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# Gestaltung sozialer Roboter für den öffentlichen Raum: Erkenntnisse aus einer Fallstudie mit dem Lutzi-Roboter

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# Designing Social Robots for Public Space: Lessons Learned from a Case Study with the Lutzi Robot

DIPLOMA THESIS

submitted in partial fulfillment of the requirements for the degree of

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by

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Farzaneh Yegan, BSc

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Wien, 25. November 2024

Farzaneh Yegan

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# Kurzfassung

Diese Arbeit befasst sich mit der zentralen Frage: Wie wird Sozialität mit Robotern – insbesondere im Kontext von Servicerobotern – gestaltet? Ziel ist es, zu verstehen, wie Menschen die Sozialität von Robotern wahrnehmen, mit einem besonderen Fokus auf die soziale Wahrnehmung von Robotern im österreichischen Kulturkontext.Konkret untersucht die Studie die Wahrnehmungen und Interaktionen der Nutzer*innen mit Lutzi, einem Serviceroboter, der in XXXLutz-Restaurants eingesetzt wird.

Während Anthropomorphismus in der Fachliteratur häufig als entscheidender Faktor im Design sozialer Roboter anerkannt wird, beleuchtet diese Arbeit, wie Sociomorphing die Mensch-Roboter-Interaktion beeinflusst. Sociomorphing beschreibt die Wahrnehmung tatsächlicher sozialer Fähigkeiten bei Agenten oder Systemen, einschließlich nichtmenschlicher Akteure. Daraus ergeben sich folgende Forschungsfragen: (1) Wie wird die Sozialität von Robotern von verschiedenen Personengruppen wahrgenommen und geformt? (2) Welche sozialen und soziologischen Faktoren tragen dazu bei, dass Roboter von Menschen als sozial wahrgenommen und in die Gesellschaft integriert werden? Und schließlich (3) welche spezifischen Rollen und Erwartungen beeinflussen die Interaktionen mit einem Serviceroboter, und wie wirkt sich dies auf dessen Akzeptanz und Integration aus?

Ein Mixed-Methods-Ansatz wurde angewandt, der Beobachtungen, Interviews und eine videobasierte Umfrage umfasst. Die Studie sammelte sowohl quantitative als auch qualitative Daten von einer vielfältigen Teilnehmer:innengruppe. Beobachtungen und Interviews lieferten Einblicke in natürliche Interaktionen mit Lutzi in realen Umgebungen und zeigten situative und kontextuelle Faktoren wie die Neugier von Kindern, funktionale Erwartungen von Erwachsenen und das Zusammenspiel kultureller Normen. Die Umfrage nutzte validierte Skalen – ASOR, Moral Agency, Moral Patiency und Cuteness/Kawaii – um Lutzi mit dem Starship-Lieferroboter und dem Vector-Companion-Roboter zu vergleichen. Die Teilnehmer*innen bewerteten die Roboter in mehreren Dimensionen, darunter Socio-Practical Relatedness, Intimate-Personal Relatedness, and Mental and Psychological Relatedness. Darüber hinaus wurden Geschlechterunterschiede, altersbedingte Trends und die Auswirkungen der Funktionalität von Robotern in verschiedenen sozialen Kontexten analysiert

Die Ergebnisse zeigen, dass Sociomorphing die Akzeptanz von Robotern signifikant steigert, insbesondere bei älteren Teilnehmer*innen, die den Fähigkeiten von Robotern

ein höheres Vertrauen entgegenbrachten. Geschlechterunterschiede traten ebenfalls auf: Frauen schrieben Robotern eine höhere moralische Patienz (Moral Patiency) zu als Männer, was darauf hinweist, dass emotionale und ethische Dimensionen die Wahrnehmung beeinflussen. Funktionale Erwartungen spielten eine zentrale Rolle, da Teilnehmer*innen die Nützlichkeit und Zugänglichkeit von Robotern in geschäftigen Umgebungen betonten. Obwohl kulturelle Übereinstimmung die Interaktion mit Robotern verbesserte, waren spezifische kulturelle Faktoren weniger stark ausgeprägt als erwartet.

Diese Ergebnisse tragen zu einem besseren Verständnis bei, wie Roboter als soziale Akteure wahrgenommen werden, und liefern wertvolle Implikationen für das Robotikdesign. Die Studie legt nahe, dass Sociomorphing anstelle von Anthropomorphismus als kulturell adaptives und praxisnahes Designkonzept für die Entwicklung sozial akzeptierter Roboter dienen kann. Indem der Fokus auf einfache, aber bedeutungsvolle Interaktionen gelegt wird, zeigen Serviceroboter wie Lutzi, dass Funktionalität und Sociomorphing die Akzeptanz und Integration in diverse soziale Umgebungen fördern können.

# Abstract

This thesis addresses the central question: How is sociality enacted with robots, particularly in the context of service robots? It aims to understand what constitutes people's perception of sociality in robots with a focus on the social perception of robots in an Austrian cultural context. Specifically it investigates user perceptions and interactions with Lutzi, a service robot deployed in XXXLutz restaurants.

While anthropomorphism is widely recognized in many literatures, as a critical factor in social robot design, some research explores how sociomorphing influences human-robot interaction. Sociomorphing refers to the perception of real social capacities in agents or systems, including non-human agents. This leads to the following research questions: (1) How is the sociality of robots perceived and shaped by different groups of people? (2) What social and sociological factors contribute to robots being perceived as social by humans and becoming part of society? Finally, (3) what specific roles and expectations influence interactions with a service robot, and how does this affect its acceptance and integration?

