



How does humor production and appreciation relate to age and a male bias regarding humor?

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Abstract:

The aim of this study was to provide insight in how humor production and humor appreciation is related to gender and a male bias regarding humor. The assumption that men could be funnier is widely shared (Howrigan & MacDonald, 2008; Greengross & Miller, 2011; Mickes et al., 2012). However, there are mixed results in the differences in humor production and appreciation and enough evidence to see if these differences could be explained by a male bias (Mickes et al., 2012; Hooper, Sharpe & Roberts, 2016; Tosun, Vaghihi & Vaid, 2018). Participants ($N=163$) were asked to perform a humor appreciation task where they were asked to score their appreciation on authorless cartoons from The New Yorker on a Likert-scale. After that they were asked if they thought the same cartoons were written by men or women and the question was asked if they thought males, females or equal were funnier. The next task was a humor production task to create funny captions to four cartoons. No difference was found between gender and humor production, appreciation and male bias. More people see men as funnier than women, regardless of the scores. Male bias was present among all ages. Future research could look if self-efficacy is an explanation for the male bias. It could also be interesting to look whether this bias is present among different cultures.

The importance of humor is widely shared and underestimated. It is appreciated by people all over the world. Due to the benefits of humor (Lurie & Monahan, 2015), it is acknowledged in science and in the clinical practice. Using humor in the clinical practice has many advantages. It has effect on emotions and perceptions which benefit the psychological state directly or indirectly (Gelkopf, 2011). It is also used to discuss difficult topics in therapy and to work on the therapeutic alliance. Therefore, it is important to find out more about the different relationships that humor has with various factors. This research will focus on the role of gender in humor production and appreciation. And if there is a male bias regarding humor.

The concept of humor production and humor appreciation is like a social interaction. For someone to be humorous, another one must be amused, it requires a producer and an audience (Robinson & Smith-Lovin, 2001). The concepts need each other but are essentially different. Humor production is seen as the ability to saying, creating or doing something which someone else find funny (O'Quin & Derks, 1997; Greengross, Silvia & Nusbaum, 2020). Humor appreciation is the ability to evaluate humor as good or not (Uekermann & Daum, 2006).

There is a stereotype about gender differences in humor, more specifically that men are funnier than women (Greengross, Silvia & Nusbaum, 2020). Researchers have looked at whether this assumption may be true. Many researchers use captionless cartoons to create the opportunity to test humor production abilities (Kohler & Ruch, 1996; Greengross & Miller, 2011; Christensen, Nusbaum, Silvia & Beaty, 2017). The results are not ambiguous. As most of the studies report higher humor production scores in men (Bressler, Martin & Balshine, 2006; Mickes, Walker, Parris, Mankoff, & Cristenfeld, 2012), some studies found equal or even slightly better humor production scores in females (Hooper, Sharpe & Roberts, 2016). With the assumption that men could indeed be funnier (Howrigan & MacDonald, 2008; Greengross & Miller, 2011; Mickes et al., 2012), the question risen how this could be explained.

One explanation for this difference in humor production may lie in the theory of sexual selection (Bressler, Martin & Balshine, 2006; Greengross & Miller, 2011; Greengross, 2014; Greengross, Silvia & Nusbaum, 2020). According to this theory, men and women differ in preference and behavior due to different parental investments. The sex with the highest reproduction costs tend to be choosier in selecting a potential mate (Greengross, Silvia & Nusbaum, 2020). One of the most desirable trait for both men and women is general intelligence (Buss, 1989). And one of the mental fitness indicators for intelligence is humor (Miller, 2000). With the thoughts that women are choosier, men would be more motivated to use humor production to attract a women. The higher humor production is not only to attract a women but also to compete with other men

(Miller, 2000b).

This leads to the expectation that men have better humor production than women, as the pressure for women to attract a man is weaker and the use of humor would be more irrelevant (Bressler, Martin & Balshine, 2006). Researchers have supported this view (Toro-Morn & Sprecher, 2003; Lippa, 2007). However, a critical note should be that a good sense of humor in a potential partner is widely interpreted in research. Different studies showed that men see a good sense of humor as a concept where women laugh at their humor (Bressler, Martin & Balshine, 2006; Mickes et al., 2012; Greengross, 2014; Hone, Lurwitz & Lieberman, 2015). Where women see a good sense of humor as a concept where men will make them laugh (Bressler, Martin & Balshine, 2006; Mickes et al., 2012; Greengross, 2014; Greengross, Silvia & Nusbaum, 2020).

