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What Makes an Idea Creative - How Gender and Domain Can Influence Creativity Perception

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Abstract

Multiple factors can influence the perception of the creativity of an idea, including the gender of the presenter of that idea. Ideas presented by women tend to be judged as less creative than ideas presented by men. Most research focused on this effect has been carried out on a professional level of creativity (Pro-c). However, there are more levels to creativity, such as everyday creativity (little-c). Therefore, this paper tries to find the gender bias, shown on the Pro-c level, on the little-c level. Additionally, it looked at the effects of the domain in which the idea is presented. 166 undergraduates participated in an online experiment in which they observed a male or female presenter who demonstrated a 'masculine' or 'feminine' life hack. Participants subsequently rate the creativity of both the life hack and the presenter. The results show that the gender bias is present on the little-c level, but failed to show the effects of the domain in which the idea was presented. These findings contribute to the overall knowledge about how the gender bias in creativity perception works.

Keywords: Creativity Perception, Gender Bias, Idea Presenter

What Makes an Idea Creative - How Gender and Domain Can Influence Creativity

Perception

According to Think!Creative (Think!Creative, 2017) the seven greatest creative thinkers in history include Steve Jobs, Walt Disney, Isaac Newton, Thomas Edison, Albert Einstein, Leonardo DaVinci, and Marie Curie. Interestingly enough, only one out of these seven thinkers is a woman. This underrepresentation raises the questions: why are there not more female great creative thinkers in history? Moreover, could it be that women overall are less creative than men, or is there something else at play?

Importance of Innovation and Creativity

Before this question is further explored it is important to differentiate between creativity and innovation. Creativity is often used interchangeably with innovation however the literature clearly distinguishes between the two concepts. An idea is seen as creative when it is both novel and useful (Amabile, 1983). Litchfield and colleagues (2015) expanded this idea by splitting useful into two factors, feasibility and value, actively creating three aspects to creativity. An idea becomes an innovation when the idea is seen as creative and gets implemented (Baer, 2012). As such, creativity and innovation are linked yet distinct concepts in which creativity can be seen as part of the innovation process (Baer, 2012)

Innovation contributes to the success and future of companies (Somech and Drach-Zahavy, 2013). An example was presented by Lee and colleagues (2007). They discuss

how the Korean internet company Neowiz managed to become one of the most successful internet companies in a highly competitive climate. Neowiz managed to become and stay successful by coming up with three big innovations over the span of 10 years. This example shows that innovation is crucial for companies to survive and thrive. Given the link between creativity and innovation (Baer, 2012), it is not surprising that creativity also plays a major role in the success of companies. This idea is strengthened by the findings of Somech and Drach-Zahavy (2013) who found that teams with higher creativity ratings implemented more innovations than teams with lower creativity ratings. Essentially, companies need creative ideas in order to produce innovations.

Receiving Side of Creativity

Currently, research focused on creativity in the workplace tends to focus on either idea generation or idea implementation and the factors that influence these processes (Anderson et al., 2014). Zhou and colleagues (2019) point out that one important aspect is not taken into account, namely the fact that the process of idea implementation is part of a social process. They explain that idea generation can occur among individuals, but in order for an idea to be implemented it needs support from others. This idea is in line with the idea journey model by Perry-Smith and Mannucci (2017). They propose that there are four phases an idea goes through before it will be implemented. For an idea to successfully pass through a phase, a specific need must be fulfilled. These needs are influenced by social ties. For example, the second phase is idea elaboration, where a new idea is evaluated to see its potential and it is further developed. In order for an idea to pass this phase the idea presenter needs emotional support from close social ties. Similarly, the review carried out by Rietzschel and colleagues (2019) points out the importance of social

context. They suggest that there should be a distinction between idea evaluation and idea selection. Both of these processes occur in a social setting. The idea will be evaluated or selected either by an individual or in a group setting, both of which are in a social context.

Zhou and colleagues (2019), Perry-Smith and Mannucci (2017), and Rietzschel and colleagues (2019) suggest that the social context plays an important role in idea implementation. Therefore, a different perspective on creativity should be taken. Zhou and colleagues (2019) suggest looking at the receiving side rather than at the proposing side of creativity. Instead of looking at what factors influence the generation of creative ideas, focusing on factors influencing the perceived creativity of these ideas.

Aspects of the Idea

Research has shown that there are aspects of ideas that can influence how creative these ideas are perceived to be. For example, Blair and Mumford (2007) found that ideas that are perceived as risky and original are disliked by people, whereas ideas that have short-term benefits for many people and are in line with social norms are seen as good ideas. These findings are conflicting with the notion that originality is associated with creativity (novelty) and the general belief that people are able to select and implement creative ideas (Staw, 1995). Mueller and colleagues (2012) resolved this contradiction with their studies. They showed that people placed in uncertain situations, as well as, people with low tolerance for uncertainty negatively evaluate creative ideas. As such, people do not dislike original ideas but rather dislike the uncertainty that stems from originality.

Aspects of the Presenter

Apart from aspects of the idea, there are also aspects of the idea presenter that can influence the perception of the creativity of an idea. Sgourev and Althuizen (2014) suggest that ideas presented by people with a higher reputation are more likely to be seen as creative. They found that art pieces drawn in an atypical or original style are regarded as creative but only when it was believed that these pieces were made by high status artists, such as Picasso. Sgourev and Althuizen (2014) suggest that original pieces are harder to evaluate, therefore, people will use heuristics, such as the expert heuristic, to evaluate these pieces. Another aspect of the presenter that influences the creativity perception of their ideas is personality. Goncalo and colleagues (2010) found that ideas pitched by people who scored higher on narcissism were viewed as more creative. However, they did not find a significant correlation between narcissism and creativity. These findings led them to the assumption that narcissists are more enthusiastic while presenting their ideas, which makes their ideas seem more creative. These findings show that the perceived creativity of ideas can be influenced by aspects of presenters despite those aspects being unrelated to the actual creativity of the idea. However, the examples provided above are rather specific, artists and narcissism. Research has shown that there is a bias in creativity perception that influences a larger portion of the population, a gender bias (Proudfoot et al., 2015).

Gender, Sex, and Gender Bias

Before the impact of a gender bias is discussed, it is important to define what a gender bias is as well as the difference between gender and sex. Simon and colleagues (2021) define sex as ‘biological characteristics of an individual, including chromosomes, hormones, and reproductive organs’ (Simon et al., 2021, p.83), while gender is defined as ‘differences between individuals attributable to society and culture and encompasses the concept of self’ (Simon et al,

2021, p.83). This distinction is important because it shows that a gender bias does not just affect cis women, but also trans women. A cis or cis gender woman, is a woman who was born female (sex) and also identifies as a woman (gender). A trans or trans gender woman on the other hand was born male (sex) but identifies as a woman (gender) (Watson, 2020). A gender bias persists when people believe one is incapable or less capable of doing something based on the gender of a person (Simon et al., 2021).

