Electronic supplementary material for:

# HOW CONSUMERS PERCEIVE DIFFERENT MATERIALS, PACKAGING, AND WASTE: A PLASTIC-FOCUSED ANALYSIS

Jessica Schlossnikl*[,1] Barbara Hartl[2,3], Anna-Maria Lipp[4,5], Jakob Lederer[4], Vasiliki-Maria Archodoulaki[1]

[1] Institute of Materials Science and Technology, Faculty of Mechanical and Industrial Engineering, TU Wien, Getreidemarkt 9, Objekt 8, 1060 Vienna, Austria
[2] Vienna University of Economics and Business, Welthandelsplatz 1, 1020 Vienna, Austria
[3] Institute for Advanced Studies, Vienna, 1080, Austria, barbara.hartl@ihs.ac.at
[4] Christian Doppler Laboratory for a Recycling-based Circular Economy, Institute of Chemical, Environmental and Bioscience Engineering (ICEBE), Faculty of Technical Chemistry, TU Wien, Getreidemarkt 9/166, 1060 Vienna, Austria
[5] University of Applied Sciences Technikum Wien, Faculty Industrial Engineering, Competence Center Resilient Energy Systems, Giefinggasse 6, 1210 Vienna, Austria

*Correspondence: jessica.schlossnikl@tuwien.ac.at

## Table of Contents

# Study 1 - Procedure

- Online questionnaire in January 2021
- Within-subject design
- (no construct, except for psychological ownership of waste)

1. Attention check (three times then dismissed)
2. Evaluation of material and food
    a. Paper, glass, plastic, metal, vegetables, meat, food in general
    b. Scale 1-5 semantic differential: Evaluated as wertvoll (valuable), praktisch (convenient), gut (good), wichtig (important), natürlich (natural)
3. Evaluation of waste – scale as above
    a. Paper, glass, plastic, metal, food waste
    b. Scale 1-5 semantic differential: Evaluated as wertvoll (valuable), praktisch (convenient), gut (good), wichtig (important), natürlich (natural)
4. Separation of materials
    a. 5 statements: “Ich sammle Papierabfälle/Glasabfälle/Plastikabfälle/ Metallabfälle/Lebensmittelabfälle getrennt vom restlichen Müll” ("I separate paper waste/glass waste/plastic waste/metal waste/food waste from the rest of the garbage")
    b. Scale: 1-5 Likert Scales (does not apply at all – fully applies)
5. *Laytheory*
    a. *Self-Perception 3 statements: “Ich achte generell darauf, meinen Müll zu trennen” ("I generally make sure to separate my waste"), “Wenn ich zu Hause bin, dann trenne ich meinen Müll” (*"When I'm at home, I separate my waste"*), “Wenn ich unterwegs bin, dann trenne ich meinen Müll (in Bahnhöfen, Parks,…)“ (*"When I'm on the go, I separate my waste (in train stations, parks,…)"*)*
    b. *Other-Perception 3 statements: “Ich glaube, dass andere generell darauf achten, ihren Müll zu trennen” (*"I believe that others generally make sure to separate their waste"*), “Ich glaube, dass andere ihren Müll zu Hause trennen” (*"I believe that others separate their waste at home"*) “Ich glaube, dass andere ihren Müll trennen, wenn sie unterwegs sind (in Bahnhöfen, Parks,…)“ (*"I believe that others separate their waste when they are on the go (in train stations, parks,…)"*)*
    c. *Scale: 1-5 Likert Scales (does not apply at all – fully applies)*
6. Psychological Ownership
    a. Denken Sie jetzt bitte kurz an die Erfahrungen und Gefühle, die Sie mit der Aussage „Das ist mein Haus‘/ mein Zimmer/…!“ verbinden. Wie stark empfinden Sie dieses Gefühl von Besitz für den Abfall in Ihrem Mistkübel? Bitte ergänzen Sie den folgenden Satz: „Für mich ist dieser Abfall…“ (*Now please briefly think about the experiences and feelings you associate with the statement "This is my house / my room / …!"* How strongly do you feel this sense of ownership for the waste in your

*questions in gray were not part of this article

trash bin? Please complete the following sentence: "For me, this waste is…")
   b. „Irgendein Abfall – MEIN Abfall (5 stufiges Differential) (*"Just some waste – MY waste"* (5-point semantic differential))
7. Demographics
   a. Gender (male, female, diverse)
   b. Age (open question)
   c. Monthly net income (6 possibilities: <500, 501-1000. 1001-2500, 2501-5000, >5000, no comment)
   d. Education (compulsory school; vocational training, secondary school; higher education entrance qualification; academic degree)

# S1 Study 2 - Procedure

- Pre-registered (#84662)
- Online questionnaire in January 2022
- In-between-subject design: glass vs. plastic