Another explanation for the difference in humor production lies in social roles. Gender differences may have arisen from historical borders of men and women in society. In many places, men have more power and status (Greengross, Silvia & Nusbaum, 2020). This could lead to more dominant and masculine behavior by men and more subservient and passive behavior by women. If there is a stereotype that men have better humor production than women, both genders might try to fit into that expectation (Greengross, Silvia & Nusbaum, 2020). This expectation could have made it harder for women to produce humor and eventually lead to the idea that women are less funny (Porter, 2002; Kotthoff, 2006). For many years women were the objects of jokes and historically the role expectation for women to be pretty, modest and decent did not suit the use of humor (Porter, 2002; Kotthoff, 2006). Evidence for this lies in the study of Robinson and Smith-Lovin (2001). They found that women joke more when men are not present. Even more than men joke when women are not present. So, maybe the difference in humor production is influenced by social roles and expectations or even a male bias regarding humor.

Men seems to be more focused on cues showing that women appreciate their humor (Bressler, Martin & Balshine, 2006; Greengross, 2014; Hone, Lurwitz & Lieberman, 2015). So are there also gender differences in the appreciation of humor? Research suggests that men and women may appreciate different kinds of humor (Crawford 1995; Lundell 1993). Some studies point out that research on gender differences in humor production and appreciation has been based on a male type of humor with jokes that are sexual or hostile in content (Crawford, 1995; Crawford; 2003; Kotthoff; 2006). This could lead to differences in humor appreciation. Another important factor to consider is that men evaluate their humor more positive than women (Robinson & Smith-Lovin, 2001). There appears to be a preference in gender. Both men and women seem to have a preference for men's humor. (Mickes et al., 2012). However, this result is not widely

shared (Tosun, Vaghihi & Vaid, 2018). Some studies have not found a difference in the appreciation of humor between genders (Köhler & Ruch, 1996; Edwards & Martin 2010; Hull, Tosun & Vaid, 2017). And other studies describe that men might not be funnier than women, but that there is a male bias regarding humor (Mickes et al., 2012; Hooper, Sharpe et al., 2016; Tosun, Vaghihi & Vaid, 2018). It is interesting to discuss whether the differences in humor production and appreciation are based on this male bias regarding humor.

As described above, there are several reasons to believe that the gender differences in humor may be due to concepts other than the humor itself. One interesting result is that men are seen as funnier than women regardless of how their humor is judged (Mickes et al., 2012; Hooper, Sharpe & Roberts, 2016; Tosun, Vaghihi & Vaid, 2018). And when people are asked to describe an individual who is funny or asked which sex has a greater sense of humor, both women and men are more likely to describe a man (Crawford, 1995; Nevo, Nevo, & Yin, 2001; Mickes et al., 2012; Hooper, Sharpe & Roberts, 2016). This result is present among different cultures (Nevo, Nevo, & Yin, 2001; Tosun, Vaghihi, & Vaid, 2018). The social roles could have led to the idea that women are less suitable for using humor. This idea may suppress women in their willingness and their ability to produce humor, which can put them at a disadvantage compared to men (Porter, 2002; Kotthoff, 2006; Greengross, Nusbaum & Silvia, 2020). With the changes in societal consciousness that has taken place over the years in the field of gender and humor, one would expect that this stereotype would be less present (Kotthoff, 2006). However, over all time periods, men consider men as the embodiment of a great sense of humor (Tosun, Vaghihi, & Vaid, 2018). Another explanation for this bias could be an availability bias. Looking at comedians and comedy writing, men are still vastly in the majority compared to women (Schwerm, McDermott & Thorpe, 2015; Tosun, Vaghihi, & Vaid, 2018). This difference can perpetuate a male bias regarding humor, and therefore prime people to think of men as the embodiment of a great sense of humor instead of women (Tosun, Vaghihi, & Vaid, 2018). The limited studies that have looked into the male bias regarding the appreciation of humor were all done with students (Nevo, Nevo, & Yin, 2001; Mickes et al., 2012; Hooper, Sharpe & Roberts, 2016; Tosun, Vaghihi, & Vaid, 2018). So far, no study has yet looked at this male bias in elderly people. It is interesting to see whether the differences in humor and gender are also present over different ages. With social roles being more clear in the past, it could be expected that elderly people grew up with the idea that women are not funny, more than nowadays.