A mixed-methods approach was employed, including observations, interviews, and a video-based survey—the study collected both quantitative and qualitative data from a diverse participant group. Observations and interviews provided insights into the natural interactions with Lutzi in real-world settings, highlighting situational and contextual factors such as curiosity among children, functional expectations from adults, and the interplay of cultural norms. The survey used validated scales—ASOR, Moral Agency, Moral Patiency, and Cuteness/Kawaii—to benchmark Lutzi against the Starship delivery robot and the Vector companion robot. Participants rated the robots across several dimensions, including Socio-Practical Relatedness, Intimate-Personal Relatedness, and Mental and Psychological Relatedness. The analysis also investigated gender differences, age-related trends, and the impact of robot functionality in different social contexts.

Findings indicate that sociomorphing significantly enhances robot acceptance, particularly among older participants, who demonstrated higher trust in robots' capabilities. Gender differences emerged, with women attributing higher moral patiency to robots than men, suggesting that emotional and ethical dimensions influence perception. Functional expectations also played a key role, as participants emphasized the importance of robots' utility and approachability in busy environments. While cultural alignment improved robot interaction, specific cultural factors were less prominent than anticipated.

These results advance the understanding of how robots are perceived as social agents, offering valuable implications for robot design. The study suggests that sociomorphing, rather than anthropomorphism, may serve as a culturally adaptive and practical design framework for creating socially acceptable robots. By focusing on simple yet meaningful interactions, service robots like Lutzi demonstrate how functionality and sociomorphing can drive acceptance and integration into diverse social environments.

# Contents

CHAPTER 1

# Introduction

Social robots play an important role in various fields such as healthcare, education, service, and entertainment. They highlight their potential by improving human well-being [15] and productivity [63]. As technology advances, social robots are expected to offer more benefits and become valuable assets in various aspects of human life including customer service and hospitality [40, 32], gastronomy [39], cultural institutions such as museum as tour guide [12, 27] workplace productivity and collaboration [62], social integration, and inclusion [51] etc. The increasing presence of robots in human environments highlights the urgent need for more research on human-robot interaction (HRI) of deployed systems. Unlike traditional machine interactions, interactions with social robots require a deeper level of engagement and understanding [8]. This includes effective communication, empathy, adaptability to social cues, and fitting to cultural norms.

## 1.1 Motivation and Problem Statement

The aim of this Master's thesis is to understand in more detail what constitutes people's perception of sociality in robots; a task made difficult by the diversity of human responses towards robot [37]. Although laboratory studies have advanced our understanding of how people perceive robots, real-world contexts, particularly with robots already deployed in service environments, present different challenges and factors that are not fully captured in controlled settings. Real-world perceptions often involve more complex, unpredictable variables, which can significantly differ from controlled study environments.[4, 61]. To increase our understanding of how and why people sociomorphise robots requires further investigation of these questions.

Researchers who develop social robots often prioritize the refinement of design features over the consideration of sociological factors [36]. These features enable robots to interact with humans in more effective and acceptable ways [20]. However, the effect of

sociomorphing [33] robots is not solely linked to the appearance and behavior design of robots, but is embedded in our social world and human sense-making [25].

It is important to understand *what makes a robot social*, in order to develop robot designs that successfully make use of social cues. Whether they assist in healthcare, education or customer service, social service robots have the potential to revolutionize various industries and improve people's quality of life [67]. In summary, answering the question of what makes us perceive a robot as a social entity is necessary to advance social robotics, improve human-robot interaction, and develop more effective and socially acceptable robotic systems.

## 1.2 Case Study: Lutzi

Figure 1.1: Lutzi in a restaurant setting, interacting with customers by winking. Source: [1]

To investigate the social factors and cultural norms affecting human-robot interaction, our particular focus is "Lutzi". A 1.29-meter tall, 57-kilogram service robot with a cat-like display face [64] employed in XXXLutz restaurants.

Originally named Bellabot [9], Lutzi is designed by Pudu, a Chinese company based in Shenzhen. The robot is capable of delivering orders directly to guests' tables. Utilizing advanced technology like LIDAR, 3D sensors, and cameras to navigate the restaurant while avoiding obstacles and people.

Bellabot interacts with humans by responding to simple commands and notifying guests when it arrives at their table. With its cat-like digital face, it can display various expressions and even responds to touch by purring when petted, especially on its head.

To enhance the dining experience, it can sing or play music, and the program allows it to use multiple languages in order to connect better with foreigners.

The Lutzi robot has been in use at several XXXLutz restaurant branches since May 2023. However, its functionality varies by location, and compared to other countries, its use in Austria is limited. This topic will be explored further in section 3.1. In XXXLutz's, Lutzi is primarily used to assist the staff by collecting dirty dishes.

## 1.3 Aim, Context and Scope of this Thesis

The aim of this thesis is centered around three key areas:

**Comparative Sociality Analysis of Lutzi and Other Robots:** This research examines how Lutzi is perceived (sociomrphied) in comparison to two other robots, Vector and Starship. Each robot will be described in detail later on, followed by a survey in which participants watch videos of these robots performing tasks. This analysis will help understand the distinct behavioral patterns and functionalities of Lutzi compared to the other robots.

**Functionality and Social Integration of Lutzi in Austria:** The study explores whether Lutzi functions as a social robot within the context of Austria. By gathering responses and impressions from various stakeholders such as restaurants owner, staffs and customers through direct and or indirect interaction with the robot, the research will analyze and define the social requirements for such a service robot in Austrian restaurants. This will involve understanding how Lutzi is perceived and its role in social settings.

**Design and Presentation of Social Robots:** The research aims to identify and translate social and design requirements for service robots. These will include:

- *Standards of behavior:* Detailed identification of specific social behaviors exhibited by Lutzi, such as showing responsive facial expressions, and eye movement like winking via the cat-like display face contribute to human-like social interactions. Observing and analyzing Lutzi's ability to adapt behavior based on situational and social dynamics in the restaurant environment.