1. Attention check (three times then dismissed)
2. Free associations (glass vs. plastic)
3. Free association yogurt (glass vs. plastic)
4. Evaluation of material (glass vs. plastic)
   a. Scale 1-5 semantic differential: Evaluated as wertvoll (valuable), praktisch (convenient), gut (good), wichtig (important), natürlich (natural)
5. Psychological ownership (glass bottle vs. plastic bottle)
   a. „Irgendeine Glasflasche (Plastikflasche) – Meine Glasflasche (Plastikflasche)“ (5 stufiges Differential) (*"Just some glass bottle (plastic bottle) – MY glass bottle (plastic bottle)"* (5-point semantic differential))
6. Deposit information
   a. Amount of deposit (glass vs. Plastic bottle)
7. WITH Deposit: Evaluation of material (glass vs. plastic)
   a. Scale 1-5 semantic differential: Evaluated as wertvoll (valuable), praktisch (convenient), gut (good), wichtig (important), natürlich (natural)
8. WITH Deposit: Psychological ownership (glass bottle vs. plastic bottle)
   a. *"Just some glass bottle (plastic bottle) – MY glass bottle (plastic bottle)"* (5-point semantic differential)
9. Behavior & Lay theory
   a. Self reported behavior: “Wie wahrscheinlich würden Sie die Plastikflasche mit Pfand zu einem Pfandautomaten bringen?“ („How likely would you be to take a plastic bottle with a deposit to a deposit machine?“)
   b. Other-Perception: “Wie glauben Sie ist das bei anderen Personen Ihres Alters und Geschlechts in Österreich? Wie wahrscheinlich würden diese Personen die Plastikflasche mit Pfand zu einem Pfandautomaten bringen?“ ("How do you think it is for other people of your age and

*questions in gray were not part of this article

gender in Austria? How likely would they be to take a plastic bottle with a deposit to a deposit machine?")
Scale: 0-100% (definitely not - definitely)

10. Control variable
    a. Distance to deposit machine (How far away is the nearest deposit machine from you (e.g. in the nearest supermarket)?)
    b. Scale: 5 choices: in walking distance / 5-10 minute drive / 10-20 min drive / more than 20 min drive / I do not know where the next deposit machine is
11. Comparison of packaging
    a. Shopping habit „Wir wollen von Ihnen noch gerne wissen, welche Verpackung Sie beim Einkaufen am häufigsten verwenden. Stellen Sie sich alle möglichen Situationen vor, in denen Sie verpackte Lebensmittel kaufen: Wenn ich die Wahl habe zwischen Einweg-Glasflasche oder Plastikflasche greife ich am ehesten zu…“ ("We would like to know which packaging you use most often when shopping. Imagine all possible situations in which you buy packaged food: If I have the choice between a disposable glass bottle or a plastic bottle, I am most likely to reach for...")
       Scale: 1-5, never/seldom/sometimes/often/always
    b. Ranking of current packaging (plastics, single-use glass, reuseable (Mehrweg) glass, metal, paper, tetrapack, without packaging (unverpackt)
    c. Possibility to comment (open question)
    d. Future packaging – experience „Derzeit werden verschiedene neue Verpackungsmaterialien getestet. Von welchen der folgenden haben Sie bereits gehört?” (“Various new packaging materials are currently being tested. Which of the following have you heard of?”)
       Scale: 5 Multiple Choices:
       - Zuckerrohrbasierter Kunststoff und Karton (Sugarcane-based plastic and cardboard)
       - Folien aus Milchprotein (für Lebensmittel, Folie ist essbar) (Milk protein-based films (for food, the film is edible))
       - Verpackung aus Algen (Packaging made from algae)
       - Biokunststoff aus Milchsäure (aus Zucker und Stärke) (Bioplastic made from lactic acid (derived from sugar and starch))
       - Ich habe von keinem der oben genannten Materialien gehört. (I have not heard of any of the materials listed above.)
    e. Future packaging – preference „Mit welchen dieser Materialien sollen aus Ihrer Sicht Lebensmittel in Zukunft verpackt werden?“ („Which of these materials do you think should be used to package food in the future?“)
       Scale: same as above
12. Demographics
    a. Gender (male, female, diverse)
    b. Age (open question)

*questions in gray were not part of this article

c. Monthly net income (6 possibilities: <500, 501-1000. 1001-2500, 2501-5000, >5000, no comment)
d. Education (compulsory school; vocational training, secondary school; higher education entrance qualification; academic degree)
e. Living Area (5 points rural-urban)