The aim of this study is to investigate how humor production and appreciation are related to gender and a male bias. Considering previous research, the following hypotheses have been

formulated. It is expected that humor production scores are higher in men than women. That with gender concealed, humor appreciation is equal in gender. It is also expected that men and women have equal male bias scores and that this bias is present among all ages. At last it is expected that higher male bias scores relate to higher humor appreciation scores.

At least the research questions how humor production and how humor appreciation are related to gender and male bias are investigated.

Methods

Design

The aim of this study was to investigate how humor production and humor appreciation were related to gender and a male humor bias. To answer these questions a quantitative, cross-sectional research was conducted online. Cartoon tasks has been used to measure humor from a sample of different ages across two nationalities.

Participants

In this research 166 participants were recruited in the Netherlands and Greece by means of a convenience sample. All the participants gave informed consent. Everyone with the age between 18 and 85 could participate in this study. Three participants were removed from the analysis due to extreme outliers, looking at the results there was enough reason to remove these participants from the study. This resulted in a sample size of 163 ($N=163$). The sample ranged from 18-83 years of age ($M=40,64$, $SD=16,74$) and consisted of 69 males ($M=40,33$, $SD=1,64$) and 94 females ($M=41,06$, $SD=2,15$). Table 1 shows highest level of education in the different nationalities.

Table 1 *Highest level of education in percentages*

Educational levels	<i>Dutch</i>	<i>Greece</i>
Primary school	0%	14,1%
Secondary school	6,4%	17,6%
Tertiary vocational	32,1%	3,5%
Tertiary higher vocational	39,7%	12,9%
Tertiary university	21,8%	51,8%

Measures

To collect demographic information, different questions regarding gender, age, nationality and education levels were asked. The education levels were, primary school, secondary school, tertiary vocational, tertiary higher vocational and tertiary university.

To measure humor appreciation twenty cartoons were drawn from the New Yorker Cartoon Bank. It was decided to use cartoons from the New Yorker Cartoon Bank, after permission has been requested, to be consistent with previous conducted humor appreciation studies (Greengross & Miller, 2011; Mickes et al., 2012; Hooper, Sharpe & Roberts, 2016). Ten cartoons with captions written by women and ten cartoons with captions written by men were selected in agreement between four researchers. Inclusion criteria were used to select the cartoons, they needed to be gender, cultural and age neutral. The English captions were translated into Dutch and Greek. By using forward and backward translation it was made sure they were translated right. The authors name was removed from the cartoon in order to not reveal the gender. The cartoons were shown one by one and with each cartoon the question was



asked: How much do you appreciate this joke? Participants could answer this question on a 5-point Likert scale from 1, not funny at all to 5, very funny. To measure humor bias, participants were asked to indicate whether they thought the cartoon was written by a man or a woman. And the question was asked if they thought men, women or equal were more funny.

To measure humor production, four other cartoons from the New York Cartoon bank were selected. The captions and authors were removed from the cartoon. With no time limit people needed to write something funny with each caption. After collecting the data, the humor production was rated by 10 judges between 20 and 63 years of age. The Dutch sample ($N=73$) was judged by 5 Dutch speaking judges and the Greek sample ($N=84$) by five Greek speaking judges. Every judge rated every caption in their sample in randomized order on a 5-point Likert scale from 1, not funny at all to 5, very funny. Invalid jokes, for example only a dot, could be rated as invalid.

The program used to conduct the research was the online survey tool Gorilla (Anwyl-Irvine, Massonnié, Flitton et al., 2020). The data analysis was conducted with the 25th version of SPSS statistics (IBM Corp., 2017).

Procedure

The research was conducted online to optimize the number of participants. Participants were asked to read the informed consent, and by continuing they gave permission. After that the demographic questions of gender, age and education were asked. After a short introduction twenty authorized cartoons with captions (ten written by a man and ten written by a woman) were shown randomized. Participants were asked to rate how much they appreciated the cartoons. In the next round they were asked if they thought it was written by a man or a woman. And the general question was asked if they thought men, women or both are funnier. After the humor appreciation task, four cartoons without captions were shown in randomized order. Participants were asked to fill in a funny caption for each of the cartoons, without any limitations. After this task the participants could leave their email address in order to get the results of this research. There was also space to leave comments in order to get feedback and there was a link to the original cartoons with English captions so they could see the original jokes to make a comparison with their own jokes.

