Abstract

Previous literature suggests that individuals who engage in age concealment are viewed differently depending on the type of concealment used, motivations behind engagement, and to some extent, the age of the target individual. This study aimed to expand on the literature by integrating perceiver factors such as gender, age, and individual differences in intrasexual competition, alongside the individual target factors such as concealment type and motivation for use. Using a sample of 306 participants recruited online, a linear mixed model found main effects of the target's motivation and concealment type, and perceiver's gender and intrasexual competition, but not perceiver age on target evaluations. We also found that females evaluated the targets most positively when age concealment was motivated by self-esteem, followed by employment and least positively for romantic purposes whereas males did not differ on their evaluations based on motivation. Finally, we found that the higher the female participant ICS trait, the less positively they rated the targets. These findings suggest that the general perception towards the type and motivations behind the engagement have not changed despite the increasing access to age concealment, and that perceiver trait differences also play a role in how concealers are evaluated.

Keywords: *intrasexual competition; motivations for age concealment; perception of concealment types; female perception of age concealment*

Public significance statement: *Cosmetic procedures that promise to make individuals look younger are increasingly accessible to the public. The current study tested how observers react to the use of these procedures by middle-aged women, as this age group is the highest consumer of cosmetic treatments. We found that in general, middle-aged women who aim to look younger are still viewed negatively by other females who have highly competitive traits, particularly when it is done to look for partners rather than employment or self-esteem reasons. The findings suggest that it is not the treatment themselves, but the psychological responses to them by others, that determine how individuals are viewed when they engage in appearance-altering treatments.*

Perceptions of Individuals who Engage in Age Concealment

In society, more attractive people have better outcomes in different aspects of life, be it employment, friendship circles, and most importantly, finding romantic partners (Langlois et al., 2000). However, research also suggest that as people get (and look) older, the less attractive they are perceived (Samson et al., 2009). This change has been linked to older people reporting lower self-esteem and a discrepancy between how old they feel and how old they look (Clarke et al., 2007; Muise & Desmairas, 2010; Slevec & Tiggeman, 2010), which has been cited as one of the main reasons for people engaging in anti-aging procedures (Muise & Desmairas, 2010; Tian et al., 2020). Conversely, studies also show that in general, older people who engage in age concealment techniques were viewed as vain (Chasteen et al., 2011) and were generally evaluated negatively by perceivers (Harris, 1994; North & Fiske, 2013; Schoeman & Branscombe, 2011). However, these studies were conducted when anti-aging procedures were considered invasive, have long recovery times, and were expensive. The current technological advances in cosmetic dermatology have paved the way for less invasive procedures, including home-use devices (Juhasz et al., 2017) which now result in faster recovery time and fewer complications compared to previous invasive procedures such as Botox, dermal fillers, and face-lifts, and are also more affordable to the general population. This could therefore have an impact on how individuals who choose to engage in these procedures may be viewed.

However, one thing that has not changed is that the highest consumer group has been found to be middle-aged women (ASAPS, 2018). Furthermore, traditional gender roles are changing, with women opting to either not have children or postpone having children in favour of their careers, where women aged 40 years and over being the sole age group with increased conception rates (ONS, 2019). With the shift in our societal roles and the accessibility of procedures to reduce signs of aging and maintain youthful appearance of middle-aged women, several social perceptual questions therefore arise - namely, how are middle-aged women who

engage in these procedures perceived, and how might this differ as a function of the type of concealment used, their motivations, and other demographic variables?

Target Concealment Type

Anti-aging techniques have their roots in facial reconstructive surgery, a field which emerged to help disfigured soldiers integrate back to society and has since flourished as a commodity to alter individuals' appearance to reduce signs of facial aging (Chatterjee, 2007). The demand in this field has paved the way for the technology to be refined and be more accessible to consumers of all types. Previously, anti-aging techniques have been associated with high cost in terms of affordability, recovery times, and complications, and results that appear unnatural (Clarke & Griffin, 2007). Recently, technological advancements in the field have allowed the development of non-ablative techniques, e.g. using less invasive procedures such as light therapy and chemical peels, which are more affordable, shorter recovery periods, have fewer contraindications (Beilin, 2011). It is relatively unknown, therefore, whether there is a change in how observers perceive middle-aged women who conceal their age using these new techniques.

Previous studies, relying on descriptions of different target individuals who engage in varying types of age concealment, have shown more negative evaluations for more extreme procedures such as facelifts (Harris, 1994), whereas targets using mild or natural (Botox and fillers or avoiding exposure to sunlight, respectively) were rated the most positively (Chasteen et al., 2011). However, these studies were conducted when age concealment procedures were less accessible and were associated with high recovery times and complications, and with the advancement of the field, we are interested to see whether these perceptions have changed.

As Chasteen et al. (2011) found that extreme procedures received the most negative evaluations, the current study therefore aimed to compare the evaluations between *moderate*

concealment types such as home-use devices which use intense pulse light technology and radiofrequency (Juhasz et al., 2017), and *major* treatments such as Botox and fillers, as these are still high on demand among consumers.

Our first hypothesis therefore is that (1) there will be a main effect of concealment type in the perception of middle-aged women who engage in anti-aging procedures, where moderate concealment would be evaluated more positively than major concealment.

Target Motivation Type

In females, signs of aging such as appearance of wrinkles, sagging skin, and uneven skin tone, has been linked to lowered female mate value (Buss, 1989. Maestriperi et al., 2014) and thus being at a disadvantage to attract potential mates. It is therefore understandable that for women who want to seek romantic partners, maintaining a youthful appearance is important (Harris, 1994; Swami et al., 2013). In line with this, research has found that older women who engaged in anti-aging procedures were rated as more attractive and healthier (Nellis et al., 2017, Tian et al., 2020) which therefore implies that age concealment could prove to be beneficial for older women who are seeking partners. However, studies have shown that such motivations were not viewed positively by others.