  Evaluating how Lutzi manages expected service activities and roles, such as serving food and interacting with guests, while also demonstrating its capability to perform tasks typically handled by human employees.

- *Emotional Expression*: Analysis of how Lutzi uses visual and auditory signals to express emotions or states, such as happiness when serving food or acknowledgment when interacting with guests. Lutzi enhances the perception of sociality. In certain countries, robots like Lutzi frequently use auditory signals while serving food. For example, the Robot can play the "Happy Birthday" song [13] while delivering a birthday cake to guests and celebrating their birthdays. Similarly, in a medical center in Malaysia [60], the same robot named Bellabot, [9] supports hospital operations by serving meals to patients. The robot interacts with children by meowing, winking, and singing songs.

- *Sociomorphic features*: An examination of how Lutzi's life-like characteristics, such as its cat-like face and ability to express itself, contribute to its perception as a social actor. Attribution of social skills: In determining how guests and employees rate social skills on Lutzi, including perceived intelligence, empathy, and sociability design considerations for future service robots.

By providing a detailed understanding of the parameters that contribute to the sociality of robots like Lutzi and offering practical design implications, this research aims to enhance the development of future service robots that can seamlessly integrate into social settings and improve human-robot interactions and acceptance in the Austrian context.

## 1.4 Research Questions

***How is sociality enacted with robots, specially with service robots?*** Based on the aim of this thesis and the aim to operationalize this overall research question the following sub-research questions are derived:

- **RQ1**: Perceptions of Robot Sociality: How do different groups of people (e.g., restaurant owners, customers, service staff) interact with Lutzi? How is Lutzi sociomorphised in comparison to other social robots?
- **RQ2**: Sociological Factors: Beyond design features, what makes robots seem social to humans? How do these factors influence robots becoming part of society?
- **RQ3:** Role of social robots (Lutzi): What roles and expectations in a restaurant shape the interaction between people and Lutzi? How do the staff and robot roles affect the acceptance and integration of service robots like Lutzi into social settings?

By addressing these sub-questions, this thesis aims to provide a deeper understanding of how sociality is enacted with different service robots, using Lutzi as a case study to explore its broader implications.

## 1.5 Methodology and Thesis Structure

This thesis consists of a literature review and an empirical user research methods part, which is split up into a qualitative and quantitative approach. The qualitative approach is based on observation studies and interviews, whereas the quantitative part is a video-based survey using existing validated scales for measurement to assess user perception and behaviors.

### 1.5.1 Literature Review

This literature review aims to explore key concepts and previous research surrounding social robots and human-robot interaction (HRI). The review covers important areas such as the evolution of social robots, a comparison between anthropomorphism and sociomorphing, and the role of cultural and social norms in shaping robot acceptance. These topics are crucial in identifying factors that contribute to perceived sociality, helping to understand how Lutzi might be perceived within the Austrian cultural context. Additionally, it examines the use of measurement scales such as the attitudes towards

social robots scale (ASOR), Moral Agency, Moral Patiency and Cuteness to assess user perceptions of robots. This analysis forms the basis for the empirical investigation that follows, laying the groundwork for the methodology and data analysis.

### 1.5.2 User Research

The empirical part of this master thesis uses a mixed-methods approach to answer the research questions posed above:

#### Observational Study

In total 20 participants were observed in XXXLutz restaurants. The restaurants were located in various regions of Austria and Lutzi Robot's operation differs by location. The observational study aimed to address the following research questions:

RQ1: People's interactions with Lutzi, and how they relate to the interaction capacities of the robot.

RQ2, RQ3: Sociological factors and cultural norms contributing to the interaction experience, as well as the role of the Lutzi robot.

#### Interviews

Twenty participants observed interacting with Lutzi were briefly interviewed in the restaurants to gain a deeper insight into their experiences and interactions with Lutzi. In addition to three restaurant customers, three interviews were conducted with employees who work with Lutzi on a daily basis. The interviews aimed to address the following research questions:

RQ1: People's meaning-making of the interaction with Anthropomorphizing and sociomorphising the robot.

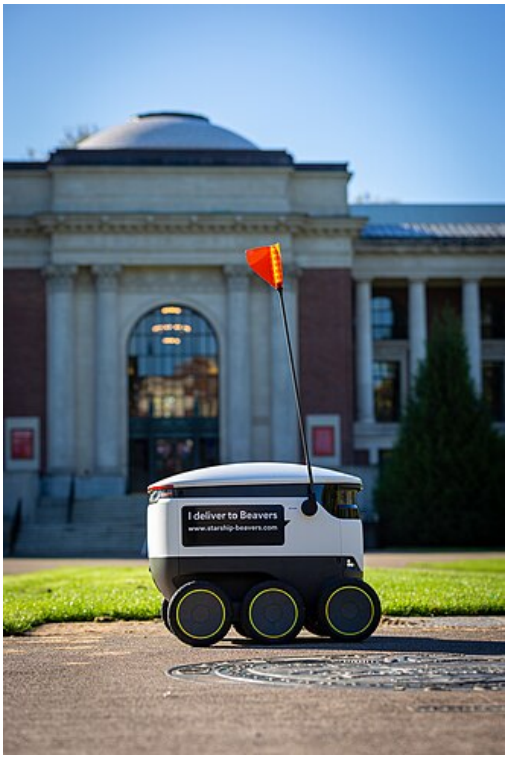
RQ2, RQ3: People's values and norms influencing the interaction as well as their perception of the role of the Lutzi robot.

#### Online Survey

A video-based online survey was conducted, benchmarking the Lutzi robot against two other social (service) robots: the Starship delivery robot 1.2a and the Vector companion robot 1.2b. The survey employed multiple scales to comprehensively measure participants' perceptions of the robots.