Gender Bias in the Workplace

In the workplace women often face a myriad of biases and stereotypes which make it harder for them to be as successful as men. These biases often affect women in multiple aspects of their work life (Parmer, 2021). Areas influenced by the gender bias include job application, managerial positions, and perceived creativity.

Job Application and Leadership Positions

When it comes to job applications, research has also shown that women have a harder time applying for jobs, especially if these jobs are part of a male dominated field (Keck and Tang, 2020; Bertogg et al., 2020). Bertogg and colleagues (2020) looked at the gender bias in the fields of mechanics and IT, which they found in three different countries: Greece, Bulgaria, and Switzerland. Keck and Tang (2020) similarly found that people were more likely to pick male applicants for a job in a male dominated field (aerospace industry) when the qualities of these male applicants were highlighted by a decoy applicant. However, female applicants did not benefit from these effects. Moreover, women face greater difficulty reaching higher positions since leadership positions are seen as masculine as well (Heilman and Okimoto, 2007). Additionally, women in managerial positions are also judged harsher than men. Chung (2001)

found that successful men in leadership positions got higher performance evaluations than successful women, even though they used the same solution for a problem. Similarly, Braddy and colleagues (2020) found that female leaders who overrated their leadership skills faced negative consequences, while male leaders did not. These papers show that women are at a disadvantage both in job application, as well as, in leadership positions.

Perceived Creativity

Perceived Creativity of Idea Presenter. Another aspect that is also influenced by a gender bias is creativity perception. The meta-analysis carried out by Hora and colleagues (2021) indicates that women are seen as less creative than men. They looked at 259 studies and found that overall men scored higher on creative performance than women. Proudfoot and colleagues (2015) had similar findings with regard to innovative performance of men and women. They found that men were rated as more innovative than women by people in high-power positions (supervisors) but not by people in low-power positions (subordinates). This finding strengthens the notion of a gender bias since people in high-power positions tend to rely on biases and stereotypes more (Fiske & Dépret, 1996). As creativity is an essential part of the innovation process (Baer, 2012), people who are seen as innovative can be considered creative.

Perceived Creativity of Ideas. The gender bias does not only affect the perceived creativity of the presenter but also of the idea itself. Ideas presented by men are often seen as more creative than ideas presented by women (Proudfoot et al., 2015; Lebuda and Karwowski, 2013). Lebuda and Karwowski (2013) found that scientific theories and music pieces got higher creativity ratings when they were signed with male names compared to female names. Furthermore, they also found that pieces signed with female names were rated as less creative

than anonymous pieces. Proudfoot and colleagues (2015) found that for TED talks, the ideas of men were rated as more ingenious, which was the closest descriptor to creativity they had, than the ideas of women. This was even the case when they accounted for competency and popularity of the idea domain.

Explanation Gender Bias in Creativity

The findings presented above show that there is a gender bias in the workplace which is negatively geared towards women. They have a harder time applying for stereotypical masculine jobs, they are judged harsher in leadership positions, and they and their ideas are seen as less creative. The gender bias in job application and leadership positions seems to stem from stereotypical gender roles. Women are not expected to perform well in these positions because these positions are stereotypically seen as masculine. It can be speculated that since the gender bias seems to stem from stereotypical gender roles in these instances, the same could be happening in creativity perception.

The study by Proudfoot and colleagues (2015) shows support for this speculation. They found that people associate the generation of creative ideas with divergent thinking. Divergent thinking is 'a method by which creative solutions are reached via consideration of perspectives that diverge from norms' (Proudfoot et al., 2015, p.2). Additionally, they found that divergent thinking is viewed as being similar to the trait agency. Agency is seen as a masculine trait because it contains behaviour stereotypically seen as masculine, such as distinctiveness. Since divergent thinking is seen as similar to agency and agency is seen as masculine, divergent thinking is also seen as masculine. Furthermore, since divergent thinking is associated with the generation of creative ideas, creativity is also seen as a masculine feature. Hora and colleagues

(2021) support this notion by looking at the cultural level of countries. They found that the gender bias was stronger in countries that had an agentic orientation and weaker in countries that had a communal orientation. These findings suggest that the gender bias in creativity indeed stems from stereotypical gender roles. However, it does not explain why women and their ideas are judged as less creative.

Chang and Milkman (2020) give a possible explanation. They claim that women who break stereotypes often face negative consequences. Women showing characteristics that are seen as stereotypically masculine, such as competence or agency, will be rated lower on characteristics that are seen as stereotypically feminine, such as warmth or empathy. This could explain why women and their ideas are rated lower on creativity. These women are seen as breaking the stereotype, which diminishes their more feminine characteristics in the eyes of the raters. This in turn leads to lower overall ratings for creativity.

Different Levels of Creativity

The existing literature points towards a gender bias in the perception of creative ideas, that seems to be rooted in gender stereotypes. However, previous creativity research focuses on a professional work level but this is not the only level of creativity (Kaufman and Beghetto, 2009). Kaufman and Beghetto (2009) differentiate between four levels of creativity. Small instances of creativity with personal meaning (mini-c), everyday creativity (little-c), creative ideas on a professional level (Pro-c), and groundbreaking new ideas, such as Einstein's theories (Big-c). Existing literature is limited since it is mainly focused on the Pro-c level. Going beyond the Pro-c level is relevant because it could show the extent to which women are affected by this bias. Little-c creativity includes a lot of different ideas in a lot of different areas of life. If the gender

bias is found on the little-c level it would suggest that women are not only affected by the gender bias in the workplace but also in everyday life. There are readily available little-c ideas one can look at, that have not been explored before, life hacks. Life hacks are small adaptations people can make to their daily life to make certain tasks easier for themselves (Altass & Wiebe, 2018). These life hacks can help to see if we find the gender bias that was found at the Pro-c level. This led to the following research question:

RI: Can the gender bias in creativity perception found on the Pro-c level of creativity also be found on the little-c level of creativity?

From Pro-C to little-c

A gender bias in creativity perception exists on the Pro-c level, but there seems to be a lack of research with regards to the gender bias on the little-c level of creativity. Therefore, it is difficult to hypothesize whether or not the gender bias will also occur on this level. However, another phenomenon has been found in creativity that operates on multiple levels, creative polymathy (Kaufman et al., 2010b). Creative polymathy means that one is creative in multiple domains rather than one (Kaufman et al., 2010b). For example, someone is a talented chef and at the same time a talented author. Kaufman and colleagues (2010b) point out that creative polymathy can be found on all four levels of creativity.

