

Analyzing the waste management attitude and behavior of university students

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Effective waste management is a crucial aspect of any sustainable economy. Therefore, analyzing the attitude, behavior and intentions of consumers can lead to significantly reducing waste disposal and positively affecting the environment, economy, and society. This study is part of a comprehensive research project meant to identify and analyze the main factors influencing consumers' behavior towards waste disposal. In this methodological paper the focus group discussion guide used is verified, and the question of whether audio stickers can improve the effectiveness of such focus group discussions is tested. After a thorough overview of the literature both quantitatively and qualitatively, two pilot focus group discussions among Hungarian university students were carried out. The focus guide was built upon previously performed World Café results. Brainstorming emerged as highly effective method for evoking a wider array of ideas. The World Café categories, while providing structure, did not foster deeper exploration and in some cases even restricted the responses. The use of audio stickers facilitated the sharing of personal examples and emotions. It also contributed to a more relaxed interview atmosphere. Overall, the methodology used here can help increase the effectiveness of the interviews, which in turn can deepen the understanding of the factors influencing consumers' responsible waste management behavior and attitude.

Keywords: waste management; interview; university students; attitude; behavior

1. Introduction

In the context of increasing environmental threats and their consequences, waste management has become a key issue worldwide (Singh et. al. 2014). Attitudes and practices of good waste management are not a general characteristic of the population but an activity influenced by norms, education, information, and knowledge (Baba-Nalikant et al. 2023). To change our own lifestyles, particular emphasis must be placed on changing attitudes, raising awareness of environmental problems, and encouraging action. In order to shape the attitudes of society and the population, it is necessary to examine the incentive tools and methods to influence people and to map the attitudes of different groups of the population, so that they can be reached with effective methods and appropriate communication tools and channels. One of the growing problems of our time is the increasing amount of waste generated by the population and industry together, much of which remains untreated.

To mitigate the environmental damage, we need to rethink waste management at several levels. The responsibility does not only lie with the organizations involved in waste collection and processing. To contribute effectively to a sustainable future, and to reduce the amount of waste generated and increase the amount of waste collected, we need the cooperation of all stakeholders involved in the process. Governments in power need to put in place the right legislative framework and ensure

that legislation is respected and enforced. Businesses should strive to use more environmentally friendly technologies and to promote sustainability in their operations (Nidumolu et al. 2019). Consumers can help to turn waste into recyclable waste by making informed choices and by collecting the waste they buy separately. Waste management in Hungary is undergoing a transformation. After July 1, 2023, the current system of shared municipal and state waste management was replaced by a centralized waste management system. The new system is in line with EU (European Union) recycling quotas: by 2040, 65% of total domestic waste should be recycled (EP 2018).

We aim to contribute to these targets through the work of our research team. We are working to identify the factors that influence (promote and inhibit) individual selective waste collection. Prior to the present research, we have used literature analysis and World Cafe methodology to identify the main factors that inhibit selective waste collection (e.g. lack of motivation, lack of interest, lack of knowledge, indifference, and laziness). The results shall contribute to the development of educational content that will help raise public awareness and thus contribute to a more efficient collection of household waste. Based on our aims and goals, and the suggestions of the literature, we have formulated two research questions for the pilot focus groups. First, we investigated to what extent the stimuli (interview tools and methods) employed in focus group sessions effectively guide participants' responses towards the intended objectives. We have also examined in the context of focus groups, whether predefined frameworks inhibit or enhance outcomes. Specifically, whether participants confine their responses within given categories, or whether these categories stimulate further discourse. These research questions were answered based on two focus groups, as well as content analysis.

At the beginning of the paper, we briefly outline some insights from previous qualitative studies that have influenced our research design. Subsequently, we explore the background of our study and provide an overview of the preliminary results upon which we have built our methodology. Following this section, we present the findings of our bibliometric analysis, demonstrating the increasing application of focus groups in investigating waste management practices among consumers. We then proceed to examine the potential advantages and disadvantages of utilizing focus groups. Next, we discuss our research aims, detail our data collection methods and results, and conclude with a discussion. It is important to note that this paper primarily emphasizes methodological considerations rather than addressing the waste management practices of citizens in detail.

2. Qualitative approaches in the literature

Our aim has been to use focus interviews in our study. Similar methodological approaches have been utilized in many social science fields. Repisky and Tóth (2019) highlight the importance of rigorous coding processes for interview data, prioritizing independence from pre-existing theories. While our methodology may not directly mirror their recommendations, we have been inspired by their principles to ensure that our analysis reflected the inherent patterns within the data (Gelencsér 2003). Similarly, Obermayer et al. (2021) advocate for structured managerial interviews and

the utilization of software tools like Atlas.ti for qualitative data analysis. In this study this software was also utilized for basic word co-occurrence and content analysis.