Data-analysis



The data was analyzed with SPSS statistics 25. The first hypothesis was: Humor production scores are higher in men than women. The hypothesis will be tested with an independent samples t test. The second hypothesis was: Men and women appreciate men's humor more. The hypothesis will be tested with descriptives and an independent samples t test. The third hypothesis was: Men and Women have equal male bias scores regardless of age. This hypotheses will be tested with a one-way analysis of covariance (ANCOVA). The fourth hypothesis: The higher the male bias score, the higher the humor appreciation and production score. This will be tested with a multiple regression. The fifth and sixth hypothesis were: How does humor appreciation relate to gender and male bias? And how does humor production relate to gender and male bias? Both hypotheses will be tested with multiple regression. For all three the multiple regressions different correlations will be performed.



Results

Before starting the analysis, all the variables were checked for outliers and normality. Male bias scores had three extreme outliers, after visual inspection of the raw data, these three have been removed. Humor production and appreciation were normally distributed. Age and male bias score were not normally distributed but visually acceptable.

Hypothesis 1: Humor production scores are higher in men than women.

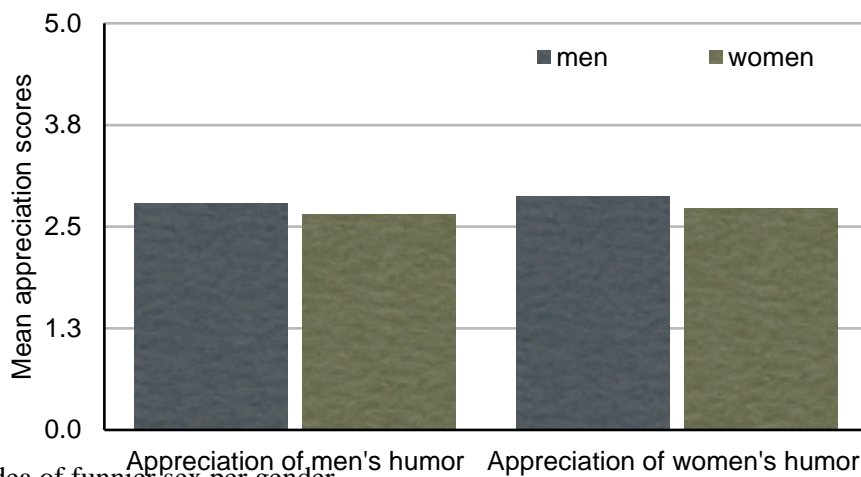
To test the first hypothesis, an independent samples t test was used to compare the average humor production scores between men ($n= 67$) and women ($n= 90$). Levene's test was non-significant, indicating that equal variances can be assumed. The t test was non-significant, $t(155) = 0.39$, $p=.969$, two tailed, $d=0.00$, 95% CI [-0.18, 1.93]. Men and women do not differ in humor production scores. The first hypothesis is rejected.

Hypothesis 2: men and women appreciate men's humor more

To test the second hypothesis, descriptives were computed for the appreciation of men's humor and women's humor. Graph 1 compares the means of cartoon appreciation on the 5-point Likert scale, divided for men and women. Men appreciate women's cartoon captions ($M=2.87$, $SD=.73$) more than men's cartoon captions ($M=2.78$, $SD=.75$). Women appreciate women's cartoons caption ($M=2.72$, $SD=.73$) more than men's cartoon captions ($M=2.65$, $SD=.72$). The results are shown in Graph 1.

An independent samples t test was used to test if the difference between men ($n= 69$) and women ($n= 94$) on the appreciation of humor was statistically significant. Levene's test was non-significant, indicating that equal variances can be assumed. The t test was non-significant, $t(161) = -1.30$, $p=.195$, two tailed, $d=-0.21$, 95% CI [-7.18, 1.48]. Men and women do not differ in humor appreciation scores, so the second hypothesis is rejected.