Using descriptions of individuals who engaged in different types of age concealment and for varying motivations, Harris (1994) found different ratings for varying motivations behind concealing one's age, with vanity and self-esteem reasons receiving the highest positive rating, followed by employment and finding a partner, and pleasing others as the lowest. Self-esteem is usually seen as a person's self-worth, often associated with feelings of adequacy. However, it has also been defined as how others value the person – in other words, one's self-esteem is a result of feedback given by other people. Leary (1999) suggests that we monitor our social relationships (sociometer theory), and thus, depending on whether our relational

value increases or decreases, so does our self-esteem as a response and motivates the individual to act on it. In turn, we could argue that as we age, we lose our relational values, i.e. in general, younger perceivers judge older people more negatively (less warm and less capable) compared to younger (d = .24, Kite et al., 2005), therefore engaging in age concealment behaviour could be seen as a response in order to increase one's relational value, and therefore increase one's self-esteem.

In line with this, appearance of signs of aging has been negatively correlated with wellbeing for women (Harris, 1994; McFarland, 1999; Muise & Desmairas, 2010; Slevec & Tiggeman, 2010), therefore increase of self-esteem and positive body image in older age has been cited to be the underlying reason for engagement in age concealment techniques (Muise & Desmairas, 2010; Slevec & Tiggeman, 2010; Slevin, 2010). Additionally, Bennett et al. (2017) found in their interviews that older women (aged 69-94) engage in different appearance management behaviours such as make-up and anti-aging creams in order to promote well-being, which may suggest that self-esteem motivations play a large part when engaging in age concealment.

Recently, Tian et al (2020) used images of middle-aged and older-aged individuals pre- and post-anti-aging procedures, e.g. face-lift, eyelid surgery, and browlift, and asked undergraduates to rate them on different personality traits, employability, and attractiveness. They found that post-operative images were rated to be more hireable in comparison. As the human face is used as a cue of social status, income, and employment (Bjornsdottir & Rule, 2017; Nash et al., 2006), it is possible that current economic and labour market conditions could threaten older workers, where signs of aging are associated with negative traits such as fragility, resistance to change, and being less productive than younger workers (Hummert et al., 1997; Perry & Finkelstein, 1999), which highlights another motivation for engaging in age concealment procedures.

Our second hypothesis therefore is that (2) there will be a main effect of motivation type on evaluations of middle-aged women who engage in age concealment, however, we are not able to give a prediction of how the different motivation types would be evaluated due to the changing societal attitudes towards romance, employment, and self-prioritisation.

Perceiver Age

Another factor that influences how individuals who engagement in age concealment are viewed is the age of perceiver. Overall, older participants were more likely to be accepting of age concealment behaviour than younger participants (Chasteen et al., 2011; Harris, 1994; Schoeman & Branscombe, 2011). It was argued that older people wanting to appear younger may threaten the social identity of younger observers, thus receiving negative evaluations (Schoeman & Branscombe, 2011). Another explanation for such evaluations could be that engaging in these behaviours may be considered atypical, and therefore older people who engage in them may be viewed negatively, e.g. desperate and vain (Harris, 1994; Schoemann & Branscombe, 2011).

We therefore hypothesise that (3a) perceiver's age will have a main effect on evaluations of middle-aged women who engage in age concealment, where older perceivers would give more positive evaluations than younger perceivers; and (3b) that this will interact with motivation type, where younger males and females would give negative evaluations for both romantic and employment reasons, but not for self-esteem.

Perceiver Gender

Recent statistics has shown that an increasing number of males are also now engaging in cosmetic procedures (ASAPS, 2018). Traditionally, use of make-up and appearance enhancing methods have been attributed to females, therefore we expect females to be more accepting of such behaviours (Clarke & Griffin, 2008). Some would argue that this is due to

153 the double standard of aging, where there is more pressure for women to look younger, as
154 appearing older is associated with more negative evaluations, e.g. fragility, incompetence, less
155 healthy, and less attractive (Sontag, 1979).

156 Evolutionary perspectives explain such phenomenon as a by-product of female
157 reproductive function, where younger women are more favoured, particularly by men, as they
158 are more able to produce offspring (Buss, 1989; Buss & Schmidt, 1993; Harris, 1994). In
159 support of this theory, studies have found that men judge older women to be less attractive
160 when they were looking for potential romantic partners (Maestripieri et al., 2014; Teuscher &
161 Teuscher, 2007). However, research has shown that women above 30 years old have
162 diminished likelihood of childbearing and increased maternal complications compared to
163 women between 20-29 years old (Salihu et al., 2003). Therefore, as women between 35-50
164 years old make up the majority of those who engage in anti-aging procedures, this has
165 implications for motivations of finding a potential mate for men, e.g. how would men evaluate
166 women who want to appear younger to find potential mates?

167 From here, we hypothesise that (4a) there will be a main effect of gender on evaluations
168 of middle-aged women, where males in general would give more negative ratings than females;
169 and (4b) that this would interact with motivation types, where males would give the lowest
170 ratings for romantic motivations, compared to employment and self-esteem reasons. To our
171 knowledge, this would be the first study to explore the relationship between perceiver gender
172 and target motivation on evaluations of age concealment.

173 **Perceiver Intrasexual Competition**

174 Finally, another factor which could affect how perceivers view those who engage in
175 age concealment could be the competitiveness of the perceivers themselves. Theories of
176 intrasexual competition posit that as there is a finite number of ideal mates, men and women

would have to compete with same-sex individuals to get access to potential partners (Buss & Schmidt, 1993; Cox & Fisher, 2008; Wang et al., 2021; Wyckoff et al., 2019). As men tend to look for young, fertile partners (Buss, 1989), women who attempt to conceal their age through cosmetic means could be viewed by other women more negatively, as this would increase their possible competitors (Fink et al, 2014).

Additionally, Arnocky et al. (2019) found that women with higher ICS were more aggressive towards the target when they appeared in a sexualised manner (wearing more revealing clothes and make-up applied) compared to conventional manner (wearing long-sleeved top and no make-up applied), and that this is due to the sexualised target being perceived as lower in humanness than the conventional counterpart. These show that a female perceiver's competition trait influences how they would perceive targets who dressed more sexually. In relation to our study, we could infer that targets who engage in anti-aging procedures with the aim to find a partner (and to some extent, employment) could be viewed more negatively by female perceivers with high competitiveness as they would potentially be competing for resources.