In addition to these methodologies, Sántha (2021) outlines typological qualitative content analysis techniques for categorizing data based on similarities. We have recognized its value in qualitative analysis and drawn inspiration from its principles. Géring et al. (2014) provide insights into mixed methods approaches, which integrate qualitative and quantitative data for a comprehensive understanding of research topics. This was also taken in consideration by our research design. Kocsis and Hrabéczy (2023) emphasize the importance of methodological rigor through manual coding and intercoder reliability checks. While our methodology may differ in certain aspects, we recognize the significance of their recommendations in maintaining the credibility and validity of qualitative analysis.

3. Background to the research

Prior to the present study, our colleagues conducted a fact-finding study with approximately 100 participants in 3 different groups in October through December 2023, using the World Café methodology. Data collection was carried out in three steps. A different working technique was used in each step. The steps of the data collection process and the working methods used are summarized in Table 1.

Table 1. Data collection process

	Data collection steps	Type of work
1	collecting obstacles to separate waste collection	individual work
2	grouping and categorizing the barriers to separate waste collection and naming the resulting groups	large group work (involving all participants together)
3	processing the content of the jointly developed categories and collecting proposals for eliminating or reducing the obstacles to separate waste collection	work in small groups of 4-6 people

Source: own construction

The factors that prevent separate waste collection were explored by collecting personal experiences of the individuals surveyed through the following question: "What are the factors that prevent you, your friends, people you know or people you do not know from collecting separate waste separately from household waste or from placing it in a designated waste bin?" In the second step of the World Café, the responses collected individually from the participants were grouped and then collectively labeled. In the third step of the survey, these newly formed categories were further developed. Participants were asked to design solutions to eliminate barriers to separate waste collection or to reduce their impact. Participants could make their suggestions at three levels. The three suggestion levels were the micro level (individual, family), the meso level (narrow community, e.g. institutions, employers, training institutions, local government), and the macro level (public or legislative level). The World Café study identified 7 main categories of barriers to separate waste collection (see Table 2).

Table 2. The seven main categories of barriers to separate waste collection

Name of categories	Number of mentions	Percentage of mentions
Lack of willingness to separate waste	45	39.82
Lack of physical conditions for separate waste collection	29	25.66
Lack of credible information on separate waste collection	23	20.35
Lack of financial benefits	5	4.42
Lack of individual skills	5	4.42
Lack of time	5	4.42
Lack of sanctions	1	0.88
Total	113	100%

Source: own construction

The results of previous studies also show that the groups surveyed have a relatively high level of environmental awareness in theory, yet many do little in practice to protect their environment (Szűcs–Hámori 2016). This is in line with our World Café study.

Regardless of the age group, a common characteristic is that the willingness to collect separately and the lack of infrastructure negatively affect the willingness to take active action. This is in line with the findings of Domina and Koch (2002) and of Halvorsen (2012). They show that convenience is an important aspect of selective waste collection (Domina–Koch 2002). The availability of infrastructure and measures to increase accessibility can have a positive effect, while that the lack of infrastructure can have a negative effect on waste collection (Halvorsen 2012).

Based on the results of a study in our country (Szűcs and Hámori 2016), it can be said that the problem in row 3 of Table 3, i.e. the lack of credible information, is also prominent. Szűcs–Hámori (2016) also found that misconceptions about waste collection (e.g. separate waste is poured together during transportation) influence waste collection behavior. The resulting findings were further investigated through a focus group discussions. The main purpose of the focus group discussions is to get to know the problem as thoroughly as possible and to explore it in detail (Malhotra, 2009). One of the main advantages of this methodological triangulation (i.e. using several methodologies to investigate the same research question) is to check whether the results obtained with different methods are correlated with each other (Géring et al. 2014).

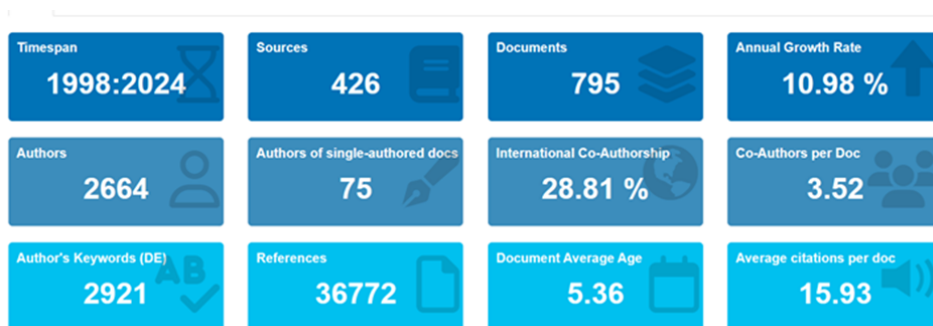
4. Bibliometric analysis

As the first step of our analysis, we wanted to find out how common focus group discussions in waste management related research are. Using the Web of Science (WoS) database, we looked at publications where focus group discussions were used out as a means of analysis. WoS was chosen as our main literature database, as it has one of the highest international publication coverages (see, for example, Birkle et al. 2020). When searching for ‘focus interview’, one can find more than 100

thousand documents (160,193 publications as of March 18, 2024). This number shows that ‘focus interview’ is a quite common qualitative analysis method.