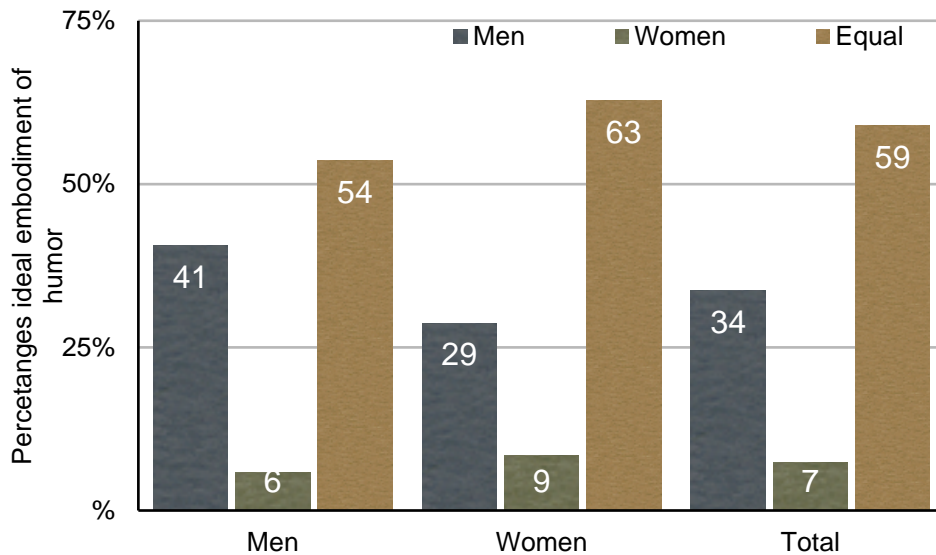
Graph 2 Idea of funnier sex per gender
 Graph 1. Appreciation of humor per gender

Hypothesis 3: Men and women have equal male bias scores regardless of age.

To test the third hypothesis, a one-way analysis of covariance (ANCOVA) would be performed. However, the assumption of linearity was violated and therefore an ANCOVA would be inappropriate. So, an independent samples t test was used to compare the average male bias scores reported by males (n= 66) to the average humor appreciation reported by females (n=93). Levene's test was non-significant. Thus, equal variances can be assumed. The t test was non-significant, $t(157) = -.109$, $p = .640$, two tailed, $d = 0.02$, 95% CI [-0,56, 0.54]. Men and women do not differ in male bias scores. To examine if male humor bias was present regardless of age, a bivariate Pearson's correlation coefficient (r) was calculated. The bivariate correlation between these variables was statistically non-significant, $r(160) = .064$, $p = .417$. No differences in male bias over age are present. The hypothesis is accepted.

To further examine if the male bias regarding humor is present, the question is asked if both genders believe men are the funnier sex. In total 33,7% of the participants believe men are funnier compared to 7,4% of participants who think females are funnier. The majority of participants (58.9%) believe men and women are equally funny. In Graph 2 the percentages per gender are shown.





Hypothesis 4: The higher the male bias score the higher the humor appreciation and humor production

The fifth hypothesis, that male appreciation bias is higher when cartoon appreciation and humor production are higher, is tested with correlations and a multiple regression.

To assess the size and direction of the linear relationship between male bias score and humor appreciation, a bivariate Pearson's correlation coefficient (r) was calculated. The bivariate correlation between these two variables was statistically non-significant, $r(159) = -.082$, $p=.304$. There was also a statistically non-significant bivariate correlation between male bias score and humor production, $r(153) = .093$, $p=.251$ and between humor appreciation and humor production, $r(157) = .032$, $p=.691$. The correlations are shown in table 2.

A standard multiple regression was performed to estimate the proportion of variance in male appreciation bias that can be accounted for cartoon appreciation and humor production. Assumptions of normality, linearity and homoscedasticity of residuals, which were inspected with scatterplots, were met. Also, Mahalanobis distance did not exceed the critical X^2 $df=2$ ($\alpha=.001$) of 13.82, indicating that multivariate outliers were not of concern. Humor appreciation and humor production accounted for a non-significant 1.1% of the variability in humor appreciation, $R^2=.01$, adjusted $R^2= -.003$, $F(2,152) = .801$, $p=.451$. In Table 3 the Unstandardised (B) and Standardised (β) regression coefficients for humor appreciation and humor production are reported. This hypothesis is rejected. Male bias seems not to be related to humor appreciation and humor production.