13. Quality question: Would you recommend us to use your data (yes / no)

# S2 Calculation of (M)ANOVA results

Repeated MANOVA results were calculated using R Core Team (2017)[1]. An example of the code is given in **Figure 1**. Repeated measurement ANOVA and one-way ANOVA were calculated using the Software Origin Pro, Version 2021b. OriginLab Corporation, Northampton, MA, USA.

```
dataf <- my_data %>%
  select(ResponseId, contains(c("Q98_", "Q105_", "Q106_", "Q116_"))) %>%
  mutate_at(vars(contains(c("Q98_", "Q105_", "Q106_", "Q116_"))), as.numeric) %>%
  pivot_longer(!ResponseId, names_to = "id", values_to = "Bewertung") %>%
  mutate(Material = substr(id, 1, 4),
         Question = paste0("Q_", rep(seq(1, 5, 1), 1264))
  ) %>%
  select(-id) %>%
  pivot_wider(names_from = Question, values_from = Bewertung)

manova_results <- manova(cbind(Q_1, Q_2, Q_3, Q_4, Q_5)~Material, data = dataf)
summary(manova_results)
```

***Figure 1.*** *Code for MANOVA calculations*

# S3 Results Study 1

Basic calculations like mean and standard deviation were calculated using MS Excel, see **Table 1**. Additionally, the results of Bonferroni post hoc tests are displayed in **Table 2 & 3**.

***Table 1.*** *Mean and standard deviation of the perception of the different material or waste (plastic, paper, glass, and metal) in the dimensions valuable, convenient, good, important, natural (N = 316).*

| | *dimension* | $M_{plastic}$ | $SD_{plastic}$ | $M_{paper}$ | $SD_{paper}$ | $M_{glass}$ | $SD_{glass}$ | $M_{metal}$ | $SD_{metal}$ |
|---|---|---|---|---|---|---|---|---|---|
| ***Material*** | valuable | 2.66 | 1.18 | 4.33 | 0.90 | 4.38 | 0.87 | 4.05 | 1.05 |
| | convenient | 3.78 | 1.21 | 4.34 | 0.89 | 4.06 | 1.08 | 3.67 | 1.11 |
| | good | 2.29 | 1.10 | 4.39 | 0.85 | 4.31 | 0.89 | 3.75 | 1.06 |
| | important | 3.13 | 1.15 | 4.43 | 0.85 | 4.36 | 0.89 | 3.89 | 1.10 |
| | natural | 1.60 | 0.93 | 4.45 | 0.89 | 3.92 | 1.10 | 3.36 | 1.20 |
| ***Waste*** | valuable | 2.75 | 1.48 | 4.20 | 1.10 | 4.07 | 1.19 | 3.97 | 1.21 |
| | convenient | 2.31 | 1.29 | 3.62 | 1.17 | 3.22 | 1.39 | 3.08 | 1.28 |
| | good | 1.88 | 1.12 | 3.76 | 1.17 | 3.62 | 1.18 | 3.29 | 1.17 |
| | important | 2.69 | 1.31 | 3.85 | 1.09 | 3.77 | 1.12 | 3.51 | 1.19 |
| | natural | 1.73 | 0.98 | 4.03 | 1.00 | 3.59 | 1.14 | 3.14 | 1.22 |