As our research concentrates on waste management, we narrowed down our publication search with the following algorithm ((ALL=('focus interview') AND ALL=(waste) AND ALL=(management)). In this way we were able to retrieve publications related to waste management topics where ‘focus interviews’ were used as means of analysis. One can see that there is a large number of studies using this methodological tool (795 in number as of March 18, 2024, the date when the publication database was downloaded). Using focus group discussions is quite common in waste management related research, thus applying it in our research seems well-motivated. The main bibliometric properties of the database can be seen in Figure 1.

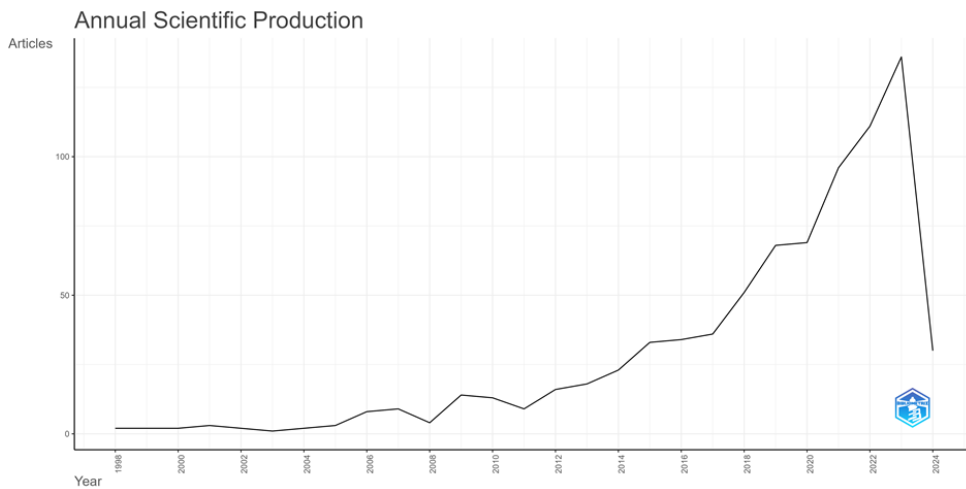
Figure 1. The main bibliometric properties of the publication database



Source: own construction via R (Biblioshiny), based on the Web of Science database

The earliest publication is from 1998, while articles from the first quarter of 2024 are also covered. Most of the documents analyzed are articles and written in English. Other languages used included Spanish, Portuguese, French and, in one document, Lithuanian. The average number of authors is 3.5. Single-authored publications are quite rare (less than 10%). Interestingly, more than a quarter of the documents analyzed are international co-authored papers (28.8%). The time distribution of the number of publications retrieved can be seen in Figure 1. Although the average annual publication growth rate is 10.98% (see also Figure 2), the number of the articles published shows a skewed distribution. Only 2 documents are from 1998, while the number of publications from 2023 is 120.

Figure 2. The time distribution of the number of publications retrieved



Source: own construction via R (Biblioshiny), based on the Web of Science database

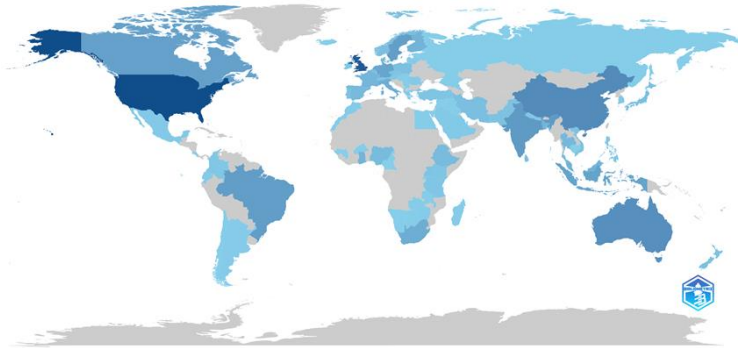
An exponential publication growth starting roughly from 2014 can be observed. Beginning with 2021 more than 100 articles were published each year (except in 2024, an unfinished year). Approximately 45% of the publications analyzed are from 2021, 2022, and 2023.