Creative polymathy is one example of a creative phenomenon that can be found on multiple levels. There is a notion that other creative phenomena can also be found on multiple levels of creativity, since these phenomena are all built on the same foundations (Kaufman et al., 2010b). Therefore, it would be relevant to research whether or not the gender bias can also be found on multiple levels of creativity. Thus, the first hypothesis is:

H1: Life hacks presented by men will be judged as more creative than life hacks presented by women

Domain of the Creative Idea

Previous research indicates that a gender bias negatively affects the creativity perception of ideas presented by women (Proudfoot et al., 2015; Lebuda and Karwowski, 2013). However, there are instances in which this is not the case. More precisely if the creative idea falls within a domain that is seen as stereotypically feminine, the idea will be seen as more creative when it is presented by a woman. Lebuda and Karwowski (2013) found that ideas in domains seen as more masculine, such as science, were rated as more creative when signed with a male name. However, when ideas were part of a domain seen as feminine, such as art, they were seen as more creative when signed with a female name. This seems to be in line with the findings of Kaufman and colleagues (2010a). They found that poems signed with a female name were rated as more creative than poems signed with a male name. Both Lebuda and Karwowski (2013) and Kaufman and colleagues (2010a) give a similar explanation for these findings, which are rooted in gender stereotyping. Kaufman and colleagues (2010a) noted that women tend to score higher creativity scores on tasks that are seen as non-masculine. Lebuda and Karwowski (2013) explain that domains such as art and literature are seen as more feminine domains. These domains are seen as feminine because they are related to emotionality and self-expression. These personality traits in turn are seen as feminine. This suggests that the reverse effect is also rooted in stereotypical gender roles. Women are expected to be more creative in these domains, because these domains are associated with feminine traits.

These findings show that the domain in which an idea is presented can have an impact on the creativity perception of the idea. However, the research has mainly been done on a Pro-c level. Assuming that the gender bias found on the Pro-c level can also be found on the little-c level, the effects influencing the gender bias on the Pro-c level can also be found on the little-c level. Therefore the second hypothesis is:

H2: The effect of the gender of the presenter on creativity evaluation of the life hack is moderated by the domain of the idea, such that a) the gender effect is stronger in ‘masculine’ domains and b) weaker in ‘feminine’ domains

Methods

It should be noted that this experiment was used to collect data for two master theses. The creation of the experiment, the data collection, and the data analysis was done in collaboration with Weronika Sokolowska (Sokolowska, 2022).

Participants

The final sample consisted of 166 participants (female = 74.7%). The vast majority (47.6%) of the participants were Dutch, followed by 25.3 percent Germans, and a somewhat lower number (6.0%) of Polish participants. The rest of the participants (21.1%) were from none of the previously listed countries. The questionnaire did not require the participants to share their age to minimize the collection of personal and identifiable information. In order to comply with the new General Data Protection Regulation measures enforced at the RUG.

The majority of participants approached for the experiment (78.6%) were first-year Psychology students at the Rijksuniversiteit Groningen (RUG). First year students were required to participate in various research projects in return for course credits. By completing the current

online experiment they were granted 0.4 SONA credits. The remaining participants (21.4%) were approached personally by the researchers and the snowballing sampling method was encouraged to gather more diverse responses. Of these participants, the majority too consisted of students such as psychology students (37.9%) or architecture students (17.2%). The rest of these participants (44.9%) were either working, did not indicate their area of expertise, or studied a subject that no one else mentioned. The participants who were approached personally, unlike the first-year Psychology students from the SONA pool, did not receive any compensation for completing the experiment.

Participants were excluded when they did not complete the questionnaire, failed the attention check, or took more than 30 minutes to complete the questionnaire. Out of the 207 responses to the experiment, 166 responses were used. 20 participants were excluded for failing to complete the experiment, 11 participants were removed for failing the attention check, and 10 participants were removed for taking more than 30 minutes to complete the experiment. These participants were excluded because the experiment should take approximately 12 minutes to complete. It was believed that the manipulations would have lost their strength if the participants took longer than 30 minutes. It should also be noted that one participant did not give their consent and they were therefore not included in the experiment.

Procedure

The procedure differed slightly between participants approached through the SONA system and those approached directly or by snowballing.

The first-year Psychology students of the RUG entered the experiment by signing up via the SONA pool. The experiment was filled out online, via the computer or mobile phone.

Participants were informed about the purpose and procedure of the study and proceeded to start with the experiment after providing their consent. Once they agreed with their data being stored the participants read a small description of what was expected of them during the experiment. Participants were told to imagine themselves being in the role of a recruiter at the company uNlimited (Appendix 4). Next, they were presented with a blog description introducing either Mary or James (Appendix 5). Afterwards, the participants were presented with one of two life hacks, a home renovation life hack, or a home care life hack (Appendix 6). Next, the participants had to rate the creativity of the life hack on different aspects using sliders. Afterwards, the participants had to answer questions about the creative level of Mary/James, the personality of Mary/James, and the agency level of Mary/James using Likert scales. Additionally, participants were asked if they would hire Mary/James. The personality and hiring questions were used as distractors. Next, participants had to answer manipulation checks. Finally, the participants had to answer questions regarding their demographics (nationality, gender, and studies), rate their personal creativity level, and indicate whether or not they paid attention throughout the experiment. Instead of a debriefing the participants received a message telling them they would receive the debriefing once data collection has finished.

The procedure for non-SONA participants was identical to the procedure of SONA participants, apart from two aspects. Firstly, non-SONA participants were approached by the researchers and sent a link to the experiment via email. Secondly, non-SONA participants were debriefed directly after finishing the experiment.

Design

Qualtrics (Qualtrics, Provo, UT, 2020) was used to carry out the survey. The participants were able to fill out the survey in English. The survey contained 53 items of which four were manipulation checks and two were attention checks.

Independent variables

Gender of the Idea Presenter. One of the independent variables in the experiment was the gender of the idea presenter. A between-subject study design was used, there were two levels to this variable, namely Male (James) and Female (Mary). To make sure the gender of the idea presenter became salient the participants were shown a picture (Figure 2) of the candidate. Furthermore, the participants had to read a blogpost introduction which started and ended with the name of the candidate (James/Mary). The full blogpost introduction can be found in the appendix (Appendix 5). Additionally, the questions the participants answered regarding the idea presenter all included the name of the candidate.

Type of Life Hack. The other independent variable was the type of life hack. A between-subject study design was used, there were two levels to this variable, namely the home improvement life hack (screwdriver hack) and the home care life hack (vacuum hack). These types were picked because they are part of the same environment (the home) but are part of different stereotypical gender domains (Cerrato and Cifre, 2018). Home improvement is seen as masculine and part of a masculine domain, while home care is seen as feminine and part of a feminine domain. The results of an informal pilot study showed that these life hacks were most strongly associated with the corresponding gender (vacuum hack was assumed to be presented by a woman and screwdriver hack by a man).

