	FW16nM - MW16	2.21863799283154 3	3.14437025624330 9	.32605600 6607144	1.57106261954950 4	2.86621336611358 1	6.804	92	.000
Pair 6	FA16nM - MA16	-1.08602150537635 1	2.43745592097216 2	.25275240 4808279	-1.58800959814246 1	-.58403341261024 1	-4.297	92	.000
Pair 7	FW18nM - MW18	1.66487455197132 7	3.06929772763331 3	.31827134 8030161	1.03276018257116 8	2.29698892137148 6	5.231	92	.000
Pair 8	FA18nM - MA18	-1.30824372759856 9	3.24194898705040 7	.33617444 9635151	-1.97591520212737 6	-.64057225306976 2	-3.892	92	.000

Appendix M. The results of the paired samples *t*-tests conducted to test for differences between females with and without makeup for White participants.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	95% Confidence Interval of the Difference Upper			
Pair 1	FW12M - FW12nM	2.225806451612911	2.212263410381874	.229401029258560	1.770196206308077	2.681416696917745	9.703	92	.000
Pair 2	FA12M - FA12nM	2.792114695340507	2.257656847443444	.234108109407623	2.327155782558828	3.257073608122186	11.927	92	.000
Pair 3	FW14M - FW14nM	.663082437275982	1.861441070534401	.193022447273146	.279723195882446	1.046441678669517	3.435	92	.001
Pair 4	FA14M - FA14nM	1.569892473118273	2.554044176395343	.264842043712952	1.043893313946717	2.095891632289829	5.928	92	.000
Pair 5	FW16M - FW16nM	.958781362007169	2.089433953866825	.216664207948950	.528467543226798	1.389095180787541	4.425	92	.000
Pair 6	FA16M - FA16nM	1.379928315412194	2.193309654650313	.227435616345825	.928221549800501	1.831635081023887	6.067	92	.000
Pair 7	FW18M - FW18nM	.003584229390686	1.634837095147798	.169524709642167	-.333106476814665	.340274935596037	.021	92	.983
Pair 8	FA18M - FA18nM	.340501792114694	2.291012947405123	.237566975846109	-.131326727972623	.812330312202010	1.433	92	.155

Appendix N. The results of the paired samples *t*-tests conducted to test for differences between White and Asian models for White participants.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	FW12nM - FA12nM	.34408602 1505374	2.9875755 65677931	.30979715 4596494	-.27119786 8268985	.95936991 1279734	1.111	92	.270
Pair 2	FW14nM - FA14nM	2.1756272 40143371	3.1970666 65008090	.33152036 9644629	1.5171991 70201732	2.8340553 10085009	6.563	92	.000
Pair 3	FW16nM - FA16nM	1.8942652 32974913	3.0939188 58782858	.32082444 0397331	1.2570802 01758406	2.5314502 64191419	5.904	92	.000
Pair 4	FW18nM - FA18nM	2.6630824 37275989	3.2349594 83374135	.33544967 1866907	1.9968504 33955520	3.3293144 40596458	7.939	92	.000
Pair 5	MW12 - MA12	-4.0197132 61648747	3.7115866 25582955	.38487360 4153703	-4.7841054 60613919	-3.2553210 62683575	-10.444	92	.000
Pair 6	MW14 - MA14	-3.8745519 71326159	3.6808565 93520631	.38168704 8271088	-4.6326153 95254671	-3.1164885 47397648	-10.151	92	.000
Pair 7	MW16 - MA16	-1.4103942 65232981	3.3322062 53274681	.34553369 2152450	-2.0966540 03262420	-.72413452 7203541	-4.082	92	.000
Pair 8	MW18 - MA18	-.31003584 2293907	3.4351823 67393628	.35621181 7757690	-1.0175032 59478593	.39743157 4890780	-.870	92	.386

Appendix O. The results of the paired samples *t*-tests conducted to test for differences between male and female models for Asian participants