The average citation per document is 15.93, however, the actual citations of publications show an uneven distribution. There were 631 documents that received at least one citation (79.37%), but only 18 received more than 100 (2.3%). The paper with the most citations (478 citations) presents the results of expert interviews and a literature review on factors causing consumer-related food waste in households and supply chains. It is shown that consumers' motivation to avoid food waste, their management skills of food provisioning, food handling, and their trade-offs between priorities have an extensive influence on their food waste behaviors (Aschemann-Witzel et al. 2015). The publication with the second highest number of citations (285) analyses the causes of food waste in the supplier–retailer interface in Spain and UK (Mena et al. 2011). It can be seen that the citation difference between the top two articles is more than 100, thus, a quite skewed citation distribution can be observed.

The journal containing most of the articles is *Sustainability* (68 articles), while the second highest number of documents is from the *Journal of Cleaner Production* (46 articles). Only 4 contained more than 20 articles, and from the 428 journals present in our publication database, just 108 (less 14%) have more than 2 documents. We also examined the country affiliation of the retrieved publications (see Figure 3).

As a next step, we looked at the geographical distribution of the publications (see Figure 3).

Figure 3. Country distribution of publications related to the topic analyzed
Country Scientific Production



Source: own construction via R (Biblioshiny), based on the Web of Science database

Researchers from both developing and developed countries used focus group discussions to analyze the aspects of 'waste' (waste management). In total, there were 88 countries mentioned. It comes as no surprise that USA (292 affiliations), UK (262 affiliations), China (145 affiliations), and Australia (135 affiliations) are the countries with the highest number of publications. The latter two showed an increasing performance starting from 2008. Interestingly, however, researchers from developing countries such as Ghana (54 affiliations) or Ethiopia (39 affiliations) were also quite active in publishing waste management related articles. When it came to citations, however, English speaking and developed countries seemed to dominate. The most cited countries were the UK, the USA, and Australia, while Denmark, the fourth most cited, was the top non-English-speaking country.

Overall, the quite extensive number of publications related to 'waste management' and 'focus interviews' supports our assumption that focus group discussions can be an appropriate tool to examine the waste management behavior of consumers. As the retrieved publication database was only used to support the validity of our methodology, only a simple bibliometric analysis was carried out. Thus, a thorough data cleaning and a more complex analysis of the retrieved documents is outside the scope of our present study, and it is left for further research.

5. Advantages and disadvantages of focus groups

Although the data from our bibliometric analysis confirms that the use of the focus group discussion methodology is relevant for the present study, we should be aware that the use of this method, beside advantages, may also have disadvantages. The "course of the interviews is influenced by various social-psychological and psychological mechanisms" (Vicsek 2006, p. 478, our translation). Indeed, it is a well-known fact in the social sciences that increased attention to research subjects alone can influence the behavior of the individuals observed (Perrow 1997).

The homogeneity or heterogeneity of the group also influences the group's results. According to Vicsek (2006), a homogeneous composition tends to create a more pleasant atmosphere and stronger group cohesion, thus homogeneity was one of our aims when selecting the sample of students. The content of the focus group is also an influencing factor. "The topic, the main aspects of the interview outline/guide, the characteristics of the questions (e.g. how broad they are), the order, the style and language of the questions and the specific techniques used in the groups are all factors that influence the way the group proceeds" (Vicsek 2006, p. 489, our translation). We tried to minimize the impact of these influencing factors in our interviews.

In addition to the content and format of the focus group discussion and the impact of the tools and methods used, the personal characteristics of the moderator can also influence the conversation (Farquhar 1999), as can the physical characteristics of the focus group discussion (Stewart–Shamdashani 1990). To ensure that these effects were consistent across both groups studied, discussions were conducted in the same focus group room and the same person conducted the discussions in both cases.

Malhotra (2009) listed other advantages and disadvantages of the focus group discussion, as shown in Table 3.

Table 3. Advantages and disadvantages of focus groups

Advantage	Disadvantage
Special information	Bias towards group selection
Synergy	Bias towards moderator selection
Snowball effect	Bias towards environment
Encouragement	Non-representativeness
Safeness	Inappropriate application
Spontaneity	Bias in the discussion conduct
Valuable thoughts that arise unexpectedly	Disorganization
Specialization	Misinterpretation
Academic rigor	
Structure	
Speed	

Source: own construction based on Malhotra (2009, pp. 188-189)

In our analysis, we have tried to validate the advantages listed above and avoid the disadvantages.

6. Research aims and questions

6.1. Aim of the focus group discussion

In general, the goal of the focus group discussions is to understand household selective waste collection behaviors. We aim to explore factors that promote and inhibit responsible waste management, identify misconceptions and knowledge gaps, and understand motivations behind inaction despite awareness. This includes examining

attitudes and psychological characteristics related to selective waste collection. To achieve these objectives, we investigate the most effective tools and methodologies. This methodological paper details our pilot focus groups, which had two primary aims. First, to test our focus group guide for its effectiveness and suggest improvements. Second, to evaluate the methodology, examining the efficiency of tools like gamification, brainstorming, audio stickers, and presenting pre-existing knowledge.