Dependent variables

Creativity of the Life Hack. One of the dependent variables in this experiment was the creativity evaluation of the idea. It was measured using questions from the 80-item Remised CPAM bipolar objective scale (Besemer & O'Quin, 1986). The original test was used to measure the creativity of items (shirts) and contained 11 subscales. This experiment only used questions from the three subscales that were closely related to the three aspects of creativity presented by Litchfield and colleagues (2015). The original subscale was used for novelty, the logical subscale was used for feasibility, and the usefulness subscale was used for value. The items were rated on sliders with five possible options. For example, the participants were asked to rate the life hack on a scale from useless to useful (1 = useless; 5 = useful) (Appendix 1). Cronbach's alpha for these items was $\alpha = .75$.

Creativity of the Idea Presenter. The other dependent variable was the creativity of the idea presenter, which was used by Weronika (Sokolowska, 2022). To measure the creativity of the idea presenter the questions by Proudfoot and colleagues (2015) were used. These questions were originally used to measure creativity of professionals. Five items were used and rated on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). An example is *[Mary/James] seems like a person who is creative* (Appendix 2). Cronbach's alpha is $\alpha = .55$. However, it should be noted that one of the items seemed to have failed. Item 4 was a reverse coded item; *[Mary/James] seems like a person who is not gifted*, however the 'not' was not highlighted. It seems that participants did not notice this reverse questioning and thus answered the question as if it was positively phrased. Therefore, we decided to remove the question which increased Cronbach's alpha to $\alpha = .83$.

Manipulation Checks

A couple of manipulation checks were used to assess whether the participants were adequately influenced by the manipulations throughout the experiment. These manipulation checks ensured the gender of the idea presenter and the domain of the life hack were made salient.

Gender of Idea Presenter. One question was used to check if the gender of the idea presenter had become salient; “*Who was the candidate?*” (Appendix 3). The participants were presented with four options, of which two were distractors (Luisa, a woman in her 40s/50s; Tom, a man in his 40s/50s). The other two options corresponded to the different conditions; “*Mary, a woman in her 20s/30s*” (female condition); “*James, a man in his 20s/30s*” (male condition).

Type of Life Hack. Two questions were used to check if the type of life hack had become salient. The first question was hidden among the questions rating life hack creativity “*Please rate the life hack on the following attributes; feminine-masculine*” (Appendix 3). The second question was “*What life hack did the candidate present during their submission*” (Appendix 3). The participants were presented with four options, of which two were distractors (sponge and oil life hack; cloth folding life hack). The other two options corresponded with the different conditions; “*screw and rubber band life hack*” (home improvement domain condition); “*vacuum cleaner life hack*” (homecare domain condition).

Attention Check. One attention check was used. It was put in among the personality questions and asked the participants to pick the agree option; “*please pick agree*” (Appendix 3). Additionally, two items were reversed coded; “*[Mary/James] seems like a person who is not gifted*” (Appendix 2); “*[Mary/James] seems like a person who cannot make decisions easily*” (Appendix 3).

Results

Preliminary Analysis

Manipulation Check

Out of the three manipulation checks carried out one check seemed to have failed. The findings indicate that the manipulation check where people rated the life hack on the slider from feminine to masculine has failed. Looking at the home renovation life hack 44 out of the 76 participants (57,9%) rated this life hack as androgynous (neither masculine nor feminine) and only 27 out of 76 participants (35,5%) rated this life hack as masculine (Table 1). Looking at the home care life hack 45 out of 89 participants (50,6%) rated the life hack as androgynous and 40 out of 89 participants (44,9%) rated this life hack as feminine (Table 1). For both life hacks more than half of the participants did not attribute a specific gender to the life hack.

The other two manipulation checks were successful. For the manipulation check that checked if the gender of the presenter had become salient three participants picked the distractor options, however out of these participants only two picked the incorrect gender (Table 2). For the manipulation check that checks if the type of life hack had become salient only one participant failed the check (Table 3).

Assumption Checks

Before conducting the ANOVA the normality and homoscedasticity assumptions were checked. To check the normality assumption a histogram and Q-Q plot were created (Figure 1a & 1b). The histogram and plot both indicate an approximately normal distribution. To check homoscedasticity the standard deviations of the different groups have to be equal. These numbers are similar and therefore assumed to be equal. The numbers can be found in table 4. Finally, the

observations between each group are independent of each other. Each participant was only shown one out of the four conditions. Since all the assumptions have been met ANOVA could be carried out.

Descriptive Statistics

Bivariate correlations among the variables gender of the presenter, type of the life hack, and perceived creativity of the life hack can be found in table 5. The correlations show that there is a small positive effect between the gender of the presenter and the creativity perception of the life hack ($r = .15, p = .05$). This finding shows that people rated the life hack presented by the man as more creative than the life hack presented by the woman. Additionally, a small negative correlation was found between the type of life hack and the creativity perception of the life hack ($r = -.21, p = .002$). This finding indicates that the home renovation life hack overall had a lower creativity score than the home care life hack.

Hypothesis Testing

Hypothesis 1

The first hypothesis proposed that the life hacks presented by men would be judged as more creative than those presented by women. A 2(gender of presenter) x 2(type of life hack) ANOVA on the creativity perception of the life hack showed two main effects. Firstly, the ANOVA showed that there was a significant difference between the perceived creativity of the home care life hack and the home renovation life hack ($F(1,162) = 10.63, p = .001$) (Table 6). This shows that the participants who saw the home care life hack rated it as more creative ($M = 3.65, SD = 0.58$) than people who saw the home renovation life hack ($M = 3.37, SD = 0.57$) (Table 4). The ANOVA also showed that there was a significant difference between the

perceived creativity rating of the life hack presented by James and the one presented by Mary ($F(1,162) = 4.99, p = .027$) (Table 6). This shows that participants believed the life hack presented by James ($M = 3.61, SD = 0.59$) to be more creative than the life hack presented by Mary ($M = 3.42, SD = 0.60$) (Table 4). Since the life hacks presented by the man were seen as more creative than the life hacks presented by the woman, the first hypothesis was supported.

Hypothesis 2

The second hypothesis proposed that the main effect of the gender of the presenter on the creativity perception of the life hack would be moderated by the type of life hack that was presented. In such a way that the effect would be stronger for the home renovation life hack (masculine type), and weaker for the home care life hack (feminine type). A two-way ANOVA showed that the interaction effect between the gender of the presenter and the type of the life hack was insignificant ($F(1,162) = 0.47, p = .495$) (Table 6). Therefore, the second hypothesis was rejected.