However, there is some evidence which show that women enhance their appearance to impress other women, rather than simply attracting a mate (Mafra et al., 2020; Mileva et al., 2016; Wagstaff, 2018). Mileva et al. (2016) found that female raters judged women with make-up as more dominant than those without, implying that certain behaviour could be targeted to change how other women perceive them, rather than simply attracting a partner. Similarly, Wagstaff (2018) have found that how often women use make-up is predicted by their sexual strategies and are highly related to their intrasexual competitiveness. Another study by Mafra et al. (2020) has demonstrated that women's intrasexual competition trait and desire to attract a mate predicted frequency of make-up use. On a similar note, Wang et al., (2021) found that women focus more on their appearance when there is a higher density of women in their

environment, compared to when there are more men, suggesting that when there are more competitors, the more women focus on enhancing their appearance. This could be a strategy to attract a potential mate (Buss & Schmidt, 1993), which is referred as self-promotion. Another way of competing towards others is by derogating the other person's appearance (Cox & Fisher, 2008) in order to reduce their value to potential mates. It has been shown that women engage in derogatory tactics such as gossiping and labelling the competition with negative traits, e.g. vain and desperate (Kellie et al., 2020).

From here, we hypothesise that (5a) the perceiver's intrasexual competition scores (ICS) will have a main effect on evaluations of middle-aged targets, where the higher the ICS, the more negative the evaluations will be; and (5b) that this will interact with participant age and gender, where younger female participants would be likely to have higher ICS; and (5c) this will also interact with motivation types, where those with higher ICS would give more negative evaluations to those engaging in concealment due to romantic and job reasons, compared to self-esteem.

Current study aims and motivations

Previous studies have shown that various factors influence how individuals who attempt to enhance their appearance using cosmetics and anti-aging techniques have been evaluated. Given the increasing popularity and easier accessibility of less invasive anti-aging techniques to both genders, as well as societal shifts in terms of finding a partner, competitiveness in the labour market, and the surge of 'self-care' movements, it is therefore important to explore whether perceptions of engagement in anti-aging techniques have also shifted.

Following Harris (1994) and Chasteen et al. (2011)'s methods of using vignettes, the current study aimed to investigate how different perceiver factors (age, gender, and intrasexual

competition), target factors (concealment type and motivation type) and their interactions would predict overall ratings of middle-aged women who engage in age concealment.

In summary, this study explores how evaluations of middle-aged women who conceal their age would be predicted by:

(1) Concealment type – particularly moderate (use of hand-held devices) and major procedures (Botox and fillers), implying that severity of procedure could influence whether the action is acceptable;
(2) Motivation type – whether the age concealment is motivated by self-esteem, looking for employment, or seeking romantic partners, implying that reasons behind age concealment could make the action more acceptable;
(3) Perceiver's age – whether younger or older raters would have differing perceptions of target individuals, implying that one's age influences how middle-aged women are perceived for their behaviour;
(4) Perceiver's gender – whether male or female participants would be more accepting of the behaviour, implying that gender differences would exist in evaluations of women who engage in age concealment;
(5) Intrasexual Competition Scores (ICS) – whether those with high or low ICS would influence evaluations, implying that age concealment behaviours could be viewed as a way of increasing competition; and
(6) The interactions between the above variables.

Methods

Participants

493 participants accessed an anonymous link to the study on Gorilla platform (Anwyl-Irvin et al., 2018). Data was collected between 12 January 2021 and 10 February 2021.

Participants were recruited through social media platforms (Facebook and Twitter) and recruitment platforms (surveycircle.com and SONA). Three hundred and six participants completed the tasks and were included in the analysis. Following data cleaning (see below), two participants were removed, leaving 304 participants (230 F, 74 M) with an age range of 18-67 (M = 27.50, SD = 9.51).

Statement of Ethics

Written consent forms were acquired before participants were presented the study. Participants accessed the study using an anonymous link and were able to withdraw by not completing the study at any time. Only completed tasks were included in our analysis. All participants were given an option to be included in a raffle draw as compensation for their time, and a study credit (1) was awarded when the study was accessed through SONA. This study was approved by the Swansea University Ethics Committee and followed the Declaration of Helsinki (World Medical Association, 2015).

Materials

Vignettes (Chasteen et al., 2011)

The vignettes followed the structure from Chasteen et al.'s study (2011; see Supplementary Materials A). These consist of a description of a middle-aged woman engaging in either a moderate (non-invasive, hand-held device) or major (Botox and fillers) procedures to conceal their age, for three different reasons: looking for a job, romantic partner, or for self-esteem. For example, "Angela is a middle-aged woman who wants to maintain a more youthful appearance to look for a *romantic partner.* She regularly uses *non-invasive techniques such as light therapy* that she could use at home as part of her anti-aging routine." Each vignette follow the same format, with the motivation type and concealment type changed accordingly. The vignettes were presented on their own first in the middle of the screen with no time limit. After

each vignette, participants were asked to rate each target individual on eight traits, following Harris' study (1994): admirable, attractive, conceited[r], foolish[r], interesting, pathetic[r], vain[r], and wise.

For our vignettes, we decided to describe only middle-aged targets as they are the highest consumers of anti-aging procedures (ASAPS, 2018). Furthermore, for the interest of time and contemporary changes in the market, we opted only to use moderate (non-invasive, hand-held devices) and major (Botox and fillers) in our vignettes as these are currently the most popular procedures. In addition, data from Chasteen et al. (2011) found that those who used mild procedure received the most positive evaluations, and those who used extreme procedures received the most negative evaluations, and we believe that this would still be the case.

Intrasexual competition scale (ICS; Buunk & Fisher, 2009, see Supplementary Material B)

This is a 12-item questionnaire which aimed to measure how competitive an individual is towards people of the same-sex. Participants were presented a statement relating to their attitude towards same-sex individuals and were asked to rate on a 7-point Likert scale: 1 (not at all applicable) to 7 (completely applicable). Items include 'I wouldn't hire a very attractive man/woman as a colleague,' and 'I can't stand it when I meet another man/woman who is more attractive than I am.' Sums for the 12 items were calculated, with a maximum score of 84. The higher the total score, the more competitive they are with the same-sex individuals.

Procedure

Participants accessed the anonymous study link either through student recruitment sites for course credit or social media advertisement. After providing consent and demographic information (e.g. age, sex, and ethnicity) participants completed the ICS.