6.2. Research questions

Although the guiding questions of the two focus group discussions were the same, the methods used to ask the questions differed. Based on our aims and goals, and the suggestions of the literature, we have formulated the following research questions for the pilot focus groups:

- **Research question 1:** To what extent do the stimuli (tools and methods) employed in focus group sessions effectively guide participants' responses towards the intended objectives?
- **Research question 2:** In the context of focus groups, do predefined frameworks inhibit or enhance outcomes? Specifically, do participants confine their responses within given categories, or do these categories stimulate further discourse?

These research questions were answered based on two focus groups, and with co-occurrence, observations, and content analysis, further detailed in the following sections.

7. Data collection and methodology

7.1. The setting and participants

The setting and participants of the study were crucial components that contributed to the depth of the research findings. These, considering the qualitative nature of the method, can be of great importance. They are also stated amongst the weaknesses of the focus group discussions. The recruitment criterion for the participants was to ensure homogeneity and methodological comparability between the two groups. A further criterion was that the respondents should know each other. This was important to be able to create a more relaxed atmosphere in which expressing opinions freely was possible. The basis for our group formation in this part of the research were the students at the University of Pannonia's Faculty of Economics. This section provides detailed insights into the venue, group composition, date, duration, and methodology employed during the research sessions.

Venue and date: The discussions were conducted at the Marketing Laboratory of University of Pannonia. The sessions took place on February 12, 2024.

Group Composition: The participants were divided into two focus groups, each comprising individuals of quite similar backgrounds. The composition of these groups was deliberately mixed based on gender to ensure varied viewpoints and

experiences. However, homogeneity was maintained based on age group and residence to minimize potential biases and enhance the relevance of discussions. Each focus group consisted of five individuals, allowing for intimate and in-depth conversations.

Duration: Each focus group session lasted for 90 minutes, providing efficient time for thorough discussions and engagement with the research tasks.

Methodology: The research methodology employed a combination of open-ended questions and interactive tasks to stimulate participant engagement and support diverse perspectives. Several projective techniques were used during the focus group discussions. Projective, as a technique of association, construction, and expression, encourages respondents to express their motivations, views, feelings, and attitudes (Malhotra–Simon 2017). Various techniques, including audio stickers, brainstorming sessions, World Café categories, and a free association game were utilized to encourage creativity, spontaneity, and depth in responses. These methodologies were carefully selected to foster a dynamic and collaborative environment conducive to meaningful dialogue and exploration of the research topic. Some of these techniques were only used in one group, and the other group served as a control group.

7.2. Methodology

In this chapter, we describe the methodology employed in our research, highlighting the utilization of two types of data collection and analysis techniques to ensure a comprehensive understanding of the research subject. We employed a dual-pronged approach to data collection, incorporating both focus group discussions and observational data.

Focus group discussions: The focus group discussions were conducted and recorded to capture the discussions and perspectives. Subsequently, transcripts of these discussions were generated for in-depth analysis. Textual data from these transcripts were then subjected to co-occurrence and content analysis techniques to identify patterns, themes, and insights relevant to our research objectives.

Observational data: In addition to focus group **discussions**, we integrated observational data gathered by an external observer. Positioned discreetly behind a blank window during the **discussions**, the observer keenly noted down her observations, capturing non-verbal cues, group dynamics, and other contextual nuances that might not be explicitly expressed by participants. These observational data provided supplementary insights and enriched the overall understanding of the research context.

Following data collection, we employed analytical tools to extract meaningful insights from the collected data. Textual data extracted from focus group transcripts underwent thorough examination and analysis using Atlas TI software. This qualitative data analysis tool facilitates the systematic coding, categorization, and interpretation of textual data, making possible to identify recurrent themes, patterns, and connections within the dataset.

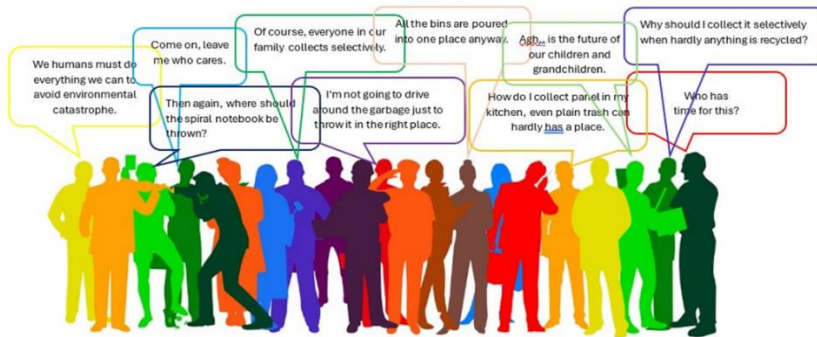
8. Tools and methods applied

In addition to open-ended questions, the focus group discussions used a number of interactive exercises and projective techniques.