Explorative Analysis

The results show that one life hack overall was seen as more creative than the other life hack. This could have influenced the findings with regards to the main effect of the gender of the presenter. It is possible that the male presenter was more often paired with the home care life hack. Thus, the difference between the two genders was only there because the male presenter (James) was more likely to present the 'more creative' life hack. This was checked by testing the frequencies of each pairing. As can be seen in table 7 the pairings seem to be evenly divided. 44 participants saw the pairing of James with the home care life hack (26.5%) and 45 participants

saw the pairing of Mary with the home care life hack (27,1%). This shows that James was not more often paired with the home care life hack than Mary.

On another note, literature has not only indicated that the domain in which an idea is presented can influence creativity perception of that idea, but that it can also influence the perceived creativity of the person presenting the idea (Proudfoot et al., 2015). Therefore, an explorative analysis was carried out to see if this effect could be found for the perceived creativity of the idea presenter. As mentioned before the underlying assumptions for the ANOVA model need to be checked. The histogram and plot both indicate an approximately normal distribution (Figure 2a & 2b). The standard deviations of the different groups are similar and can be considered equal (Table 4). Finally, the observations between each group are independent of each other. Since all the assumptions have been met ANOVA could be carried out. A 2(gender of the presenter) x 2(type of the life hack) was carried out to check if these variables affected the creativity perception of the life hack presenter. The results showed that neither the two main effects nor the interaction effect were significant. These are shown in table 8. The findings indicate that neither the type of life hack nor the gender of the presenter influences perceived creativity of the idea presenter.

Discussion

Research has shown that the perceived creativity of an idea can be influenced by the gender of the person presenting the idea (Proudfoot et al., 2015; Lebuda and Karwowski, 2013). Research has also demonstrated that the domain in which the idea is presented also influences creativity perception (Lebuda and Karwowski, 2013; Kaufman et al., 2010). These studies were carried out in a professional business environment. However, creativity can also be measured on

other levels than the professional creativity (Pro-c) level (Kaufman and Beghetto, 2009). This paper looked at little-c creativity, that is, everyday life creativity and to try to extend findings of the Pro-c level of creativity.

Firstly, this paper explored whether the gender bias found on the Pro-c level could be found on the little-c level as well. This paper showed that the life hacks presented by a man were rated as more creative than life hacks presented by a woman. However, the type of life hack had a stronger effect than the gender of the presenter which showed that one of the life hacks (the home care life hack) overall was seen as more creative than the other (the home improvement life hack). An explorative analysis was carried out to test if the findings resulted from a gender bias or a faulty matchmaking between presenter and life hack type. The analysis suggests that there was no faulty matchmaking. Thus, the results indicate that the gender bias does exist on the little-c level of creativity. This is in line with existing research (Proudfoot et al., 2015; Lebuda and Karwowski, 2013; Kaufman et al., 2010; Hora et al., 2021)

Secondly, this paper explored if the effects of the life hack type on the gender bias found on the Pro-c level could be found on the little-c level. It was hypothesized that the life hack type would influence the gender bias in such a way that the bias would be stronger for the home renovation life hack and weaker for the home care life hack. This study failed to recreate the effects found on the Pro-c level. The type of the life hack did not have a significant effect on the way the gender bias operates. One possible explanation for the lack of support found for this hypothesis could be the way the gender of the presenter was presented to the participants. In this study the participants were presented with the presenter's picture, blogpost introduction, and name. However, the studies that also looked at this effect only reported the name of the idea

presenter (Kaufman et al., 2010a; Lebuda and Karwowski, 2013). There is a possibility that the participants instead of focusing on the gender of the presenter focused on other aspects. One example could be the attractiveness of the presenter. Hong and colleagues (2019) found that physically attractive spokespeople are perceived as more credible. It is possible that the participants focused on the attractiveness of the presenter instead of focusing on the gender. If this is the case, the presenters could have been seen as creative because they were perceived as attractive. On another note, Lebuda and Karwowski (2013) found that the type of name can influence creativity perception. They looked at two types of names, unique and common names and found that ideas presented by women only received high creativity ratings when the name was unique. It is possible that the effects found in the study by Lebuda and Karwowski (2013) were not found in this study because the names used for the idea presenters were common names (Mary and James)

Additionally, this paper explored if the gender of the presenter and the type of life hack could have influenced the perceived creativity of the presenter rather than that of the life hack. This explorative analysis was carried out because Proudfoot and colleagues (2015) have shown that the gender bias in creativity influences both the perceived creativity of an idea and perceived creativity of the idea presenter. However, this analysis did not show that the gender of the presenter had an effect on their perceived creativity. This indicates that the gender bias towards the perceived creativity of the presenter, found on the Pro-c level, does not apply to the little-c level.

Implications

From a theoretical viewpoint this study adds to the literature that there is a gender bias in creativity perception, which has a negative effect on women (Proudfoot et al, 2015; Lebuda and Karwowski, 2013). Additionally, this study also found that the gender bias found on the Pro-c level of creativity can also be found on the little-c level. This seems to support the idea that phenomena found on one level of creativity can also be found on other levels.

Additionally, this study shows the magnitude of the impact of this gender bias. Unlike Pro-c creativity which is shown by professionals, little-c creativity is shown by virtually everyone. The importance of creativity in children is pointed out by Alves and colleagues (2021). They note that creativity has positive effects on growth and development of children. Additionally, it is a predictor for creative behaviour later in life. Sternberg (2007) points out that creativity is a habit and children should receive support to continue and develop this habit. However, it is possible that girls and young women might not receive this support if the gender bias exists on the little-c level. Taylor and colleagues (2020) found that men tend to receive more support than women for creative behaviour, which seems to be rooted in the bias that creativity is a masculine trait. This means that the gender bias could negatively affect the growth and development of girls and young women.

Limitations and Future Research

One of the limitations of this study is that the feminine/masculine manipulation of the life hack domain seemed to have failed. The results showed that the majority of people rated the life hack as androgynous. It was assumed that the gender bias was rooted in stereotypical gender roles, therefore it was important that these life hacks did get assigned to a specific gender. Since this did not happen, the domain in which the life hack was presented became inconsequential.

This is a possible explanation as to why the results of Lebuda and Karwowski (2013) and Kaufman and colleagues (2010a) were not replicated.

The two life hacks were designed to feature similar degrees of creativity. However, the results indicate that the home care life hack was considered more creative by participants than the home renovation life hack. This could have influenced the moderating role of the life hack type on the gender bias (Lebuda and Karwowski, 2013; Kaufman et al., 2010a) but it did not influence the effect that the gender of the idea presenter has on the perceived creativity of the idea. The results still indicated that there is a gender bias in creativity on the little-c level.