The participants were then presented with a total of six individuals who engage in different age concealment techniques for varying reasons. Each trial consisted of the description first – there

was no time limit to the presentation of the vignette – before the participant continued to the evaluation component. The vignette was kept on the left side of the screen, with the traits to be measured presented on the right side. Each trait was followed by a sliding scale with values of 0 (Not at all) to 100 (Extremely). The traits to be evaluated were presented in two screens. The trials were presented in random to the participant to avoid order effects. The study took approximately 8-10 minutes to complete.

Data Cleaning

187 participants did not complete the tasks and therefore were removed from the dataset. In addition, we calculated the standard deviation (SD) for within each participant's responses and removed those who had a standard deviation of zero, as this meant the participant gave consistently the same answers in the study. From this procedure, one participant was removed. Furthermore, as we are looking at gender differences, and we only had one participant who identified as other, we decided to only include participants who identified as male or female. This yielded a final sample of 304.

Design and Analytic Strategy

We fitted a linear mixed effects model in R (R Core Team, 2012) using lme4 (Bates et al., 2012) with a mean rating (averaging all variables together, after reverse scoring conceited, foolish, pathetic, and vain) as the outcome variable, with fixed effects of participant age (scaled), participant gender, participant ICS (scaled), concealment type, motivation type, and their interactions. Participants were used as random effects, reflecting that the ratings come from different individuals. This statistical model allows us to investigate the differences in evaluations of people who engage in different age concealment types (moderate or major) for different motivations (romantic, job or self-esteem) between males and females, across the age and ICS distribution.

The model is as follows:

$$\textbf{Mean Rating} = P_{Age(scaled)} * P_{Gender} * \textbf{Motion} * \textbf{Concealment} * P_{ICS(scaled)} + (1|P)$$

Note. P stands for 'participant', where the age, gender, and ICS values were collected from the participants, rather than the target vignettes.

Results

Descriptive Statistics

Table 1 presents the means and standard deviations of the averaged ratings given by the participants to each target vignette. Overall, female participants gave higher ratings for the targets (M = 56.80, SD = 17.00) than males (M = 52.88, SD = 15.90), moderate concealment procedures were given higher evaluations (M = 60.93, SD = 14.38) than major concealment (M = 50.75, SD = 17.54), and self-esteem motivations received the most positive evaluations (M = 58.75, SD = 16.25), followed by looking for job (M = 55.42, SD = 16.76), and looking for romantic partner received the lowest evaluations (M = 53.36, SD = 17.03). Our raw data and code could be seen in https://osf.io/pj6h8/.

Table 1

Means and standard deviations of the mean rating for each vignette from female and male participants.

Sex		Romantic			Job			Self-esteem		
		Moderate	**Major**	**Overall Romantic**	**Moderate**	**Major**	**Overall Job**	**Moderate**	**Major**	**Overall Self-esteem**
Females (n=230)	Mean	58.83	48.52	53.68	60.73	51.76	56.25	65.71	55.22	60.46
	SD	14.9	18.14	17.36	14.41	17.72	16.75	13.83	16.75	16.22
Males (n=74)	Mean	58.26	46.47	52.36	58.54	47.13	52.83	58.34	48.54	53.44
	SD	11.81	17.46	15.99	14.81	16.39	16.59	12.95	15.76	15.19

Note: The maximum rating for each vignette is 100.

345 **Perceptions model**

346 The complete estimated coefficients for our model are shown in Supplemental Data.
347 We found several significant predictors: gender (b = -4.47, t(643.9303) = -2.128, p = .033),
348 concealment type (b = 8.92, t(1480) = 9.642, p < .001); and ICS (b = -4.33, t(643.9303) = -
349 4.15, p < .001. We also found significant interactions between age and romantic motivation (b
350 = -1.999, t(1840.001) = -2.166, p = .030), age and self-esteem motivation (b = -2.394,
351 t(1480.001) = -2.594, p = .009) and gender and ICS scores (b = 4.901, t(643.930) = 2.336, p =
352 .02). Other interactions were not significant, p > .05.

353 **Main effects**

354 To further investigate the significance of our model, we conducted an ANOVA (using
355 Type III sums of squares) on the fitted linear mixed model in R (R Core Team, 2012). Here we
356 found a significant main effect of gender, F(1,296) = 4.57, p < .001, η_p^2 = .02; where females
357 gave higher ratings (M = 56.80, SD = 17.002) than males (M = 52.88, SD = 15.90). There was
358 also a significant main effect of motivation type, F(2, 1480) = 17.786, p < .001, η_p^2 = .02, where
359 concealment due to romantic pursuits were rated the lowest (M = 53.36, SD = 17.03), followed
360 by employment (M = 55.42, SD = 16.76) and self-esteem reasons (M = 58.75, SD =16.25). We
361 also observed a significant main effect of concealment type, F(1, 1480) = 364.05, p < .001, η_p^2
362 = .20, where moderate treatment was rated higher (M = 60.93, SD = 14.38) than major
363 treatments *(*M = 50.75, SD = 17.54); and a significant main effect of ICS, F(1, 296) = 5.115,
364 p < .024, η_p^2 = .02, where the higher the participant's ICS, the lower the mean rating they
365 provided.

366 **Interactions**

367 Figure 1 demonstrates the two-way interaction found between gender and motivation,
368 $F(2, 1480) = 9.02$, $p < .001$, $\eta_p^2 = .01$. Pairwise comparisons using *emmeans* package (Russel
369 et al., 2017) showed no evidence that that male and female participants were similar in their
370 evaluations of romantic ($p = .59$) and job motivations ($p = .08$), but were significantly different
371 in their evaluations for self-esteem reasons ($p < .001$), where female participants gave higher
372 ratings for ($M = 60.46$, $SD = 16.22$) than male participants ($M = 53.44$, $SD = 15.19$), $p < .001$.
373 Furthermore, we found that within genders, male participants did not differ in their ratings
374 across the three motivation types (all comparisons $p > .05$), whereas female participants gave
375 significantly different ratings across the three motivations ($p < .001$) where they rated romantic
376 reasons the lowest ($M = 53.68$, $SD = 17.36$), followed by employment ($M = 56.25$, $SD = 16.75$),
377 and self-esteem received the highest evaluations ($M = 60.46$, $SD = 16.22$).