8.1. Audio stickers

Audio stickers were used as a tuning tool for the experimental group. Sander and Höttecke (2014), in a qualitative study of students' judgement, found that audio matrices are suitable as stimuli.

Figure 5. The audio stickers and their content



Source: own construction

By briefly describing a situation, audio matrices can provoke statements from group discussion participants, trigger ideas and decision-making situations. They have the advantage of being less restrictive than video stickers, as they are not influenced by visual stimuli such as gestures and facial expressions. They can be encouraging or elicit statements, and they tend to resemble to the participants' experiences. The voice matrices are situation and context oriented (Sander–Höttecke 2014). For our experimental focus group discussion, we formulated short messages suggesting 10 inhibiting and supporting factors. We made audio recordings with child, female, and male participants, i.e. voice stickers evoking short descriptions of positive and negative situations. Our aim was to create the most open conversation impulses possible. In the group, after listening to the sound stickers, we asked the participants about their feelings and thoughts. It was interesting to see what feelings they associated with the messages they heard about waste management.

8.2. Brainstorming

The advantage of this method is that a relatively large amount of information can be obtained in a very short time on a given topic, and the evaluation of ideas and solutions is very simple (Nahlik 1987, Osborne 1953). In order to identify good solutions in the interviewees' environment, this method was used to gather information during both focus group discussions. The aim was to identify factors that promote and hinder responsible waste management. The work involved informal responses to questions

written on a whiteboard by the participants, followed by a group discussion to organize and evaluate the written and spoken reflections.

8.3. Free association game

When examining the information channels and content of attitude formation, we asked the students to individually write down on a sheet of paper the topics they suggested. Then we closed the discussions with a **projective technique**, playing association games and recalling stories (Malhotra–Simon 2017). According to Joffe and Elsey (2014), if a question about attitudes and behaviors is asked directly, answers are unlikely to reflect how people see the issue in its full reality and complexity, but the free association technique can offer a window into implicit content (László 2022). The free association games technique provides an opportunity to uncover implicit content and better understand consumers, namely, what selective waste management means to citizens and what concepts they associate with it. Social representations are systems of social influence and communication that constitute the social reality of distinct groups within society (László 2022).

9. Results

9.1. Introducing audio stickers

The results demonstrate that audio stickers are highly effective as an interviewing tool in focus group discussions. They encouraged participants to share more emotional content and personal examples, rather than making generalized statements about others. Furthermore, audio stickers successfully eased the atmosphere, proving to be an excellent icebreaker and facilitating more open and engaging discussions.

Table 4. Comparison of the focus groups based on the results of the brainstorming

	Group 1	Group 2 – with audio sticker
Content diversity	Participants had one opinion each with or without the audio stickers.	
		Content-wise no more information was immediately available thanks to the sticker.
Type of content shared (What feelings do you connect to selective waste management?)	Two participants shared internally induced content, the other three spoke about infrastructure, external factors at the beginning.	Four participants shared feelings and internal factors, and one concentrated on external barriers
Group dynamics	With no sticker, participants were very half-hearted, reserved, and the atmosphere started to get dull after about 30 minutes in the 3rd block of topics.	With the audio stickers, smooth and enthusiastic conversation flowed from the beginning.

Source: own construction

The first thing we found in both groups was that only one response was given to the question asked by the moderator, either with or without a sound sticker. Although no more information was provided using the sound stickers, the conversation started off in a half-hearted and subdued manner without the use of these stickers, and only after about 30 minutes, when the third topic was discussed, did the atmosphere begin to lighten. In contrast, when employing sound stickers, the conversation was more relaxed from the start. The factors mentioned in the experimental group confirmed that the sound stickers evoke internal feelings easily, as shown by the phrases used by the participants: *"I'm used to it", "I feel bad", "I felt obligated, but it's weird if I don't do it."* In addition, without the sound stickers, the participants' feelings were predominantly related to external factors.