[1] R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

***Table 2. Results of Bonferroni post hoc tests for the different materials***

| | | Mean Difference | Std. Error | DF | \|t\| Value | Prob. >\|t\| | Alpha | Sig | 95.00% LCL | 95.00% UCL |
|---|---|---|---|---|---|---|---|---|---|---|
| valuable | Paper - Glass | -0,05063 | 0,06929 | 945 | 0,73078 | 1 | 0,05 | 0 | -0,23381 | 0,13255 |
| | Paper – Plastic | 1,67089 | 0,06929 | 945 | 24,11585 | <0.0001 | 0,05 | 1 | 1,48771 | 1,85407 |
| | Paper - Metal | 0,27848 | 0,06929 | 945 | 4,01931 | 3,78082E-4 | 0,05 | 1 | 0,0953 | 0,46166 |
| | Glass - Plastic | 1,72152 | 0,06929 | 945 | 24,84664 | <0.0001 | 0,05 | 1 | 1,53834 | 1,9047 |
| | Glass - Metal | 0,32911 | 0,06929 | 945 | 4,75009 | <0.0001 | 0,05 | 1 | 0,14593 | 0,51229 |
| | Plastic - Metal | -1,39241 | 0,06929 | 945 | 20,09654 | <0.0001 | 0,05 | 1 | -1,57558 | -1,20923 |
| convenient | Paper - Glass | 0,28165 | 0,07776 | 945 | 3,62197 | 0,00185 | 0,05 | 1 | 0,07606 | 0,48723 |
| | Paper – Plastic | 0,56013 | 0,07776 | 945 | 7,20325 | <0.0001 | 0,05 | 1 | 0,35454 | 0,76571 |
| | Paper - Metal | 0,67089 | 0,07776 | 945 | 8,62762 | <0.0001 | 0,05 | 1 | 0,4653 | 0,87647 |
| | Glass - Plastic | 0,27848 | 0,07776 | 945 | 3,58128 | 0,00216 | 0,05 | 1 | 0,0729 | 0,48407 |
| | Glass - Metal | 0,38924 | 0,07776 | 945 | 5,00565 | <0.0001 | 0,05 | 1 | 0,18366 | 0,59482 |
| | Plastic - Metal | 0,11076 | 0,07776 | 945 | 1,42437 | 0,92801 | 0,05 | 0 | -0,09482 | 0,31634 |
| good | Paper - Glass | 0,08228 | 0,07019 | 945 | 1,17226 | 1 | 0,05 | 0 | -0,10329 | 0,26784 |
| | Paper – Plastic | 2,09494 | 0,07019 | 945 | 29,84764 | <0.0001 | 0,05 | 1 | 1,90937 | 2,2805 |
| | Paper - Metal | 0,63924 | 0,07019 | 945 | 9,10759 | <0.0001 | 0,05 | 1 | 0,45368 | 0,8248 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Glass - Plastic | 2,01266 | 0,07019 | 945 | 28,67538 | <0.0001 | 0,05 | 1 | 1,82709 | 2,19822 |
| | Glass - Metal | 0,55696 | 0,07019 | 945 | 7,93532 | <0.0001 | 0,05 | 1 | 0,3714 | 0,74253 |
| | Plastic - Metal | -1,4557 | 0,07019 | 945 | 20,74005 | <0.0001 | 0,05 | 1 | -1,64126 | -1,27013 |
| important | Paper - Glass | 0,07278 | 0,0697 | 945 | 1,04433 | 1 | 0,05 | 0 | -0,11148 | 0,25705 |
| | Paper – Plastic | 1,30696 | 0,0697 | 945 | 18,75256 | <0.0001 | 0,05 | 1 | 1,1227 | 1,49122 |
| | Paper - Metal | 0,54114 | 0,0697 | 945 | 7,76438 | <0.0001 | 0,05 | 1 | 0,35688 | 0,7254 |
| | Glass - Plastic | 1,23418 | 0,0697 | 945 | 17,70822 | <0.0001 | 0,05 | 1 | 1,04992 | 1,41844 |
| | Glass - Metal | 0,46835 | 0,0697 | 945 | 6,72004 | <0.0001 | 0,05 | 1 | 0,28409 | 0,65262 |
| | Plastic - Metal | -0,76582 | 0,0697 | 945 | 10,98818 | <0.0001 | 0,05 | 1 | -0,95008 | -0,58156 |
| natural | Paper - Glass | 0,52215 | 0,07405 | 945 | 7,05167 | <0.0001 | 0,05 | 1 | 0,32639 | 0,71792 |
| | Paper – Plastic | 2,8481 | 0,07405 | 945 | 38,46363 | <0.0001 | 0,05 | 1 | 2,65234 | 3,04387 |
| | Paper - Metal | 1,08544 | 0,07405 | 945 | 14,65892 | <0.0001 | 0,05 | 1 | 0,88968 | 1,28121 |
| | Glass - Plastic | 2,32595 | 0,07405 | 945 | 31,41196 | <0.0001 | 0,05 | 1 | 2,13018 | 2,52172 |
| | Glass - Metal | 0,56329 | 0,07405 | 945 | 7,60725 | <0.0001 | 0,05 | 1 | 0,36752 | 0,75906 |
| | Plastic - Metal | -1,76266 | 0,07405 | 945 | 23,80471 | <0.0001 | 0,05 | 1 | -1,95842 | -1,56689 |

Sig equals 1 indicates that the difference of the means is significant at the 0.05 level.

Sig equals 0 indicates that the difference of the means is not significant at the 0.05 level