The ASOR scale (adapted from [22]) was used to measure three dimensions of human-robot interaction:

*Socio-Practical Relatedness (SPR):* Three questions assessing participants' perceptions of the robots' functionality and practical assistance in social settings. *Intimate-Personal*




(a) The Starship delivery robot. Source: [56]

(b) The Vector companion robot. Source: [34]

Figure 1.2: The Starship delivery robot (a) and the Vector companion robot (b) were benchmarked against the Lutzi robot in a video-based survey to assess their social and functional perceptions.

*Relatedness (IPR):* Six questions measuring the perceived closeness and personal connection between participants and the robots. *Psychological Moral Relatedness (PMR):* Eight questions focused on the psychological and moral attributions made toward the robots, to assess how participants perceive the robots' mental and moral capacities. Additionally, the survey incorporated ten questions based on Banks' Moral Patiency [6] and Moral Agency scales [5], designed to assess two critical dimensions of robot morality: *Moral Agency:* Evaluates the extent to which participants believe the robots can perform moral actions. *Moral Patiency:* Measures whether participants consider the robots capable of experiencing moral treatment or harm.

Lastly, 6 questions from the cuteness/kawaii scale (adapted from [10]) were used to evaluate the robots' aesthetic appeal, focusing on their perceived cuteness, which can influence emotional engagement and likability.

These scales collectively provide a multi-dimensional understanding of the participants' perceptions, addressing the research questions surrounding robot sociality, morality, and aesthetics. All items of the scale can be found in 6.3

CHAPTER 2

# Related Work

This literature review covers several research areas, starting with an investigation into the social factors that shape perceived sociality in Human-Robot Interaction. It focuses on how social robots are seen as social beings, influenced not only by their design but by factors beyond it. It then explores cultural perspectives to understand how social robots may be perceived in various cultural context. Lastly, it examines relevant scales and measurements that capture the complex attitudes people hold toward social robots.

## 2.1 HRI and Anthropomorphism

Anthropomorphism has emerged as a key factor in shaping human-robot interactions. Several studies discuss how a robot's human-like appearance can significantly influence user perceptions. For instance, [48] and [23] both highlight that robots with more human-like attributes — such as physical appearance and behavior — are perceived as more intelligent and intentional. This is critical for enhancing user engagement, aligning a robot's appearance with its functional capabilities can improve satisfaction. Similarly, [65] underscores that anthropomorphic design can mitigate the "Uncanny Valley" impact, a phenomenon where robots which are almost, but not absolutely human-like initiate discomfort in users.

Additionally [30] demonstrate that humans prefer robots whose appearance corresponds to the seriousness of the task, to highlight the significant influence of perceived social attributes on interactions. This finding is consistent with existing social psychological literature, which suggests that robots exhibiting attractive characteristics elicit more favorable responses. The authors emphasize that initial, automatic perceptions formed through visual and behavioral cues play a critical role in shaping user expectations and interactions with humanoid robots.

### 2.1.1 Differing Views on Anthropomorphism

While there is general consensus that anthropomorphism enhances interaction, studies differ in how they view its implementation. For example, [16] argue that users interact with robots as depictions of social agents, maintaining a cognitive distinction between real and artificial social beings. Otherwise, [18] support the deliberate use of anthropomorphism to create a believable "social presence", using it to make interactions more intuitive and comfortable, thereby blurring the lines between human and robot interactions. These differing perspectives highlight the nuanced ways anthropomorphism can be applied in the HRI design process. [16] emphasize that users are knowingly engaging in imaginative interactions with robots, compared to [18] who consider anthropomorphism as a strategic design tool to foster "genuine" social presence.

In addition to anthropomorphic design, [18] introduces the concept of "synthetic ethics", advocating for the integration of ethical considerations in robot design. The potential harms of anthropomorphic design—such as sex robots with inappropriate features—are raised as concerns. This highlights the double-edged nature of anthropomorphism: it can enhance user interaction, but also raise significant ethical questions.

### 2.1.2 Cognitive Mechanisms and Theoretical Frameworks

Further supporting these findings, [31] examines how people perceive robots as social agents. Their study shows that people attribute intentions and emotions to robots much like they do to humans, highlighting the cognitive processes involved in human-robot interactions.

Building on this, [57] analyzes models of social cognition and interaction, proposing frameworks to explain how people perceive and interact with robots. The work emphasizes the need for clear theories to fill existing gaps and guide future research in HRI. Additionally, [59] highlights the importance of developing models that account for both the cognitive and emotional aspects of human-robot interactions, advocating for a comprehensive understanding of these dynamics.

### 2.1.3 Anthropomorphism vs. Sociomorphing

In contrast to anthropomorphism, Seibt introduces the concept of sociomorphing [54], a process where humans interact with robots as social entities without attributing human-like characteristics to them [33]. Sociomorphing is based on the premise that robots can exhibit a distinct form of sociality, which, although different from human behavior, remains meaningful within interactions.

Sociomorphing posits that human-robot interactions do not require the projection of human traits onto robots for them to be perceived as social. Robots can engage in behaviors that are recognized as social actions. Seibt [33]. argues that sociomorphing allows for a more accurate conceptualization of these interactions, acknowledging that robots may simulate social actions without being anthropomorphic, yet still foster

meaningful social engagement.While anthropomorphizing involves the projection of human characteristics onto robots, sociomorphing emphasizes the inherent sociality of robots, even in the absence of such projections. Additionally, anthropomorphism assumes social interaction is contingent upon human-like attributes, while sociomorphing argues for a broader understanding of sociality. This allows robots to be recognized as social agents based on their own unique capacities and behaviors, rather than their ability to mimic humans.