Table 5. Feelings evoked by participants

How do you feel about separate waste collection? (inner feelings, motivation, or external factors)			
Without audio stickers		With audio stickers	
INNER	<i>"...Anyway, it's great, because I can do something for my environment, so that we can live in a cleaner environment..."</i>	INNER	<i>"...something that has grown on us, I don't feel that it makes me feel any particular emotion, but it feels like a general thing to do..."</i>
INNER + EXTERNAL	<i>"...I'm used to separate waste collection, now we have a blue bin like this at home, and we throw the bottles in it, we also take care of it in the dormitory, so I actually like it..."</i>	INNER	<i>"...it's been ingrained in our lives since birth, but I don't think everyone applies it regardless..."</i>
EXTERNAL	<i>"...I don't think we can do it as well as we should, and we can't do it as well as we should, and we still don't have the conditions to actually collect waste separately..."</i>	INNER	<i>"...that's the way we should all perceive it, so that we can make it a little bit better, so that in a few years we'll still be as healthy..."</i>
EXTERNAL	<i>"...obviously I try to pay attention to this, but, for example, where I come from, so where I live in a small village, they collected the recycling bins, so they were put out, and they decided not to continue..."</i>	INNER + EXTERNAL	<i>"...It's a completely positive thing I think, and it has as much impact on the environment as it does on society, and it doesn't take any longer than if you throw it in one place, because you usually have these bins next to each other."</i>
EXTERNAL	<i>"...but now I've somehow got to the point where, if I don't have it in me at the office level, but let's say at home, where I really have the possibility, because I have a separate bin for mixed and selective, a small bin for each..."</i>	EXTERNAL	<i>"...but there are still a lot of places where it's difficult to do this, for example in the countryside, or even in prefabricated buildings, where you have to carry it down, that it might be a problem for somebody."</i>

Source: own construction

9.2. Brainstorming

As a group work method, brainstorming can provide the additional result of more informal collective thinking compared to individual responses and reflection. It allows the participants to respond informally to a question written on a whiteboard and to write, organize and evaluate the ideas expressed on the whiteboard. In both focus group discussions, this method was used to gather information about good practices regarding responsible waste management in the participants' environment. The moderator wrote down on the flipchart the 3 levels (micro/household, meso/municipality, municipality/waste management body, and macro/government), where they perceive and see tangible efforts. During the discussion, we also examined the factors that hinder the separate collection of waste, building on the results of the previous World Café method. For methodological comparison purposes, we asked only open-ended questions in our first discussion to explore the barriers and enablers in the practice of selective waste collection. However, for the other group, the results obtained during the World Café were shown by the moderator on a flipchart and, based on the factors already identified, he asked the participants to give examples of these categories from their own lives. We then aimed to identify additional inhibiting and supporting factors in addition to those listed. A brainstorming activity was proposed for the question: who is responsible for what, when it comes to selective waste management? The participants then worked together to collect the tasks for the responsible actors on the micro, meso and macro levels.

Table 6. Comparison of the focus groups based on the results of the brainstorming

	Group 1	Group 2
Content diversity	Similar content in both groups	
Type of content shared	Diverse content, working on other ideas, reflecting on each other	
Group dynamics	Working in group, using a smart broad together in general boosted the eagerness of participation	

Source: own construction

The most important lesson learnt was that the two groups were similar based on content diversity, type of content, and group dynamics. The differences in the other tasks might be due to the application (or non-application) of the different methods, not the differences arising from the groups.

9.3. World Café categories

Pre-existing knowledge has been presented to one of the groups, and then the same question was asked from both focus groups: "Who is responsible for what, when it comes to selective waste management?" One group was presented with the World Café categories, while the other group was not. The group exposed to the categories exhibited a more structured and methodical approach in their responses. They seemed to engage with the provided categories, leading to a facilitated exchange of ideas and a more confident expression of opinions. However, this adherence to categories also

constrained their thinking, as participants got stuck within the predefined framework, limiting the exploration of alternative viewpoints.

Table 7. Comparison of the focus groups based on the WC category presentation

	Group 1	Group 2 WC categories presented
Content diversity	participants share exact examples of barriers	participants get stuck in the presented content.
Type of content shared	internal thoughts, real-life situations	more general thoughts, less examples of their own feelings.
Group dynamics	more half-hearted response according to the observer	presenting the WC categories supported the courage of expression

Source: own construction

In contrast, the group without predefined categories demonstrated more diverse and spontaneous responses. Participants were observed to provide more hesitant responses when no specific categories were provided. However, they shared feelings, private thoughts, real-life situations, and examples of barriers, enriching the discussion with a broader range of perspectives, and serving more our research objectives. The absence of categories allowed for greater flexibility in thinking and encouraged participants to freely express their opinions without being confined to predetermined frameworks. This distinction highlights the importance of carefully considering the use of structured approaches, such as World Café categories, in facilitating discussions and achieving research objectives.

9.4. Projective technique

By using the projective technique, we wanted to encourage respondents to express their feelings and views on the issue of separate waste collection. By using these techniques, respondents indirectly formulate their motivations and attitudes by interpreting the behavior of others in relation to a given situation. In marketing research, association, complementary, construction and expression techniques are used (Malhotra and Simon, 2017). The discussion was concluded in both groups by playing an association game and recalling personal stories. The students were asked to quickly, without thinking, write down on post-it notes five words that came to their minds about selective waste collection. After that they were asked to recount a personal experience related to waste selection. In each group, 21 of the thoughts expressed by the participants were positive and 3 negative, such as "*accumulation, problem*".