***Table 3. Results of Bonferroni post hoc tests for the different waste materials***

| | | Mean Difference | Std. Error | DF | \|t\| Value | Prob. >\|t\| | Alpha | Sig | 95.00% LCL | 95.00% UCL |
|---|---|---|---|---|---|---|---|---|---|---|
| valuable | Paper - Glass | 0,12975 | 0,0721 | 945 | 1,79947 | 0,43358 | 0,05 | 0 | -0,06088 | 0,32037 |
| | Paper – Plastic | 1,44937 | 0,0721 | 945 | 20,10145 | 2,53215E-74 | 0,05 | 1 | 1,25874 | 1,63999 |
| | Paper - Metal | 0,23734 | 0,0721 | 945 | 3,29172 | 0,0062 | 0,05 | 1 | 0,04672 | 0,42797 |
| | Glass - Plastic | 1,31962 | 0,0721 | 945 | 18,30197 | 1,6709E-63 | 0,05 | 1 | 1,12899 | 1,51025 |
| | Glass - Metal | 0,10759 | 0,0721 | 945 | 1,49225 | 0,81581 | 0,05 | 0 | -0,08303 | 0,29822 |
| | Plastic - Metal | -1,21203 | 0,0721 | 945 | 16,80973 | 6,7203E-55 | 0,05 | 1 | -1,40265 | -1,0214 |
| convenient | Paper - Glass | 0,40506 | 0,08024 | 945 | 5,04804 | 3,21239E-6 | 0,05 | 1 | 0,19292 | 0,61721 |
| | Paper – Plastic | 1,31013 | 0,08024 | 945 | 16,32725 | 3,36684E-52 | 0,05 | 1 | 1,09798 | 1,52227 |
| | Paper - Metal | 0,53797 | 0,08024 | 945 | 6,70443 | 2,08424E-10 | 0,05 | 1 | 0,32583 | 0,75012 |
| | Glass - Plastic | 0,90506 | 0,08024 | 945 | 11,27921 | 5,42058E-27 | 0,05 | 1 | 0,69292 | 1,11721 |
| | Glass - Metal | 0,13291 | 0,08024 | 945 | 1,65639 | 0,58785 | 0,05 | 0 | -0,07923 | 0,34506 |
| | Plastic - Metal | -0,77215 | 0,08024 | 945 | 9,62282 | 3,38868E-20 | 0,05 | 1 | -0,9843 | -0,56001 |
| good | Paper - Glass | 0,14557 | 0,07271 | 945 | 2,00216 | 0,27332 | 0,05 | 0 | -0,04665 | 0,33779 |
| | Paper – Plastic | 1,87975 | 0,07271 | 945 | 25,854 | 4,09843E-111 | 0,05 | 1 | 1,68752 | 2,07197 |
| | Paper - Metal | 0,47468 | 0,07271 | 945 | 6,52879 | 6,48408E-10 | 0,05 | 1 | 0,28246 | 0,66691 |
| | Glass - Plastic | 1,73418 | 0,07271 | 945 | 23,85184 | 4,99153E-98 | 0,05 | 1 | 1,54195 | 1,9264 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Glass - Metal | 0,32911 | 0,07271 | 945 | 4,52663 | 4,05455E-5 | 0,05 | 1 | 0,13689 | 0,52134 |
| | Plastic - Metal | -1,40506 | 0,07271 | 945 | 19,32521 | 1,33136E-69 | 0,05 | 1 | -1,59729 | -1,21284 |
| important | Paper - Glass | 0,07911 | 0,07116 | 945 | 1,1117 | 1 | 0,05 | 0 | -0,10903 | 0,26726 |
| | Paper – Plastic | 1,16139 | 0,07116 | 945 | 16,31982 | 3,70246E-52 | 0,05 | 1 | 0,97325 | 1,34954 |
| | Paper - Metal | 0,34177 | 0,07116 | 945 | 4,80256 | 1,09238E-5 | 0,05 | 1 | 0,15363 | 0,52992 |
| | Glass - Plastic | 1,08228 | 0,07116 | 945 | 15,20811 | 4,1461E-46 | 0,05 | 1 | 0,89413 | 1,27043 |
| | Glass - Metal | 0,26266 | 0,07116 | 945 | 3,69086 | 0,00142 | 0,05 | 1 | 0,07451 | 0,4508 |
| | Plastic - Metal | -0,81962 | 0,07116 | 945 | 11,51725 | 4,90099E-28 | 0,05 | 1 | -1,00777 | -0,63147 |
| natural | Paper - Glass | 0,43987 | 0,06985 | 945 | 6,29754 | 2,77583E-9 | 0,05 | 1 | 0,25521 | 0,62454 |
| | Paper – Plastic | 2,29747 | 0,06985 | 945 | 32,89216 | 5,52102E-158 | 0,05 | 1 | 2,1128 | 2,48214 |
| | Paper - Metal | 0,88291 | 0,06985 | 945 | 12,64038 | 3,57557E-33 | 0,05 | 1 | 0,69824 | 1,06758 |
| | Glass - Plastic | 1,85759 | 0,06985 | 945 | 26,59463 | 5,29212E-116 | 0,05 | 1 | 1,67293 | 2,04226 |
| | Glass - Metal | 0,44304 | 0,06985 | 945 | 6,34284 | 2,09523E-9 | 0,05 | 1 | 0,25837 | 0,62771 |
| | Plastic - Metal | -1,41456 | 0,06985 | 945 | 20,25179 | 3,02368E-75 | 0,05 | 1 | -1,59922 | -1,22989 |

Sig equals 1 indicates that the difference of the means is significant at the 0.05 level.