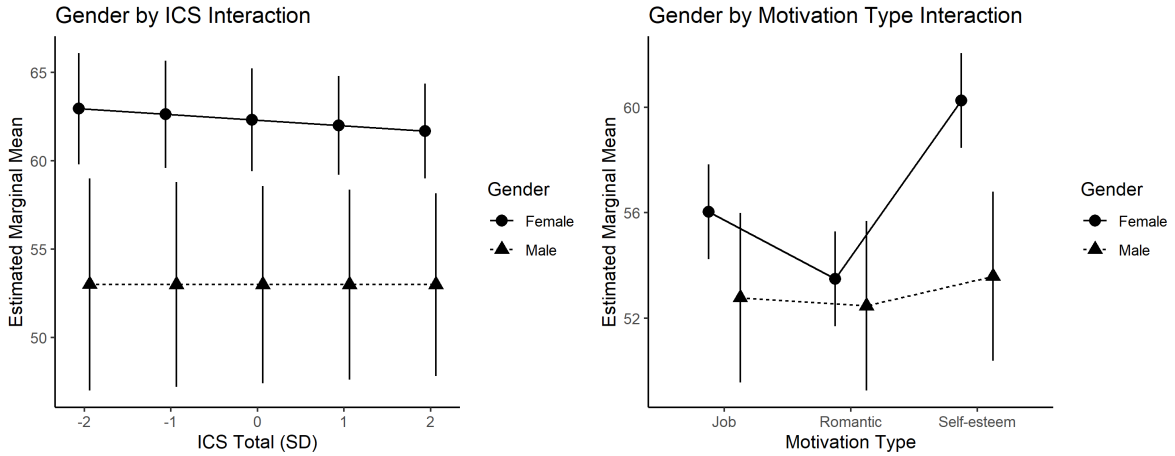
378 We also found a significant two-way interaction between gender and ICS (Figure 2),
379 $F(1,296) = 4.95$, $p = .03$, $\eta_p^2 = .02$. We conducted an estimated marginal means analysis
380 (*emmeans* package on R, Russel et al., 2017) on the ICS scaled to their standardised scores (-
381 2, -1, 0, 1, 2) between each gender. The pairwise comparisons yielded significant differences
382 between male and female participants for each level of ICS, where female participants
383 consistently gave higher ratings than male participants (all comparisons $p < .001$) regardless of
384 ICS scores.

385

386 Figure 1

387 *Illustrations of interactions between variables.*

388



389

390 *Note*: Panel on the left depicts the interaction between participant gender and participant
391 intrasexual competition scores. Panel on the right depicts the interaction between participant
392 gender and target motivation type.

Discussion

The current study investigated how target factors (motivation and concealment type), and participant factors (age, gender, and intrasexual competition scores) would predict how the target individuals who engage in anti-aging behaviour would be evaluated. We presented participants with six hypothetical middle-aged women who varied on their concealment type used and motivation behind the use of anti-aging procedures. To address our hypotheses, we ran a linear mixed model which allowed us to integrate the between and repeated measures variables in a single analysis.

We found a number of main effects and two-way interactions. First, our findings support hypothesis (1a) that there will be a main effect of concealment type, where, as expected, targets who engaged in moderate concealment received more positive evaluations than those who engaged in major concealment. This supports findings from previous studies, where it was found that more invasive procedures were rated negatively than milder ones (Chasteen et al., 2011; Harris, 1994). This implies that the general attitude towards more invasive procedures has not changed. It is worth remembering that although Botox (classed as major procedure in this study) is less invasive than extreme measures such as face-lift in Chasteen et al.'s study (2011), this could be appraised as more invasive than home-use products. It is also important to point out that although the moderate procedure in this study is relatively new to the market, the premise of achieving professional results at home could be viewed as less invasive and more natural (Juhasz et al., 2017). We understand that there are other appearance enhancing procedures that are currently gaining in popularity, such as dermal fillers, which provide instant changes in appearance, however, this is outside the scope of our rationale as we wanted to compare the relatively new domain of home-use devices to those of established anti-aging procedure such as Botox (Chasteen et al., 2011). This will be a good avenue for future research, however. In general, therefore, our findings firstly demonstrate that the overall perception of

418 anti-aging procedures remain the same – that is, the less extreme, the more acceptable it is
419 perceived.

420 Our data also support our hypothesis (2a) that there will be a main effect of motivation
421 type on evaluations of individuals who engage in age concealment. However, we predicted that
422 the three motivations would significantly differ with each other, instead, we found that
423 romantic and employment motivations were rated similarly, and self-esteem reasons were
424 significantly rated higher than the other two motivations. Self-esteem motivations receiving
425 the highest evaluations support previous studies which found that the primary goal of most
426 women wanting to engage in anti-aging procedures was to increase their confidence and body
427 image (Clarke & Griffin, 2008; Muise & Desmairas, 2010; Slevec & Tiggeman, 2010). Overall,
428 this finding highlights the idea that personal wellbeing as motivation for appearance
429 enhancement is more accepted than other motivations. This could also be viewed as women
430 wanting to increase their relational value as they get older (Leary, 2000), as the appearance of
431 youth is perceived to be more positive compared to appearing old (Schoemann & Branscombe,
432 2011).

433 That employment motivations were not rated significantly different from romantic
434 reasons, however, was not expected, as previous studies have shown that middle-aged and
435 older-aged individuals who have engaged in appearance enhancement procedures were deemed
436 as more hireable than their counterparts (Tian et al., 2020), and therefore could be argued that
437 appearing younger to gain or progress in one's career would be more acceptable than finding a
438 partner. However, a study by North and Fiske (2013) have shown that older target individuals
439 were disliked by younger raters when they did not share their wealth, compared to those who
440 were more generous. In relation to employment, we could infer that our middle-aged targets
441 are viewed negatively due to them taking up resources (income) that would otherwise be taken
442 up by others, that is, the younger group. Unlike North and Fiske's study (2013), however, we

did not find an interaction of age and motivation type – although this could be due to the majority of our participants being in a younger age range, and with our current labour market being saturated, the idea that middle-aged targets further competing may have influenced the negative evaluations.

Romantic motivations receiving the most negative evaluations support findings from Chasteen et al (2011) and Harris (1994). One explanation for this could be that as a target's sex and age interact in terms of how the perceivers view them (Sng, Williams & Neuberg, 2020), our participants may have viewed our target as atypical for their sex *and* age, that is, younger women are typically viewed to be more invested in finding a partner and starting a family, therefore, a middle-aged woman trying to find a romantic partner may not fit the stereotype. Further research looking at how male middle-aged targets would be viewed could be beneficial to the literature.