Furthermore, Seibt [33] critiques the dualistic nature of anthropomorphizing, which frames human-robot interactions as either social (human-like) or non-social (machine-like). Instead, sociomorphing proposes a spectrum of sociality where robots can engage in different degrees of social interaction without requiring human-like traits. Importantly, sociomorphing occurs both consciously and unconsciously, often arising pre-consciously as humans interact with robots in a real-world contexts.

The shift from anthropomorphizing to sociomorphing has significant implications for the robot design process and human-robot interaction studies. While anthropomorphism drives designs that mimic human behavior [33], sociomorphing encourages the development of robots that interact meaningfully in ways unique to their non-human nature, but perceived as social. This shift allows for a wider range of interaction styles and robot functionalities, leading to more nuanced robot designs that better align with the users' specific needs (ibid).

Seibt's Ontology of Asymmetric Interactions (OASIS) framework [54], developed in her work addresses the limitations of fictionalist interpretations of HRI. Fictionalist views, which compare robots to humans through analogy. It fails to capture the genuine social dynamics involved in these interactions. Seibt developed OASIS to provide a framework for classifying and analyzing human-robot relations without relying on human-like projections.

The OASIS framework identifies five types of simulated interactions which include, replicating, imitating, mimicking, displaying, and approximating (ibid). The five types of interactions describe how robots interact with human social behaviors at different levels. These interactions are not simply fictional analogies of human-human interactions, but represent genuine processes by which robots perform social functions. This allows for a more rigorous understanding of robot behavior, making clear that HRI can be social without robots being "human-like".

In this way, the OASIS framework [54] challenges dualist and fictionalist views in HRI by focusing on the degrees of sociality robots can demonstrate. It provides a systematic approach to analyzing robot interactions and supports a transition from anthropomorphism to sociomorphing. Sociality is perceived based on the robot's actual behavior and capacities.

## 2.2 Cultural Considerations in Robot Design

The role of culture in Human-Robot Interaction (HRI) is a critical and complex area of research. Across various studies, there is broad consensus on the importance of cultural factors in shaping how users perceive, interact with, and ultimately accept robots [42]. However, these studies reveal a complex interplay of cultural complexities that influence different aspects of HRI, ranging from design preferences [47, 52] to communication styles [50] and long-term acceptance [19].

In their study [54, 55], Seibt argues that robot design must align with users' cultural expectations and social norms to ensure user acceptance. Advocating for a human-centric approach, this research underscores the need for culturally sensitive designs that enhance user satisfaction by considering cultural diversity. This approach supports the idea that robots should be tailored to fit various social contexts, meeting the unique needs of diverse user groups. Similarly, Dipietro [21] and Kamino et al. [36] focus on the social aspects of robot design, investigating how cultural attributes shape user interactions with robots. This research focused primarily on Japan's robot-friendly culture, where robots have become part of daily life, reflecting broader cultural norms around companionship and emotional support. For instance, in Japan, the owners of robots like Sony's Aibo, SHARP's RoBoHoN, and Groove X's LOVOT create social rituals around their robots, including regular gatherings and community events, which contrasts with cultures where robots are viewed more as tools rather than social companions. Additionally, companies in Japan facilitated this by designing robots that encourage group activities, hosting events, and integrating robots into social spaces, thus helping to establish robots as social agents rather than mere objects of technology. This highlights how cultural norms and communal practices influence the design and interaction with social robots.

In contrast, Seibt et al. (2020)[33] highlights both the challenges and opportunities posed by culturally specific design elements in robots. The study underscores the need for a balanced approach that incorporates cultural nuances while maintaining universal design principles. The issue arises when these culturally designs limit a robot's effectiveness in other contexts. For example, robots like Aibo or LOVOT, which well-suited in Japan's social environments where they are integrated into social rituals, may not resonate as well in cultures that perceive robots primarily as functional tools. The more a robot's design is tailored to fit one specific culture, the more difficult it becomes to adapt the robot for broader, global markets with diverse expectations and norms regarding robots.

While cultural specificity can enhance interactions in localized settings, overly focused design features can reduce the robot's flexibility and applicability across different regions. For instance, in Japan, where communication is often indirect and polite, robots may need to adopt a communication style that reflects these norms, using formalities and subtlety. In contrast, in the United States, where communication tends to be more direct and informal, the same robot would need to adjust its approach to align with these expectations. Salem et al. [52] found that Arabic speakers were more likely to anthropomorphize and accept robots that reflected their cultural norms, showing that

even universally appealing designs must be adapted to fit specific cultural contexts for optimal acceptance. A culturally adaptive agent must be able to balance these variations to improve social acceptance in different contexts.

The challenge, however, is ensuring that robots designed with specific cultural traits, such as Japan's indirect communication style, remain functional in cultures where directness is valued. Striking a balance between cultural specificity and adaptability is essential to making these robots relevant across various contexts. As O'neill-Brown [47] suggests, earlier frameworks may not fully address the complexities of contemporary cultural adaptation in robot design, highlighting the need for ongoing research to develop effective strategies for integrating cultural considerations into human-robot interaction. Similarly, O'neill-Brown [47] argues that communication and interaction styles shaped by cultural differences are essential for designing effective intelligent systems. This is supported by Korea [24] and Rau et al.[50], which emphasizes on how cultural backgrounds influence user expectations and preferences in HRI. Without cultural adaptation, robots risk being perceived as ineffective or inappropriate in certain cultural contexts.

Communication style is a significant factor in how users from different cultures interact with robots. For example, Rau et al. [50] found that Chinese participants preferred implicit communication styles, viewing robots using this approach as more trustworthy and likable, while German participants favored explicit communication. Similarly, Sanoubari and Young [53] revealed that Indian participants preferred implicit communication, contrasting with the more varied preferences of American participants. These findings suggest that robots must communicate in ways that resonate with the cultural norms of their users, reflecting the diverse interaction strategies required across cultures.