Sig equals 0 indicates that the difference of the means is not significant at the 0.05 level.

# S4 Results Study 2

**Table 4** shows the values of the perceptions assigned to the person in each case, categorized as either not assigned (NA), negative, positive, neutral, or a combination thereof, resulting in **Figure 2**.

***Table 4.*** *Perception assigned by the researchers per participant, in absolute numbers, and as a percentage*

| | Plastic | | | Glass | | |
|---|---|---|---|---|---|---|
| | Absolute numbers | Percentage | Mixed statements | Absolute numbers | Percentage | Mixed statements |
| NA | 5 | 3 % | - | 5 | 3 % | - |
| negative | 110 | 71 % | - | 25 | 16 % | - |
| positive | 8 | 5 % | - | 56 | 36 % | - |
| neutral | 11 | 7 % | - | 32 | 21 % | - |
| negative + neutral | 5 | 3 % | ∑ 14 % | 4 | 3 % | ∑ 25 % |
| negative + positive | 15 | 10 % | | 25 | 16 % | |
| positive + neutral | 1 | 1 % | | 7 | 5 % | |
| positive + negative + neutral | 0 | 0 % | | 1 | 1 % | |
| sum | 155 | 100 % | - | 155 | 100 % | - |

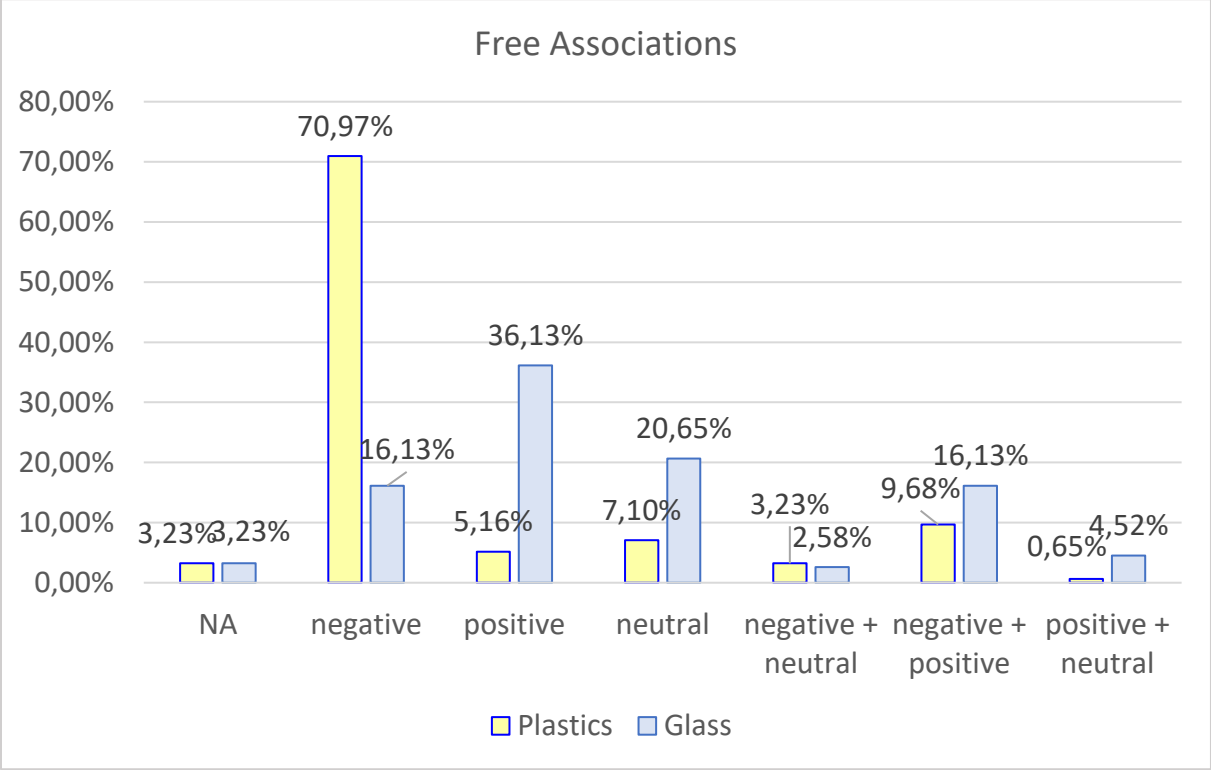


***Figure 2.*** *General associations for each person, 155 participants per group (plastic/glass) (N=310)*

In total 269 reasons were categorized for plastic into 215 negative, 35 positive, and 19 neutral ones. For glass, 280 reasons were categorized into 84 negative, 147 positive, and 49 neutral ones, shown in **Figure 3** with percentages.