In contrast to our hypothesis (3a), we did not find a main effect of participant age. This contradicts previous studies which found that younger perceivers rated older targets more negatively (Chasteen et al., 2011; Harris, 1994; North & Fiske, 2013; Schoeman & Branscombe, 2011). However, although we tried to recruit a wider age range of participants, our sample is relatively young (mean age = 27.50) and therefore the effect may not have been as salient as expected. It is therefore useful to recruit more older adults for future studies.

On the other hand, our findings support our hypothesis (4a) that there will be a main effect of participant gender on target evaluations, where male participants in general gave harsher ratings than female participants. This supports previous findings by Teuscher and Teuscher (2007) where male participants rated older female targets more negatively, and findings from Harris (1994) where female participants gave higher ratings to targets overall. Additionally, as women are the main consumers of cosmetic products and procedures (ASAPS,

2018), it could be that female raters viewed engaging in age concealment behaviour as more typical and therefore had more positive assessments (Harris, 1994). However, as our study only included female targets, we are not able to explore how male targets would be evaluated. This could be a useful avenue for future research.

Additionally, our results support our hypothesis (4b) that gender would have an interaction with motivation type. However, the trend we originally predicted was not observed. Instead of male participants giving the lowest ratings for romantic motivations and their evaluations increasing for employment and self-esteem motivations, our data show that male evaluations did not significantly differ across the motivation types, whereas female evaluations did. In other words, male participants in general gave lower evaluations overall, regardless of the motivation. This is of particular interest, as such findings contradict the evolutionary perspective, where we expect men to view women who want to look younger to gain a partner negatively as this potentially conceals their reproductive value, a trait suggested to be sought after by males (Buss, 1989; Buss & Schmidt, 1993). It could be that with middle-aged women wanting to appear younger (and if they want to attract a mate), the pool for potential mates would increase and could therefore be beneficial for men. This, however, still poses as an issue in terms of reproductive value, as females face more pregnancy complications and risks as they get older (Maestriperi et al., 2014).

Furthermore, although female participants were more generous in their evaluations overall, they gave harsher evaluations when the target was looking for a romantic partner, followed by employment, and gave the highest evaluations for self-esteem. This supports previous findings by Harris (1994), where it was found that vanity and self-esteem reasons received the highest ratings than looking for partner and employment. This also implies that female participants, rather than male participants, pay more attention to *how* other women consume cosmetic products, and the motivation which influence such behaviour. Previous

studies have shown a similar trend, where Mileva et al. (2016) have found that female observers perceived women who wore more make-up as threat to themselves. This therefore questions the concept of double standards theory, which claims that females engage in appearance enhancement for males (Sontag, 1979) – if this is the case, we would expect males to also have significant differences in their evaluations between motivation types. However, as we did not explore our participants' attitudes and behaviours regarding anti-aging procedures, we cannot fully make assumptions as to their personal motivations.

Finally, our data also support our hypothesis (5a) that the perceiver's intrasexual competition scores (ICS) will have a main effect on evaluations, and as expected, we found that the higher the ICS, the less positive the evaluations were. This is in support of previous studies which showed that female participants would engage in derogatory tactics in order to compete with rivals (Cox & Fisher, 2008; Wyckoff et al., 2019), in this study's case, more negative evaluations towards an individual who is aiming to appear younger.

Our results did not yield a two-way interaction between motivation type and ICS, however, contradicting hypothesis (5b). This implies that those with high competitiveness view others as competitors regardless of the reason behind their appearance enhancement. This supports findings from Arnocky et al (2019), where participants with high competitiveness trait were more aggressive towards our targets. We could infer that as all our targets were engaging in appearance enhancement, this on its own could be reason enough to be viewed negatively. However, unlike Arnocky et al's study (2019), we did not ask our participants to rate our targets on their humanness and therefore we cannot assume that the same psychological mechanism is at work here.

We also did not find a three-way interaction for age, gender and ICS (5c), implying that there are similar levels of ICS across the population, and that evaluations towards the targets

516 are similar across the age range. We did, however, found a significant two-way interaction
517 between participant gender and participant ICS, where males had similar ratings across all
518 levels of ICS and female's mean ratings were significantly different for each level of ICS,
519 where those with higher ICS gave higher evaluations. It could be that as our target individuals
520 were female, intrasexual competition towards the targets is therefore more relevant to the
521 female participants. This supports the general idea that females who are more competitive
522 would view others as threat, and therefore would engage in tactics to reduce their rival's
523 potential (Wyckoff et al., 2019).

524 One limitation of the current study is that we only investigated how male and female
525 perceivers would evaluate *female* targets. This therefore did not allow us to fully investigate
526 the double standards of aging, as we cannot make conclusions as to how male age concealers
527 would be evaluated. To overcome this, future research could include both male and female
528 targets and compare the evaluations between the two. We could expect that male perceivers
529 ICS would have an influence on male, but not female targets, and vice-versa. However, as
530 mating strategy of males do not depend on them looking younger (Buss, 1989; Buss & Schmidt,
531 1993), we do not anticipate changes in the evaluations of male targets as a function of perceiver
532 age and target motivation type.

533 Another limitation of our study is the sole use of vignettes to describe the targets.
534 Recent study by Tian et al. (2020) have shown that participants who were shown pre- and post-
535 treatment photos of age concealers rated the target more positively on their post-treatment
536 appearance. They argued that seeing the results of age concealment would negate the
537 underlying stigma about age concealment. However, as the moderate treatment in the current
538 study aims to be less invasive while aiming to deliver similar results to professional procedures,
539 it could be that those who engage in more extreme procedures would be rated more negatively

when participants are able to compare the results side-by-side. Such studies therefore would need to consider using independent samples to reduce carry-on effects.

Another limitation of the current study is that we did not provide an explicit definition of 'middle-age'. It was previously shown that the perception of onset of 'middle-age-ness' differ between younger and older people, where older participants tend to attribute middle-age onset as later than younger participants (Chopik, Bremner, Johnson & Giasson, 2018; Drevenstedt, 1976). It could therefore be that the subjective views of our participants have affected how they would evaluate our target. This could also explain why we did not find a significant main effect of age, but previous studies did (Chasteen et al., 2011). For future studies, therefore, it would be important to explicitly define the target's age as this could affect evaluations.