Cultural factors also influence the design and perceived attributes of robots. Berque et al. [10] explore the influence of kawaii (cuteness), a concept deeply rooted in Japanese culture, on robot design and user preferences. The study found that kawaii design elements, such as smaller, rounder shapes, appeal across cultures and genders, indicating some level of cross-cultural consistency. However, this universal appeal must be balanced with culturally specific design features, as highlighted by Gasteiger et al. [28], who discuss the importance of localization and adapting the robot's design and behavior, particularly in service settings like restaurants. With respect to kawaii, the design elements that often need adaptation are the level of cuteness and the associated behaviors that align with local cultural expectations. While smaller, rounder shapes and generally cute aesthetics may have broad appeal, certain cultures might perceive kawaii features differently in terms of appropriateness or effectiveness. For example, in Japan, kawaii elements are deeply integrated into everyday life, often signifying friendliness and approachability, which can enhance user engagement with robots. However, in cultures that emphasize professionalism or functionality over cuteness, such as in Western service settings, kawaii designs might need to be toned down to avoid appearing overly childlike or frivolous. Thus, robot designers must adapt kawaii elements in ways that maintain broad appeal while aligning with the cultural values and expectations of specific regions.

Long-term acceptance of robots in both domestic and public environments is another

area where cultural factors play a critical role. De Graaf et al. [19] present a phased framework for technology acceptance, to emphasize the need to test robots in real-world environments that reflect the cultural contexts in which they will operate. Kao and Huang [37] along with De Graaf et al. [19] highlight that robots must be designed for long-term usability, evolving to meet changing user needs and contexts, which are often shaped by cultural factors. Similarly, Burgard et al. [12] emphasize the importance of context in shaping user experiences with robots. This study highlights that robots need to be adaptable to specific use cases and environments. Later studies, by Kao et al.[37] and De Graaf et al. [19] build on Burgard's work to highlight the idea that the effectiveness and acceptance of robots are influenced by the contexts in which they are used.

These findings collectively suggest that cultural adaptation is a requirement for successful human-robot interaction. Communication styles, design preferences, and long-term acceptance are all shaped by cultural factors, and these must be carefully considered in robot design and deployment. While some universal principles, such as the appeal of kawaii designs, exist, cultural adaptation remains key. As robots become more integrated into daily life across diverse cultural settings, their ability to navigate and adapt to these cultural differences will be crucial for their success.

## 2.3 Related Scales and Measurement Metrics

As mentioned in section 2.1 and 2.2, various factors—including robot design and appearance, behavior, anthropomorphism, sociomorphing, cultural norms, and communication styles—play a significant role in shaping human perceptions and interactions with social robots. However, these aspects are inherently abstract and require measurement for effective analysis. To quantify these dimensions of sociality, established scales and tools are essential, which provide a structured approach to capture user perceptions and attitudes. By integrating the theoretical framework of sociality with empirical measurements, we can effectively bridge the gap between understanding the complexities of robot sociality and the practical methods required for its study.

### 2.3.1 The Need for Standardized Measurement Tools

Developing measurement tools for assessing sociality perception in HRI remains a key challenge. [7] emphasizes the importance of consistency in research through tools like the "Godspeed" questionnaires. [58] also highlights how the absence of standardized methods has led to multiple challenges in the field, complicating efforts to draw definitive conclusions. These differing approaches highlight the significance of anthropomorphism in HRI, even as researchers call for standardization. Whether through established tools like the "Godspeed" questionnaires or new scales like PMA and PMP, there is a clear need for more cohesive methodologies to ensure consistency and comparability across studies.

### 2.3.2 Godspeed Scales

The Godspeed Scales [7] are widely used in HRI research to assess how people perceive robots, focusing on aspects like anthropomorphism, likeability, intelligence, and safety. Their popularity stems from their standardized format, which makes it easier for researchers to compare findings across different studies.[66]

While the Godspeed scales provide useful benchmarks and are easy to apply, they have their limitations. For one, they may not fully capture the nuanced views people have about robots, especially in specific contexts. Kaplan et al. [38] argue that using Likert scales, like those in Godspeed, might miss individual differences and more subtle perceptions. This is especially true for concepts like sociomorphing or the cultural role of robots, which are not adequately covered by the Godspeed dimensions.

### 2.3.3 Attitudes Towards Social Robots Scale (ASOR)

ASOR was designed to measure how people relate to social robots across multiple dimensions of social interaction. According to [26] the scale initially aimed to assess five theoretical domains of social relatedness, which include: (1) *Socio-practical relatedness* which evaluates whether "the agent is perceived as an interaction partner capable of training or acting in "accordance with a norm"(2) *Intimate-personal relatedness* which refers to the emotional attachment a person may feel toward a robot, similar to human-to-human bonding. (3) *Moral relatedness*, which assesses if the robot is perceived as a moral agent, capable of telling the right or wrong (being morally sound), (4) *Psychological relatedness* obtains emotional and mental states to robots, reflecting empathy, compassion, or emotional contagion. (5) *Mental relatedness* which focuses on the perception that the robot has intentions, beliefs, and a capacity for mind-reading or social cognition.

Although the scale originally aimed to assess these five dimensions, a factor analysis conducted on a sample of 339 participants yielded a more refined three-factor model based on 25 items. These factors include:

- Ascription of Mental Capacities (AMC): Measures the extent to which respondents attribute emotions and mental life to the robot, including self-awareness and social obligations.
- Ascription of Socio-Practical Capacities (APC): Evaluates if respondents believe that the robot will act in their best interests and will behave consistently over time.
- Ascription of Socio-Moral Status (AMS): Captures how participants view the robot's role as a social agent and the expectations regarding its status and role in their lives.