Future research could extend these findings by focusing on the other two levels of creativity. Kaufman and colleagues (2010b) pointed out that creative polymathy can be found on all four levels of creativity. This paper insinuates that the same is true for the gender bias in creativity since it was found on the little-c level as well. However, in order to solidify this idea the gender bias needs to be found on the other two levels of creativity, mini-c and Big-C, as well.

Conclusion

This study shows that the gender bias found in a professional work setting also applies in everyday life. More specifically, we learned that the gender bias for the perceived creativity of professional ideas, can also be found for the perceived creativity of life hack. Women's ideas tend to be seen as less creative in both instances. This suggests that presenting creative ideas anonymously, without mentioning the gender of the person, could ensure a more objective judgement of the creativity of these ideas.

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Table 1

Frequencies of Ratings Given to the Life Hack Type Manipulation Check Slider

	Domain of the Life Hack				Total
	Home Care Life Hack		Home Renovation Life Hack		
	N	%	N	%	
Feminine ^a	40	44.9%	5	6.6%	45
Androgynous	45	50.6%	44	57.9%	89
Masculine ^b	4	4.5%	27	35.5%	31
Total	89	100.0%	76	100%	165*

*Note. *One participant did not answer this questions therefore the total is 165*

a) Participants indicated that the life hack was strongly feminine or feminine

b) Participants indicated that the life hack was strongly masculine or masculine

Table 2

Frequencies of Answers Given to the Gender of Presenter Manipulation Check Question

	Gender of the Presenter				Total
	Female Presenter		Male Presenter		
	N	%	N	%	
Mary	77	98.7%	0	0.0%	80
James	0	0.0%	86	97.7%	86
Luisa	0	0.0%	1	1.1%	4
Tom	1	1.3%	1	1.1%	2
Total	78	100.0%	88	100%	166

Note. Apart from the names the only difference between the two female options and the two male options was their age

Table 3

Frequencies of Answers Given to the Life Hack Type Manipulation Check Question

	Type of the Life Hack				Total
	Home Care Life Hack		Home Renovation Life Hack		
	N	%	N	%	
Vacuum Cleaner Life Hack	88	98.9%	0	0.0%	90
Sponge and Oil Life hack	1	1.1%	0	0.0%	1
Screw and Rubber Band Life Hack	0	0.0%	77	100.0%	81
Total	89	100.0%	77	100%	172

Note. There was a fourth option 'cloth folding life hack' but this option was not chosen by any of the participants

Table 4

Means and Standard Deviations Across Conditions for Study 1 and Explorative Analysis

	Gender of the Presenter		Type of Life Hack	
	Female (<i>N</i> = 88)	Male (<i>N</i> = 84)	Home Care (<i>N</i> = 91)	Home Renovation (<i>N</i> = 81)
Perceived Creativity of the Life Hack	3.42(0.60)	3.61(0.59)	3.65(0.58)	3.37(0.57)
Perceived Creativity of the Presenter	3.32(0.71)	3.49(0.63)	3.47(0.73)	3.34(0.60)

Note. Standard deviations are given in parenthesis

Table 5

Descriptives and Correlations of Study 1 and Explorative Analysis

	<i>M (SD)</i>	1	2	3	4
1. Gender of the Presenter	-	-	.07	.15*	.13
2. Type of Life Hack	-	-	-	-.24**	-.09
3. Perceived Creativity of the Life Hack	3,52 (0.59)			.83	.45**
4. Perceived Creativity of the Presenter	3,41 (0.67)				.75

Note. $N = 166$ participants. Scale reliabilities are given in bold on the diagonal where applicable.

** $p < .01$; * $p < .05$

Table 6

ANOVA of the Creativity of the Life Hack on the Gender of the Presenter, the Lifehack Type, and Their Interaction

Predictor	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>	partial η^2
Intercept	2009.62	1	2009.62	6208.27	< .001	.975
Gender ^a	1.61	1	1.61	4.99	.027	.030
Type ^b	3.44	1	3.44	10.63	.001	.062
Type*						
Domain	0.15	1	0.15	.47	.495	.003
Error	57.51	162	0.324			

Note. $R^2 = .088$ (Adjusted $R^2 = .071$)

^a the gender of the life hack presenter

^b the type of life hack

Table 7

Frequencies of Gender of Presenter and Type of Life Hack Match

	N	%
James*Home Care	44	26.5%
Mary*Home Care	45	27.1%
James*Home Renovation	44	26.5%
Mary*Home Renovation	33	19.9%

Table 8

ANOVA of the Creativity of the Idea Presenter on the Gender of the Presenter, the Lifehack Type, and Their Interaction

Predictor	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>	partial η^2
Intercept	1891.77	1	1891.77	4197.81	<.001	.963
Gender ^a	1.43	1	1.43	3.17	.077	.019
Type ^b	0.79	1	0.79	1.74	.189	.011
Gender*						
Type	0.00	1	0.00	0.001	.975	.000
Error	73.00	162	0.45			

Note. $R^2 = .028$ (Adjusted $R^2 = .010$)

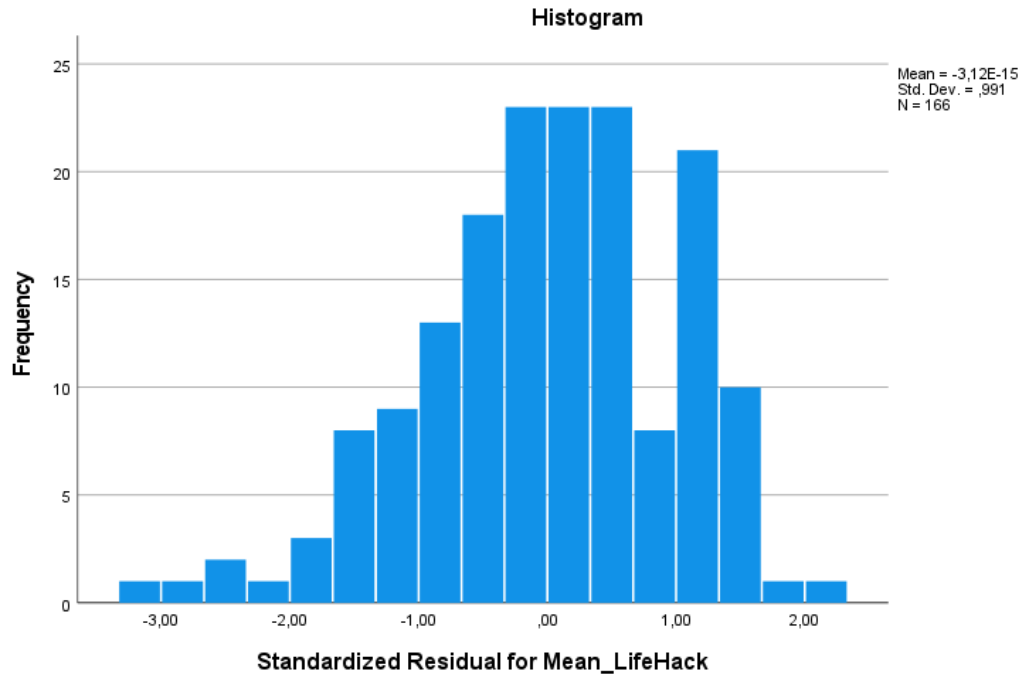
^a the gender of the life hack presenter