In sum, the current study aimed to investigate whether the perceptions of people who engaged in age concealment has changed, given the current societal shift to increasing use of concealment techniques and personal priorities. We found that in general, the less extreme procedure is still regarded more positively, and male participants did not differ in their evaluations regardless of why the target engaged in age concealment. Such findings have implications on how we interpret previous theories which suggest that females primarily engage in such behaviours to attract mates, while the evidence here suggests it may be to compete with other females.

References

American Society for Aesthetic Plastic Surgery (2018). [Internet] **https://www.surgery.org/sites/default/files/ASAPS-Stats2018_0.pdf**

Anwyl-Irvine, A., Massonnié, J., Flitton, A., Kirkham, N., & Evershed, J. (2018). Gorillas in our Midst: Gorilla. sc. *Behavior Research Methods*. https://www.biorxiv.org/content/10.1101/438242v2.full.pdf

Arnocky, S., Proietti, V., Ruddick, E. L., Côté, T. R., Ortiz, T. L., Hodson, G., & Carré, J. M. (2019). Aggression toward sexualized women is mediated by decreased perceptions of humanness. *Psychological Science*, *30*(5), 748-756.

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2014). Fitting linear mixed-effects models using lme4. *arXiv preprint arXiv:1406.5823*.

Beilin, G. (2011). Home-use TriPollar RF device for facial skin tightening: Clinical study results. *Journal of Cosmetic and Laser Therapy*, *13*(2), 69-76. https://doi.org/10.3109/14764172.2011.552607

Bennett, E. V., Clarke, L. H., Kowalski, K. C., & Crocker, P. R. (2017). "I'll do anything to maintain my health": How women aged 65–94 perceive, experience, and cope with their aging bodies. *Body Image*, *21*, 71-80. https://doi.org/10.1016/j.bodyim.2017.03.002

Bjornsdottir, R. T., & Rule, N. O. (2017). The visibility of social class from facial cues. *Journal of Personality and Social Psychology*, *113*(4), 530. https://doi.org/10.1037/pspa0000091

Buunk, A. P., & Fisher, M. (2009). Individual differences in intrasexual competition. *Journal of Evolutionary Psychology*, *7*(1), 37-48. https://doi.org/10.1556/jep.7.2009.1.5

581 Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses
582 tested in 37 cultures. *Behavioral and Brain Sciences, 12,* 1-14.

583 Buss, D. M., & Schmitt, D. P. (1993). Sexual strategies theory: an evolutionary perspective on
584 human mating. *Psychological review*, *100*(2), 204.
585 https://doi.org/10.1017/S0140525X00023992

586 Chasteen, A. L., Bashir, N. Y., Gallucci, C., & Visekruna, A. (2011). Age and antiaging
587 technique influence reactions to age concealment. *Journals of Gerontology Series B:*
588 *Psychological Sciences and Social Sciences*, *66*(6), 719-724.
589 https://doi.org/10.1093/geronb/gbr063

590 Chatterjee, A. (2007). Cosmetic Neurology and Cosmetic Surgery: Parallels, Predictions, and
591 Challenges. Cambridge Quarterly of Healthcare Ethics. Vol. 16. p. 129-137.
592 https://doi.org/10.1017/S0963180107070156

593 Chopik, W. J., Bremner, R. H., Johnson, D. J., & Giasson, H. L. (2018). Age differences in age
594 perceptions and developmental transitions. *Frontiers in psychology*,
595 67. https://doi.org/10.3389/fpsyg.2018.00067

596 Clarke, L. H., & Griffin, M. (2008). Visible and invisible ageing: Beauty work as a response
597 to ageism. *Ageing and Society*, *28*(5), 653. https://doi.org/10.1017/S0144686X07007003

598 Clarke, L. H., & Griffin, M. (2007). The body natural and the body unnatural: Beauty work
599 and aging. *Journal of Aging Studies*, *21*(3), 187-201.
600 https://doi.org/10.1016/j.jaging.2006.11.001

601 Clarke, L. H., Repta, R., & Griffin, M. (2007). Non-surgical cosmetic procedures: Older
602 women's perceptions and experiences. *Journal of Women & Aging*, *19*(3-4), 69-87.
603 https://doi.org/10.1300/J074v19n03_06

Cox, A., & Fisher, M. (2008). A framework for exploring intrasexual competition. *Journal of Social, Evolutionary, and Cultural Psychology*, *2*(4), 144. http://dx.doi.org/10.1037/h0099348

Drevenstedt, J. (1976). Perceptions of onsets of young adulthood, middle age, and old age. *Journal of Gerontology*, *31*(1), 53-57. https://doi.org/10.1093/geronj/31.1.53

Fink, B., Klappauf, D., Brewer, G., & Shackelford, T. K. (2014). Female physical characteristics and intra-sexual competition in women. *Personality and Individual Differences*, *58*, 138-141. https://doi.org/10.1016/j.paid.2013.10.015

Harris, M. B. (1994). Growing old gracefully: Age concealment and gender. *Journal of Gerontology*, *49*(4), P149-P158. https://doi.org/10.1093/geronj/49.4.P149

Hummert, M. L., Garstka, T. A., & Shaner, J. L. (1997). Stereotyping of older adults: The role of target facial cues and perceiver characteristics. *Psychology and aging*, *12*(1), 107. https://doi.org/10.1037/0882-7974.12.1.107

Juhász, M. L., Levin, M. K., & Marmur, E. S. (2017). A review of available laser and intense light source home devices: a dermatologist's perspective. *Journal of cosmetic dermatology*, *16*(4), 438-443. **https://doi.org/10.1111/jocd.12371**

Kellie, D. J., Blake, K. R., & Brooks, R. C. (2020). Behind the makeup: The effects of cosmetics on women's self-objectification, and their objectification by others. *European Journal of Social Psychology*. **https://doi.org/10.1002/ejsp.2767**

Kite, M. E., Stockdale, G. D., Whitley Jr, B. E., & Johnson, B. T. (2005). Attitudes toward younger and older adults: An updated meta-analytic review. *Journal of social issues*, *61*(2), 241-266.