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	FW12nM - MW12	2.5104166 66666668	2.7035427 71719827	.67588569 2929957	1.0698004 13620772	3.9510329 19712564	3.714	15	.002
Pair 2	FA12nM - MA12	-2.5416666 66666666	3.6552853 66576885	.91382134 1644221	-4.4894307 50037047	-.59390258 3296285	-2.781	15	.014
Pair 3	FW14nM - MW14	6.0729166 66666664	3.0092257 83289584	.75230644 5822396	4.4694134 34596843	7.6764198 98736485	8.072	15	.000
Pair 4	FA14nM - MA14	-.43750000 0000004	3.1475298 95718934	.78688247 3929734	-2.1147002 91466470	1.2397002 91466463	-.556	15	.586
Pair 5	FW16nM - MW16	2.5729166 66666668	2.8047372 29389934	.70118430 7347483	1.0783776 93417243	4.0674556 39916093	3.669	15	.002
Pair 6	FA16nM - MA16	-.50000000 0000004	2.8336601 11874681	.70841502 7968670	-2.0099508 89431527	1.0099508 89431520	-.706	15	.491
Pair 7	FW18nM - MW18	.35416666 6666668	2.7847966 87837838	.69619917 1959460	-1.1297467 42025400	1.8380800 75358735	.509	15	.618
Pair 8	FA18nM - MA18	-1.1458333 33333332	3.8122002 00720100	.95305005 0180025	-3.1772114 29685248	.88554476 3018584	-1.202	15	.248

Appendix P. The results of the paired samples *t*-tests conducted to test for differences between female models with and without makeup for Asian participants.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	FW12M - FW12nM	2.86458333333329	1.60695104675489 9	.401737761688725	2.00829956374770 3	3.72086710291895 4	7.130	15	.000
Pair 2	FA12M - FA12nM	3.91666666666670	2.44797724511331 9	.611994311278330	2.61223167000731 9	5.22110166332602 1	6.400	15	.000
Pair 3	FW14M - FW14nM	-.03125000000000	1.37735488581610 1	.344338721454025	-.765190611361809	.702690611361809	-.091	15	.929
Pair 4	FA14M - FA14nM	2.35416666666661	1.89919573621163 3	.474798934052908	1.34215669444733 3	3.36617663888598 8	4.958	15	.000
Pair 5	FW16M - FW16nM	1.55208333333336	1.63380803759306 6	.408452009398267	.681488483518432	2.42267818314824 0	3.800	15	.002
Pair 6	FA16M - FA16nM	.64583333333339	1.76580167503475 8	.441450418758690	-.295095961117033	1.58676262778371 2	1.463	15	.164
Pair 7	FW18M - FW18nM	.86458333333336	2.17154898632289 7	.542887246580724	-.292553441681336	2.02172010834800 7	1.593	15	.132
Pair 8	FA18M - FA18nM	.60416666666664	2.38892118841213 5	.597230297103034	-.668799578688114	1.87713291202144 3	1.012	15	.328

Appendix Q. The results of the paired samples *t*-tests conducted to test for differences between White and Asian models for Asian participants.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	FW12nM - FA12nM	-.531249999999998	4.087568665183815	1.021892166295954	-2.709361593462583	1.646861593462586	-.520	15	.611
Pair 2	FW14nM - FA14nM	1.583333333333332	3.374194005267804	.8435485001316951	-.214647736456295	3.381314403122960	1.877	15	.080
Pair 3	FW16nM - FA16nM	1.239583333333336	2.620410449896337	.6551026102474084	-.156734832319560	2.635901498986231	1.892	15	.078
Pair 4	FW18nM - FA18nM	1.812500000000000	3.527602795310363	.8819006988827591	-.067226843744899	3.692226843744899	2.055	15	.058
Pair 5	MW12 - MA12	-5.583333333333332	4.115913111417774	1.028978277854443	-7.776548616057045	-3.390118050609619	-5.426	15	.000
Pair 6	MW14 - MA14	-4.927083333333336	4.229949982192681	1.057487495548170	-7.181064575154606	-2.673102091512065	-4.659	15	.000
Pair 7	MW16 - MA16	-1.833333333333336	2.309401076758503	.5773502691899626	-3.063926302226366	-.602740364440306	-3.175	15	.006
Pair 8	MW18 - MA18	.312500000000000	2.896917263166076	.7242293157915191	-1.231158246024885	1.856158246024885	.431	15	.672