^b the domain of life hack

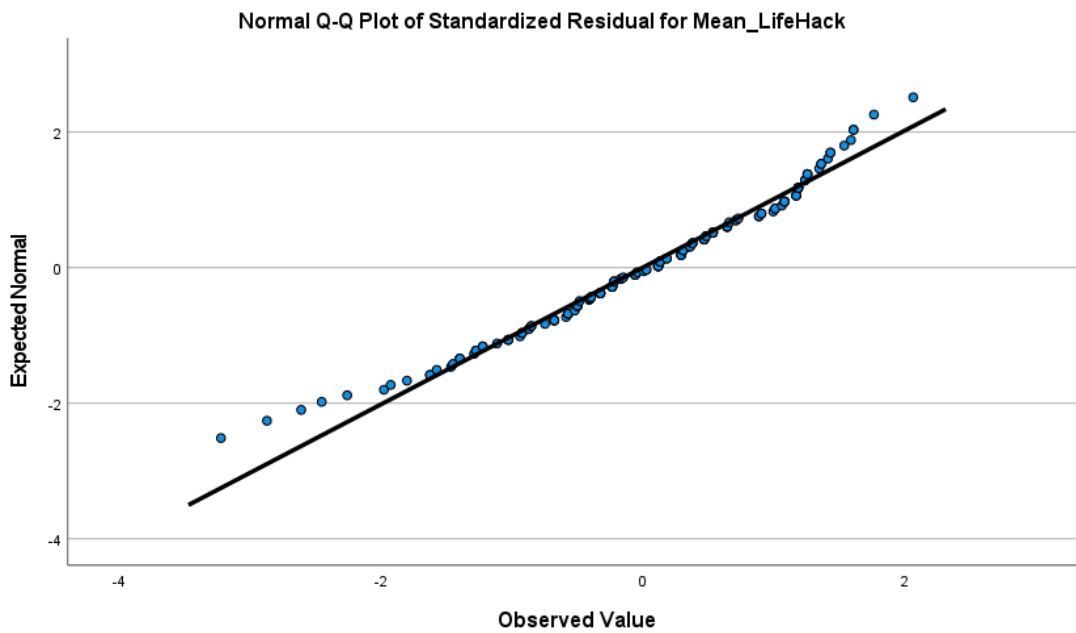
Graph 1

Normality Check Creativity of Life Hack

a) Histogram



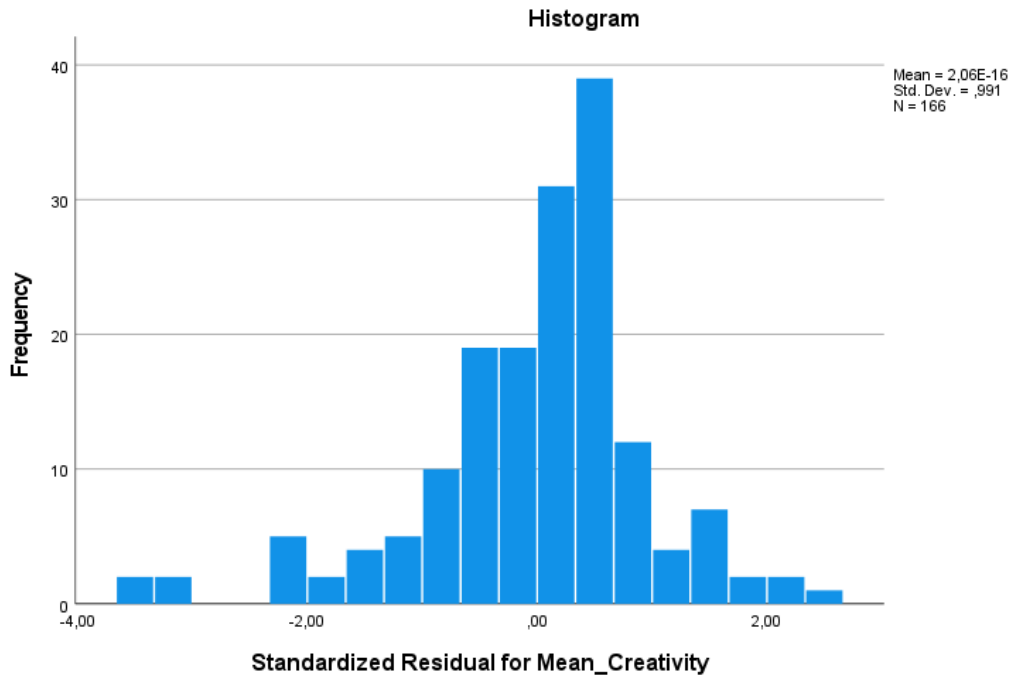
b) Q-Q Plot



Graph 2

Normality Check Creativity of the Life Hack Presenter

a) Histogram



b) Q-Q Plot

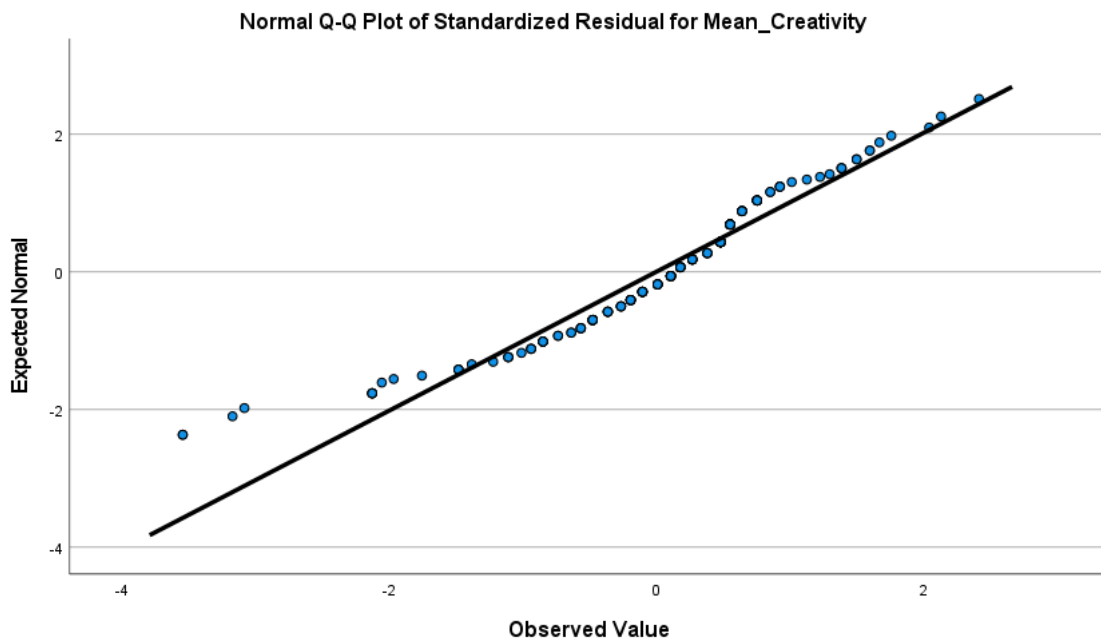


Figure 1

Research model

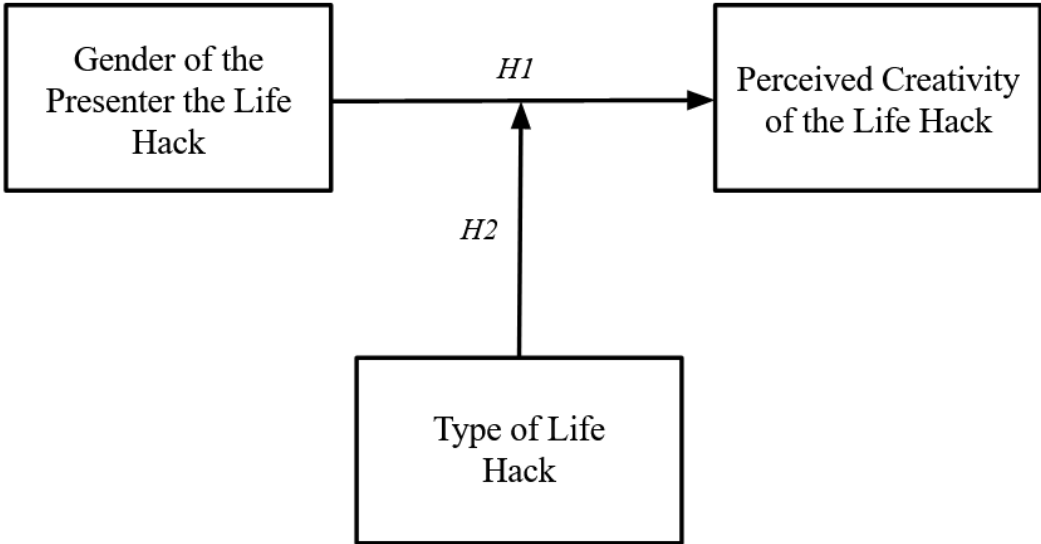


Figure 2

Pictures Mary and James

a) James



b) Mary



Figure 3

Life hack Pictures

a) Home Renovation



b) Home Care



Appendix

Appendix 1: Questions about creativity of the life hack (Besemer and O'Quin, 1986)

Scale (1= uncreative attribute, 5= creative attribute)

Please rate the life hack on the following attributes

Q1 Overused - Fresh

Q2 Usual - Unusual

Q3 Unique - Ordinary

Q4 Novel - Predictable

Q5 Illogical - Logical

Q6 Makes sense - Senseless

Q7 Effective - Ineffective

Q8 Functional - Non-functional

MC1 Feminine - Masculine

Q9 Feasible - Infeasible

Q10 Useful - Useless

Appendix 2: Questions about the creativity of idea presenter (Proudfoot et al., 2015)

Scale (1= strongly disagree, 5= strongly agree)

[James/Mary] seems like a person who...

Q1 ...thinks 'outside the box'

Q2 ...is creative

Q3 ...has creative potential

Q4 ...is talented

Q5 ...is not gifted (reversed coded)

Appendix 3: Manipulation and attention checks

MC1 Who was the candidate? (Mary, a women in her 20s/30s; James, a men in his 20s/30s;

Luisa, a women in her 40s/50s; Tom, a men in his 40s/50s)

MC2 What life hack did the candidate present during their submission? (Vacuum cleaner life hack, Sponge and oil life hack, Screw and rubber band life hack, Clothes folding life hack)

The fourth manipulation check was hidden within the questions about the creativity of the life hack;

Scale (1= feminine, 5= masculine)

MC3 Please rate the life hack on the following attributes ...

...Feminine - Masculine

AC1[James/Mary] seems like a person who...

... please pick agree

Appendix 4: Study briefing

In this study, please try to **actively imagine** yourself in this situation of being a **recruiter** for the company uNlimited, and keep this in mind **when reading and answering the questions**.