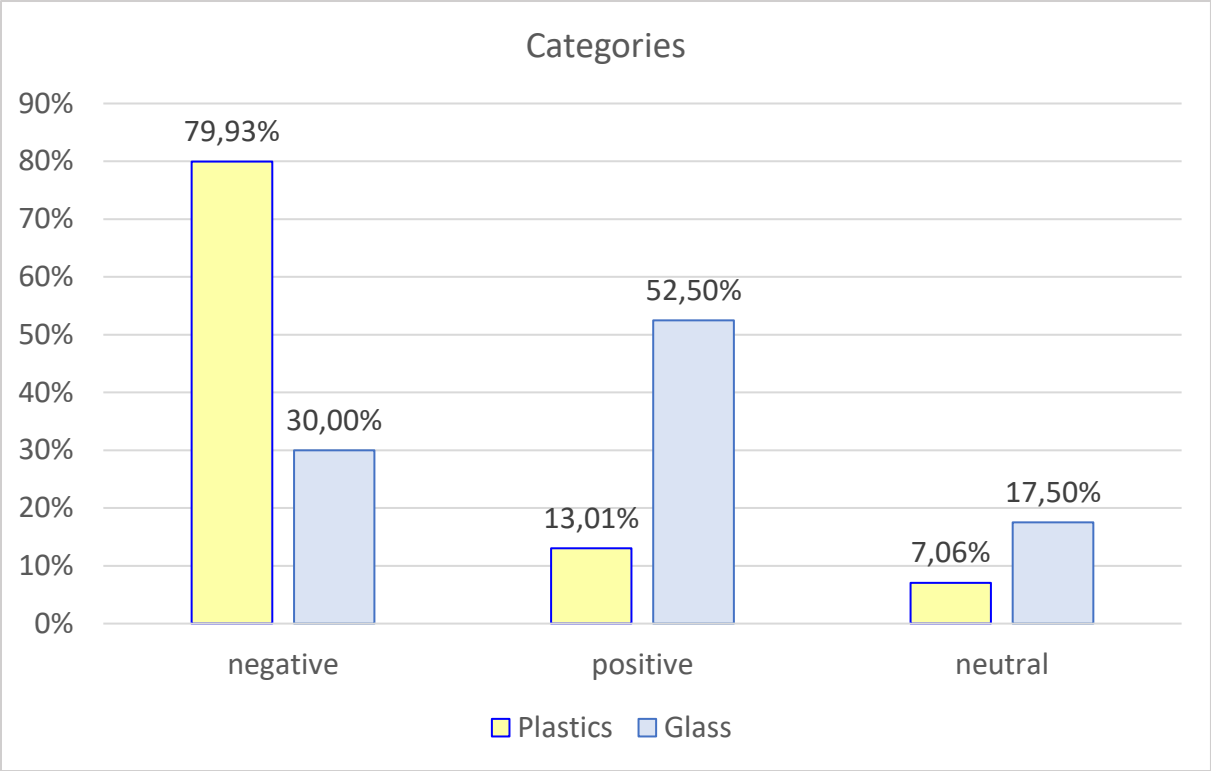


***Figure 3.*** *The percentage of categories is shown, divided by their perceived assignment (negative, positive, neutral).*

The different categories were first independently coded, which is why slightly different wording was used in **Table 5** in the first column left. The column labeled “Category” shows the final categories, which are classified as negative (red), positive (green), and neutral (yellow). The category “positive emotion” consists of good, great, ok, and shiny. The category “negative emotion” consists of the previous: bad, terrible, angry, annoying, deceptive, insane, and unattractive. Every category mentioned twice or less was combined into the category “miscellaneous.

***Table 5.*** *Assigned categories for plastic*

| Category (previous naming) | Frequency | Percentage | Category | Frequency | comment |
|---|---|---|---|---|---|
| too much | 47 | 17.47% | too much | 47 | |
| unnecessary | 46 | 17.10% | unnecessary | 46 | |
| environmental pollution | 39 | 14.50% | environmental pollution | 39 | |
| waste | 31 | 11.52% | waste | 31 | |
| existing alternatives | 14 | 5.20% | existing alternatives | 14 | |
| hygienic | 11 | 4.09% | hygienic | 11 | |