The ASOR scale [26], while promising as a supplement to existing social robotics and HRI research tools, has notable limitations. It was primarily tested in Denmark, leaving its

cross-cultural applicability unproven. The small sample size for certain groups, like the elderly, limits generalizability across age groups. Further research is needed to establish its construct, and predictive validity. The socio-moral sub-scale showed moderate internal consistency with some ambiguous items, and participants struggled with questions on robots' mental capacities. Despite these issues, ASOR has acceptable psychometric properties, though further research is needed to strengthen its applicability.

With regard to this, Dobrosovestnova et al. [22] revisited this concept by applying the previously established ASOR scale to four distinct types of robots, ranging from humanoid to non-humanoid form. This study extended the work of Damholdt et al. [26] by validating the scale across different robot types and analyzing how these variations influence perceptions of robot sociality. By exploring these different embodiments, authors highlight how a robot's form plays a critical role in shaping human attitudes towards sociality.

While both studies contribute significantly to the measurement of human attitudes towards social robots, they differ in their approach and scope. Damholdt et al. [26]focused on developing a comprehensive, adaptable scale applicable to various social behaviors and robot types, making their work foundational in capturing the complexity of human-robot interaction. In contrast, Dobrosovestnova's et al. [22] research provided a more targeted application of the scale by examining specific robot embodiment, emphasizing the role of design and form in influencing user perceptions. This targeted approach suggests that a robot's design can have a substantial impact on user acceptance. Though aligned in their overarching goal of improving attitude assessment, these studies diverge in their methodological focus. Damholdt's et al. work offers a broad, flexible tool, while Dobrosovestnova et al. narrow in on specific contexts, providing valuable insights into how the appearance of robots has an impact on human.

### 2.3.4 Perceived Moral Agency and Patiency Scale

The moral dimensions of human-robot interaction have gained increasing attention, particularly regarding how people ascribe moral responsibilities to robots. The concept of "Perceived Moral Agency" (PMA) refers to the extent to which users perceive robots as moral agents capable of making decisions, even though robots are not true moral agents. Banks [5] explores this idea, suggesting that as robots become more anthropomorphic, they may be held to higher ethical standards by users. This concern aligns with Damiano and Dumouchel [18], who discuss the societal implications of anthropomorphic robots mimicking human behavior.

Further expanding on moral dimensions, Banks and Bowman [6] introduce the Perceived Moral Patiency (PMP) scale, which assesses how users perceive robots as moral patients—entities that can experience suffering or benefit from ethical considerations. The PMA and PMP scales offer valuable insights into the moral concepts applied to robots, reflecting growing concerns about ethical implications in HRI.

The key distinction between the two scales is their conceptual focus: PMA [5]addresses how humans attribute decision-making capabilities to robots, while PMP [6] focuses on how robots are perceived as morally affected by others' actions. Together, these scales provide a comprehensive view of moral considerations in HRI, addressing different, but complementary aspects of human-robot moral interaction.

### 2.3.5 Kawaii Scale

The kawaii scale is a measurement tool designed to evaluate how individuals perceive the cuteness of robots, a factor that can significantly influence user engagement and interaction. In their paper, Berque et al. [10] explore how cuteness, or kawaii, plays a pivotal role in shaping emotional responses towards robots across different cultures. Cuteness is not only an aesthetic feature but also a key factor in enhancing robots' approachability, likeability, and overall social acceptance. The study highlights that kawaii attributes can lead to more positive emotional engagement with robots, making them more effective in social contexts. Moreover, it reveals how perceptions of cuteness vary between cultures, emphasizing the need for culturally sensitive design elements that enhance a robot's kawaii factor, thereby improving user satisfaction and acceptance across diverse populations.

In this thesis, the kawaii scale was included not only to capture emotional responses but also to explore cultural variations in how participants perceive and interact with robots. Since one of the research goals is to understand how sociomorphing and emotional appeal influence robot perception in different cultural contexts, the kawaii scale plays a crucial role in revealing how various cultural factors shape emotional engagement with robots. The results further show that the cuteness ratings for all robots were consistently high, indicating strong emotional appeal across the board. This underscores how the robot's cuteness can influence its perceived social role, while also suggesting that cultural factors may shape emotional reactions to its design and behavior, ultimately contributing to its social acceptance.

### 2.3.6 Strengths and Limitations of Scales

Each of these scales offers unique perspectives on measuring attitudes toward social robots, yet they also have limitations that could influence their suitability depending on the focus of a particular study. The adapted ASOR scale [22] aims to capture attitudes toward social robots by accounting for differences in robot embodiment. Its strength lies in its nuanced approach, allowing to explore how people's attitudes vary based on whether the robot is humanoid, animal-like, or otherwise. However, this complexity could also present a challenge; by focusing on multiple robot types, the scale may become cumbersome, potentially leading to participant fatigue when attempting to generalize across different robot forms.

In contrast, the Perceived Moral Agency Scale (PMA) [5] narrows its focus to assess how people perceive the moral decision-making capabilities and trustworthiness of social

machines. This scale is useful for the ethical dimensions of human-robot interaction, specifically concerning how users attribute moral agency to robots. However, its narrow focus on moral agency may limit its utility in studies that are more concerned with broader social attitudes toward robots rather than strictly ethical considerations. Building on this,Banks and Bowman [6]introduced the Perceived Moral Patiency Scale (PMP), which shifts the focus to the idea that robots could be seen as entities deserving moral consideration. This scale is innovative as it addresses an unexplored aspect of human-robot interaction, examining how robots might be perceived as moral subjects, capable of suffering or benefiting from ethical treatment. The PMP scale offers new dimensions for investigating the moral landscape of HRI. [26] ASOR scale also seeks to examine humans' opinions regarding social robots, addressing gaps in previous scales by considering more recent developments in social robotics. While this newer scale is highly adaptable of contemporary robotic technologies, it may lack the extensive validation and widespread acceptance of older scales like PMA or Godspeed, which could be a limitation when ensuring robust, and applicable findings.