Hypothesis 5: How does humor appreciation relate to gender and male bias?



The fifth hypothesis is tested with correlations and a multiple regression.

To assess the size and direction of the linear relationship between humor appreciation and gender, a bivariate Pearson's correlation coefficients (r) were calculated. The bivariate correlation between these those variables was statistically non-significant, $r(163) = .102$, $p=.195$. There was also a statistically non-significant bivariate correlation between humor appreciation and male bias score, $r(159) = -.082$, $p=.304$, and between gender and male bias score, $r(159) = .009$, $p=.913$. The correlations are shown in table 2.

A standard multiple regression was performed to estimate the proportion of variance in humor appreciation that can be accounted for by gender and male bias. Assumptions of normality, linearity and homoscedasticity of residuals, which were inspected with stem-and-leaf plots scatterplots, were met. Also, Mahalanobis distance did not exceed the critical X^2 $df=2$ ($\alpha=.001$) of 13.82, indicating that multivariate outliers were not of concern.

Multicollinearity was also not of concern with high tolerances for both predictors. Gender and male bias accounted for a non-significant 1.6% of the variability in humor appreciation, $R^2=.02$, adjusted $R^2=.004$, $F(2,158) = 1,28$, $p= .280$. In Table 3 the Unstandardised (B) and Standardised (β) regression coefficients for age and male bias are reported. This hypothesis is rejected. Humor appreciation seems not to be related to male bias and gender.

Hypothesis 6: How does humor production relate to gender and male bias?

The sixth and last hypothesis is tested with correlations and a multiple regression.

To assess the size and direction of the linear relationship between humor appreciation and gender, a bivariate Pearson's correlation coefficients (r) were calculated. These correlations are shown in hypothesis 4 and 5 and the correlations are shown in table 2.

A standard multiple regression was performed to estimate the proportion of variance in humor production that can be accounted for by gender and male bias. Assumptions of normality, linearity and homoscedasticity of residuals, which were inspected with stem-and-leaf plots scatterplots, were met. Also, Mahalanobis distance did not exceed the critical X^2 $df=2$ ($\alpha=.001$) of 13.82, indicating that multivariate outliers were not of concern.

Multicollinearity was also not of concern with high tolerances for both predictors. Gender and male bias accounted for a non-significant 1.0% of the variability in humor appreciation, $R^2=.01$, adjusted $R^2= -.003$, $F(2,150) = 0,77$, $p= .462$. In Table 3 the Unstandardised (B) and

Standardised (β) regression coefficients for age and male bias are reported. This hypothesis is rejected. Humor appreciation seems not to be related to male bias and gender.

Table 2 Pearson correlations among variables

	1	2	3	4
1.Male bias	-			
2.Gender	.009	-		
3.Humor production	.093	-.003	-	
4.Humor appreciation	-.082	.102	.032	-

Table 3 Regression coefficients for each predictor per hypothesis

Dependent variable	Predictor	B [95% CI]	β
Male bias <i>n</i> =153	Humor appreciation	.283 [-.195, .761]	.095
	Humor production	-.005 [-.026, .015]	-.043
Humor appreciation <i>n</i> =159	Gender	2,737 [-1.680, 7.155]	.097
	Male bias	-.649 [-1.875, .578]	-.083
Humor production <i>n</i> =153	Gender	-.046 [-.236, .144]	-.039
	Male bias	.032 [-.022, .086]	.094

Note. CI=confidence interval

Discussion

The current research aimed to investigate the relationship between humor appreciation, humor production, gender and male bias. The main conclusion of this study is that there seems to be no difference in gender regarding humor. Humor production, humor appreciation and male bias

scores were equal between genders. There seems to be a male bias and this is present among all ages. Humor production and humor appreciation do not seem to explain the male bias. Gender and age appears not to explain humor production nor humor appreciation.

The first result, that men did not have higher humor production scores, was not in line with the sexual selection theory (Bressler, Martin & Balshine, 2006; Greengross & Miller, 2011; Greengross, 2014; Greengross, Silvia & Nusbaum, 2020). This result may confirm a male bias. With the idea that men would have higher humor production scores but in the reality they are equal to women. This corresponds with the research of Hooper, Sharpe and Roberts (2016), they found that men and women rated humor production of women slightly higher than men. An explanation for this result may lie in the research from Robinson and Smith-Lovin (2001), women tell more jokes when men are not around, even more than men joke when women are not around. In this study, men and women were free to joke without any social control which could have led to less differences in humor production.