626 Leary, M. R. (1999). Making sense of self-esteem. *Current directions in psychological*
627 *science*, *8*(1), 32-35.

628 Maestripieri, D., Klimczuk, A., Traficonte, D., & Wilson, C. (2014). A greater decline in
629 female facial attractiveness during middle age reflects women's loss of reproductive
630 value. *Frontiers in Psychology*, *5*, 179. https://doi.org/10.3389/fpsyg.2014.00179

631 Mafra, A. L., Varella, M. A. C., Defelipe, R. P., Anchieta, N. M., de Almeida, C. A. G., &
632 Valentova, J. V. (2020). Makeup usage in women as a tactic to attract mates and compete
633 with rivals. *Personality and Individual Differences*, *163*, 110042.
634 https://doi.org/10.1016/j.paid.2020.110042

635 Mileva, V. R., Jones, A. L., Russell, R., & Little, A. C. (2016). Sex differences in the perceived
636 dominance and prestige of women with and without cosmetics. *Perception*, *45*(10),
637 1166-1183. https://doi.org/10.1177/0301006616652053

638 Muise, A., & Desmarais, S. (2010). Women's perceptions and use of "anti-aging" products. *Sex*
639 *Roles*, *63*(1-2), 126-137. https://link.springer.com/content/pdf/10.1007/s11199-010-
640 9791-5.pdf

641 Nash, R., Fieldman, G., Hussey, T., Lévêque, J. L., & Pineau, P. (2006). Cosmetics: They
642 influence more than Caucasian female facial attractiveness. *Journal of applied social*
643 *psychology*, *36*(2), 493-504. https://doi.org/10.1111/j.0021-9029.2006.00016.x

644 Nellis, J. C., Ishii, M., Papel, I. D., Kontis, T. C., Byrne, P. J., Boahene, K. D., ... & Ishii, L. E.
645 (2017). Association of face-lift surgery with social perception, age, attractiveness, health,
646 and success. *JAMA facial plastic surgery*. https://doi.org/10.1001/jamafacial.2016.2206

North, M. S., & Fiske, S. T. (2013). Act your (old) age: Prescriptive, ageist biases over succession, consumption, and identity. *Personality and Social Psychology Bulletin*, *39*(6), 720-734. https://doi.org/10.1177/0146167213480043

Office for National Statistics (2018). [Internet] https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/conceptionandfertilityrates/bulletins/conceptionstatistics/2018

Perry, E. L., & Finkelstein, L. M. (1999). Toward a broader view of age discrimination in employment-related decisions: A joint consideration of organizational factors and cognitive processes. *Human Resource Management Review*, *9*(1), 21-49. https://doi.org/10.1016/S1053-4822(99)00010-8

R Core Team (2013). R: A language and environment for statistical computing. R Foundation for Statistical Computing. Vienna, Austria. URL http://www.R-Project.org/.

Russel, V. L., Buerkner P.,, Herve M., Love, J., Riebl, H. & Singman, H. (2017). Estimated marginal means, aka least-squares means. https://cran.r-project.org/web/packages/emmeans/index.html

Salihu, H. M., Shumpert, M. N., Slay, M., Kirby, R. S., & Alexander, G. R. (2003). Childbearing beyond maternal age 50 and fetal outcomes in the United States. *Obstetrics & Gynecology*, *102*(5), 1006-1014. https://doi.org/10.1016/S0029-7844(03)00739-7

Schoemann, A. M., & Branscombe, N. R. (2011). Looking young for your age: Perceptions of anti-aging actions. *European Journal of Social Psychology*, *41*(1), 86-95. https://doi.org/10.1002/ejsp.738

Sng, O., Williams, K. E., & Neuberg, S. L. (2020). Sex-age stereotyping: Social perceivers as lay adaptationists. *Evolution and Human Behavior*, *41*(2), 136-149.

Slevec, J., & Tiggemann, M. (2010). Attitudes toward cosmetic surgery in middle-aged women: Body image, aging anxiety, and the media. *Psychology of women quarterly*, *34*(1), 65-74. https://doi.org/10.1111/j.1471-6402.2009.01542.x

Slevin, K. F. (2010). "If I had lots of money… I'd have a body makeover:" Managing the Aging Body. *Social Forces*, *88*(3), 1003-1020. https://doi.org/10.1353/sof.0.0302

Sontag, S. (1979). The double standard of aging. In J. Williams (Ed.), *Psychology of women* (pp. 462-478). San Diego, CA: Academic Press.

Swami, V., Pietschnig, J., Stewart, N., Nader, I. W., Stieger, S., Shannon, S., & Voracek, M. (2013). Blame it on patriarchy: More sexist attitudes are associated with stronger consideration of cosmetic surgery for oneself and one's partner. *International Journal of Psychology*, *48*(6), 1221-1229. https://doi.org/10.1080/00207594.2012.740566

Tian, L., Bashir, N. Y., Chasteen, A. L., & Rule, N. O. (2020). The Effect of Age-Stigma Concealment on Social Evaluations. *Basic and Applied Social Psychology*, 1-16. https://doi.org/10.1080/01973533.2020.1741359

Teuscher, U., & Teuscher, C. (2007). Reconsidering the double standard of aging: Effects of gender and sexual orientation on facial attractiveness ratings. *Personality and Individual Differences*, *42*(4), 631-639. https://doi.org/10.1016/j.paid.2006.08.020

Wagstaff, D. L. (2018). Comparing mating motivations, social processes, and personality as predictors of women's cosmetics use. *Evolutionary Behavioral Sciences*, *12*(4), 367. https://doi.org/10.1037/ebs0000119

Wang, X., Chen, H., Chen, Z., & Yang, Y. (2021). Women's intrasexual competition results in beautification. *Social Psychological and Personality Science*, 12(5):648-657. doi:10.1177/1948550620933403

World Medical Association (2015). [Internet] Retrieved from: https://www.wma.net/wp-content/uploads/2016/11/Ethics_manual_3rd_Nov2015_en_1x1.pdf#page=102

Wyckoff, J. P., Asao, K., & Buss, D. M. (2019). Gossip as an intrasexual competition strategy: Predicting information sharing from potential mate versus competitor mating strategies. *Evolution and Human Behavior*, *40*(1), 96-104.

700