uNlimited works with other businesses to provide them with innovative marketing strategies.

Part of the recruitment strategy to select the most outstanding candidates is asking them to submit a **life hack in form of a blogpost**. uNlimited defines life hacks as a simple (and often unexpected) solution for everyday problems. You will be presented with a short blogpost introduction of the candidate alongside the life hack submitted. You will have to **rate the life hack** and the **candidate** on numerous attributes, which will help the recruitment process.

Appendix 5: Blogpost Mary/James

Hi! My name is [Mary/James], and I am glad to be sharing with you some clever solutions for everyday issues that I recently came up with. The tips that you will come across on my blog are unusual ways to fix everyday struggles. I am sure that they will make your life so much easier because I tried them out myself and tested them with my family and friends. Once you use these life hacks yourself, you will regret not knowing them earlier. I would also love to hear from you about how they made your life simpler, so go ahead and share your ideas with me in the comments. Also, if you have any other issues with something that I haven't yet written about, please let me know so that I can come up with an idea for the next lifehack. I'm looking forward

to hearing what you have to say, go follow me on Instagram and TikTok for amazing daily updates, and enjoy my ingenious suggestions – [Mary/James],
[@Marylifehackin/@Jameslifehackin]

Appendix 6: Life Hack Descriptions

a) Masculine Life Hack

We have all encountered it. You're trying to take a cabinet or closet apart, but the screw gets stuck. This handy lifehack can help you solve this problem. All you have to do is place a rubberband between the screw and the screwdriver. This will give the screwdriver more grip, allowing you to unscrew the screw.

b) Feminine Life Hack

We have all encountered it. You drop a piece of jewelry and it falls in an unreachable place. This handy lifehack can help you solve this problem. All you have to do is put a bit of fabric over the vacuum cleaner hose. This will allow you to retrieve your lost items without sucking them up.