Figure 4. Word cloud based on the free association games



Source: own construction (WordArt)

The other associations are related to the framework, the design, and material factors: "dustbin, paper, collection, rubbish, colors, used items, plastic, etc.". When looking at word frequencies, most associations were "bin (4), collection (4), environment (3), recycling (3), plastic (3)". The result of the summary of the association ideas highlights the importance of the future for the young age group, with 21 positive mentions of this idea out of 50 associations: "children, sustainability, important, earth, environment, solidarity, selective, nature, recycling, receptivity, circular, environment, environment, future".

We ended the talks by recalling personal stories. Respondents were asked to share with us any experiences or memories they had with the practice of separate waste collection. Four people recalled childhood experiences or memories. One such story was the following: "We took a toy kitchen from a house during a waste clearance. I played with it for years afterwards, so it was useful." The others remembered it as being linked to material factors, to the existence of conditions. One respondent described positive factors, but five participants listed mainly negative factors, events that annoyed them (lack of selective condition, lack of material condition, or non-exemplary attitude of the manager at work).

The respondent who recalled their positive experience also suggested the following on the subject: "Otherwise, for me, the decisive factor was the visit to the yard. Here in the Springs, it was a very thought-provoking experience. I think that everybody should go there and see where the PET bottles that they throw away end up, or I don't know, the wine bottles that accumulate after an event, so I think that this should be made much clearer to people."

10. Conclusion

In discussing the findings of the present study, it is important to align them with the multifaceted objectives we set out to achieve through the focus group discussions. Our primary aim has been not only to explore the factors promoting and inhibiting responsible waste management but also to rigorously test the methodology itself. We have aimed to examine the efficiency of the applied tools and methods, particularly

concerning target access and the efficacy of evoking meaningful responses from participants. Central to our study have been the research questions designed to assess the effectiveness of the stimuli, encompassing the tools and methods employed during the focus group sessions. We probed the extent to which these stimuli guided participants' responses towards the intended objectives, to understand whether predefined frameworks, such as the World Café categories, inhibited or enhanced outcomes. Specifically, we have investigated whether participants felt confined within given categories or if these categories stimulated further discourse and exploration of diverse viewpoints.

Our methodological approach includes the utilization of Atlas.ti and R-Studio (Biblioshiny) for content analysis and word co-occurrence analysis. Moreover, external observations were conducted to provide additional insights into group dynamics and participant engagement throughout the discussions. Through this methodology, we have aimed to gain comprehensive insights into the efficacy of different discussion methods and tools in achieving our research objectives. From our analysis it becomes clear that the choice of discussion methods and applied tools significantly impacts the depth and diversity of responses obtained.

The use of World Café categories tended to yield general ideas rather than real-life examples. It also placed limitations on the scope of discussion and failed to evoke new ideas beyond the predefined categories. Brainstorming proved to be highly effective in generating multiple ideas and fostering a relaxed atmosphere. This method facilitated the emergence of innovative ideas and encouraged a more open exchange of thoughts and opinions. The use of audio stickers encouraged participants to share real-life examples and express their emotions, contributing to a more relaxed atmosphere throughout the focus group discussion. Unlike the World Cafe categories, this method did not impose limitations on participants' thinking and made it acceptable to express negative ideas. When posing a single open-ended question, participants typically focused on a single factor. However, brainstorming emerged as an excellent method for evoking a wider array of ideas. The World Café categories, while providing structure, did not foster deeper exploration and often restricted responses. The use of audio stickers facilitated the sharing of personal examples and emotions, contributing to a more relaxed atmosphere throughout the discussion.

The insights gained from the pilot focus group discussions provided valuable lessons for future research. Building upon these findings, we plan to conduct additional focus groups, applying the lessons learned to refine our approach and deepen our understanding. These focus groups will encompass diverse demographic groups. Based on lifestyle, high school students, young adults entering the labor market, active labor market participants, and pensioners are going to be the focus of our future focus group discussions. By engaging with a broad spectrum of participants, we aim to capture a comprehensive range of perspectives on waste management behavior. Furthermore, drawing from the qualitative data collected in these focus groups, we will design a questionnaire, which will serve as a complementary tool to further explore and validate our findings on a larger scale. Employing a mixed-method research approach, integrating both qualitative and quantitative analyses, will enable us to triangulate findings, enhancing the robustness and depth of our research outcomes.

Our results highlight the importance of selecting appropriate discussion methods that align with the research objectives. While structured approaches like the World Cafe categories may provide some guidance, they can limit the depth and diversity of responses. In contrast, methods such as brainstorming and the use of audio stickers facilitate a more open and creative exchange of ideas, fostering a conducive atmosphere for exploration and insight generation. Moving forward, researchers should carefully consider the dynamics of different discussion methods to ensure optimal outcomes in data collection and analysis.

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