| | | | | | |
|---|---|---|---|---|---|
| convenient | 9 | 3.35% | convenient | 9 | |
| packaging material | 7 | 2.60% | negative emotion | 9 | |
| unhealthy | 5 | 1.86% | packaging material | 7 | |
| redundant | 5 | 1.86% | **positive emotion** | **5** | |
| extending shelf-life | 4 | 1.49% | redundant | 5 | |
| nothing | 4 | 1.49% | unhealthy | 5 | |
| Recycling | 4 | 1.49% | extending shelf-life | 4 | |
| protective | 4 | 1.49% | nothing | 4 | 3 negative<br>1 neutral |
| incomprehensible | 3 | 1.12% | protective | 4 | |
| ocean pollution | 3 | 1.12% | recycling | 4 | |
| microplastics | 3 | 1.12% | incomprehensible | 3 | |
| necessary | 3 | 1.12% | microplastics | 3 | |
| bad | 2 | 0.74% | necessary | 3 | |
| DPRS | 2 | 0.74% | ocean pollution | 3 | |
| **good** | **2** | 0.74% | miscellaneous | 13 | |
| Single-use | 2 | 0.74% | | | |
| terrible | 2 | 0.74% | | | |
| affordable/cheap | 2 | 0.74% | | | |
| angry | 1 | 0.37% | | | 1 positive<br>1negative |
| annoying | 1 | 0.37% | | | |
| deceptive | 1 | 0.37% | | | |
| colored | 1 | 0.37% | | | |
| fossil-based | 1 | 0.37% | | | |
| lightweight | 1 | 0.37% | | | |
| **great** | **1** | 0.37% | | | |
| insane | 1 | 0.37% | | | |

| | | | | | |
|---|---|---|---|---|---|
| climate | 1 | 0.37% | | | |
| not biodegradeable | 1 | 0.37% | | | |
| ok | 1 | 0.37% | | | |
| shiny | 1 | 0.37% | | | |
| unattractive | 1 | 0.37% | | | |
| unsustainable | 1 | 0.37% | | | |
| useful | 1 | 0.37% | | | |
| | **∑ 269** | | | **∑ 269** | |

For glass **Table 6** is similarly prepared as for plastics. The category “positive emotion” consists of great, good, aesthetic, and interesting. The category “negative emotion” for glass consists only of the previously mentioned bad and unappealing and is therefore combined in the miscellaneous category. Every category mentioned only twice or less was combined into the category “miscellaneous.

***Table 6.*** *Assigned categories for glass*

| Category (previous naming) | Frequency | Percentage | Category | Frequency | comment |
|---|---|---|---|---|---|
| packaging material | 37 | 13.21% | packaging material | 37 | |
| weight | 31 | 11.07% | heavy | 31 | |
| Reuse | 21 | 7.50% | **positive emotions** | **23** | |
| Recycling | 19 | 6.79% | reusable | 21 | |
| better | 17 | 6.07% | recycling | 19 | |
| DPRS | 16 | 5.71% | better | 17 | |
| sustainable | 15 | 5.36% | DPRS | 16 | positive, or neutral |
| environmentally friendly | 12 | 4.29% | sustainable | 15 | |
| **great** | **10** | 3.57% | environmentally friendly | 12 | |
| **good** | **9** | 3.21% | no DPRS | 9 | |
| no DPRS | 9 | 3.21% | hygienic | 8 | |
| hygienic | 8 | 2.86% | fragile | 7 | |
| fragile | 7 | 2.50% | difficult transport | 7 | |
| transport | 7 | 2.50% | expensive | 6 | |
| expensive | 6 | 2.14% | inconvenient | 6 | |
| inconvenient | 6 | 2.14% | dangerous | 4 | |
| healthy | 4 | 1.43% | healthy | 4 | |
| risky | 4 | 1.43% | seminal | 4 | |
| seminal | 4 | 1.43% | greenwashing | 3 | |
| **aesthetic** | **3** | 1.07% | tasty | 3 | |
| greenwashing | 3 | 1.07% | waste | 3 | |
| taste | 3 | 1.07% | miscellaneous | 25 | |
| waste | 3 | 1.07% | | | |
| convenient | 2 | 0.71% | | | |
| high-quality | 2 | 0.71% | | | |

| | | | | | |
|---|---|---|---|---|---|
| limitations | 2 | 0.71% | | | |
| nothing | 2 | 0.71% | | | |
| odourless | 2 | 0.71% | | | |
| safe | 2 | 0.71% | | | |
| strength | 2 | 0.71% | | | |
| bad | 1 | 0.36% | | | |
| comprehensible | 1 | 0.36% | | | |
| efficient | 1 | 0.36% | | | |
| fresh | 1 | 0.36% | | | |
| hard to imagine | 1 | 0.36% | | | |
| Information | 1 | 0.36% | | | |
| **interesting** | 1 | 0.36% | | | |
| natural | 1 | 0.36% | | | |
| no Reuse | 1 | 0.36% | | | |
| space | 1 | 0.36% | | | |
| transparent | 1 | 0.36% | | | |
| unappealing | 1 | 0.36% | | | |
| | **∑ 280** | | | **∑ 280** | |