Corresponding with the previous result, this study found that there were no differences in the appreciation of humor between gender. Which is against the general view that men are funnier (Mickes et al., 2012; Greengross & Miller, 2011; Ruch, Beermann & Proyer, 2009). This result is interesting and in line with the idea that these differences are based on the male bias regarding humor (Hooper, Sharpe & Roberts, 2016). Just as described in other studies (Mickes et al., 2012; Hooper, Sharpe & Roberts, 2016), when asked to describe who is funnier, the participants in this study consider men to be funnier than women. However, specifically looking at the appreciation of humor divided for gender, when gender was concealed, there was no difference. There was even a slight preference for women's humor. So, although men's humor was not found to be more appreciated in this study, participants still regarded men as funnier than women. An interesting shift is the option that men and women are equally funny, the majority of the participants endorsed the option of equality. Caldwell and Wojtach (2019), also found that more than half of the participants think women and men are equally funny. This could be an indication that the male bias is decreasing. With more social consciousness for gender differences in humor and with less focus on social roles it is expected that male bias is less present than in the past (Kotthoff, 2006; Tosun, Faghihi and Vaid, 2018). In comparison to older studies, there is a change in which more people believe that men and women are just as funny and more people believe women are funnier, where previously the vast majority thought men are funnier. This does not mean that the male bias is gone. Women still do not get the chances men get in showing

their humor and the appreciation still seems to be influenced by a stereotype (Lawson & Lutzsky, 2016).

This study found that male bias scores are equal in men and women, similar to previous research (Nevo, Nevo, & Yin, 2001; Mickes et al., 2012; Hooper, Sharpe & Roberts, 2016). This means that funny captions were attributed to men rather than to women.

Also interesting is the fact that this is the first study to look if the male bias is present among all ages. With more clear social roles in the past than nowadays it was expected that elderly people would have higher male bias scores than younger people. However, there seems to be no age differences in the male bias scores.

The last results of this study were that humor production and humor appreciation appear not to explain the male bias. And that gender and age seem not to explain humor production nor humor appreciation. One study found that self-efficacy could be an important factor in the stereotype and male bias regarding humor (Caldwell & Wojtach, 2019). When self-efficacy is high, women can even outperform men in being humorous (Caldwell & Wojtach, 2019).

One of the strengths of this study was the varied sample. Most of the studies on this subject are done with undergraduate students (Bressler, Martin & Balshine, 2006; Mickes et al., 2012; Hooper, Sharpe & Roberts, 2016). This study focused on all ages and education levels in two different countries. Which makes the sample more representative than other studies.

One concern of this study was the low appreciation scores on the cartoons. Participants were asked to give feedback on the study, more than once there was a comment that the type of humor that was used in this study was not so funny. With an average of 2,7 on a 5-point scale the humor appreciation lies between 'not so funny' and 'neutral'. Nowadays, in the digital era, creating humor and sharing jokes seems to have shifted to the social media platforms (Hirsch, 2017). It could be an option to include this type of humor in future studies to enhance humor appreciation.

The humor appreciation could also be affected by the fact that the jokes were translated. The original cartoons were written in English and translated in Dutch and Greek. The translation has been done literally to ensure equal texts and as few differences as possible in both languages. And even though the cartoons were carefully selected. There are some problems with literal translations of jokes (Low, 2010). A joke should be translated as a joke, where language creativity should be used. This could have affected the funniness of the cartoons.

Another limitation of this research is that the participants come from WEIRD (Western,



Educated, Industrialized, Rich, and Democratic) countries. Which may reflect on only a fraction of the human population (Henrich, Heine & Norenzayan, 2010). This is also a suggestion for follow-up research. It could be interesting to look whether a male bias regarding humor is present among all cultures, where people grew up with very different social roles and norms. It is also important to make note of the digital era of humor as well as the translation of jokes. Future researchers should also consider self-efficacy as an indication for the male bias. When we learn more about where this male bias comes from, we can better implement this knowledge in the clinical practice and use more focused humor to improve people's mental health (Gelkopf, 2011).



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