### 2.3.7 Balancing Breadth and Depth in Measurement

The challenge lies in balancing the breadth of the ASOR scale with the depth provided by the moral-focused scales like PMA and PMP and Kawaii scale. By carefully combining these tools, it becomes possible to capture the multifaceted nature of attitudes toward social robots, addressing both general perceptions and ethical morals in human-robot interaction. In my thesis, this approach will allow for a comprehensive analysis of both the broad attitudes toward social robots and the specific ethical considerations tied to their integration into human environments.

To summarize, the literature review highlights several key factors that directly shape the methodological setup of this thesis. First, social dynamics, including anthropomorphism and sociomorphing, demonstrate the importance of understanding how lay people perceive robots as social agents, either through human-like traits or by attributing sociality to them through interaction.

Secondly, insights from cognitive frameworks, particularly the OASIS model, highlight the need to evaluate human-robot interactions beyond superficial attributes. This is reflected in the selection of multiple measurement tools, such as the ASOR scale, Moral Agency scale, Moral Patiency scale and Cuteness scale each targeting specific dimensions of interaction. While these scales provide valuable quantitative data on behavioral responses (e.g., how participants perceive the robot's actions) and cognitive aspects (e.g., moral considerations and social engagement), they alone cannot offer a comprehensive understanding. Therefore, qualitative observation and interviews in context are crucial for capturing the full range of user experiences and gaining deeper insights into how sociality is perceived and enacted with robots.

Lastly, the role of cultural context is important, as the literature indicates that robot perceptions vary across different sociocultural settings. This has a direct impact on

the methodological setup, particularly in the choice of measurement tools that can be sensitive to cultural variation, such as sociomorphing scales.

CHAPTER 3

# Methodological Approach

The empirical part of this master thesis uses a mixed-methods approach to answer the research questions posed above.

## 3.1 Observation

In order to collect data on how individuals interact with the Lutzi robot in a natural setting, I conducted a non-participant observation approach[14] in two different XXXLutz restaurants, located at Mariahilfer Straße 121B, 1060 Wien, and Hubatschstr. 4, 2345 Brunn Am Gebirge, Vösendorf in various time of the day. This approach was based on the assumption that the time of day and whether it was lunch or dinner service would influence the frequency of interactions, with Lutzi likely being more active during busier periods.

I observed the interactions between restaurant customers, staff, and the Lutzi robot, focusing on capturing authentic behaviors and spontaneous reactions without disrupting the participants' natural flow. In both observation sessions no video recordings were used to maintain the authenticity of the interactions and ensure privacy. To ensure all details were covered, I was accompanied by my partner who assisted in noting details that I might have missed. (see observation protocol in 6.1)

The observation method is well-suited to addressing RQ2 and RQ3 because it enables a direct, real-time examination of how people naturally interact with the Lutzi robot in social environments. By observing customers and staff in a restaurant setting, this approach captures spontaneous reactions, body language, and social cues, providing rich, qualitative data that aligns with the focus on interaction capacities and social dynamics. Since RQ2 explores how people's interactions relate to the robot's capabilities, and RQ3 investigates the influence of sociocultural norms, observation allows for a nuanced understanding of these elements as they unfold in context. The interactions were as

natural as possible, which is essential for accurately analyzing the sociological and cultural factors influencing human-robot interaction.

All observation notes are compiled in the 6.1.

### 3.1.1 Analysis

The observations have been analysed through Qualitative Content Analysis (QCA) according to Philipp Mayring [43] for the following reasons:

- it provides a structured and efficient approach that is easier and quicker to implement and replicate compared to methods like Grounded Theory (GT) [14] and Thematic Analysis (TA) [46, 11], which require more extensive time and interpretive depth. QCA's rule-guided framework reduces data into manageable categories, using predefined classifications based on theoretical assumptions. This structured approach allows for faster analysis and greater replicability, which is crucial for my work, ensuring a systematic focus on key interaction aspects without excessive time demands or subjectivity.
- The method is flexible and transparent.
- It preserves the original context of the data, ensuring the accuracy of interpretations.
- It supports continuous refinement of categories, enhancing the reliability of the analysis.
- QCA analysis is an important methodical starting point because of its intermediate position between qualitative and quantitative analysis. Furthermore the survey will be analyzed quantitatively and its combination with QAC enriches the results.

To enhance my application of Qualitative Content Analysis (QCA), I used the QCAmap software developed by Fenzl and Mayring (2017). This program streamlines the analysis process through an intuitive interface, simplifying the organization of codes and categories. Key advantages of QCAmap include free access, a guided analysis process, provided templates, and its web-based nature. By incorporating this tool, I conducted a more focused and efficient analysis, allowing for a deeper exploration of key interaction aspects without the complexities of manual coding.

For this thesis, an inductive category approach was chosen due to the descriptive and exploratory nature of the research questions. The QCAmap software provides a suitable template for this type of analysis.

After thoroughly reviewing my observation notes from different days, I created a project in QCAmap and consolidated all the notes of observation for 3 days into a single document for analysis.

The following steps were undertaken during the analysis process:

1. Category Definition: I defined 3 main and 10 sub-categories based on my research questions, including "Children's Interaction," "Cultural Expectations," and "Robot Design Perceptions." Each category was crafted to address specific aspects of the data collected during my observations of the Lutzi robot, ensuring that they aligned directly with my overall research questions

2. Level of Abstraction: The categories were initially created at a general level but adjusted during coding. For instance, I established three main categories, each encompassing various sub-categories that reflect different aspects of interaction.

3. Data Familiarization: I reviewed my observational notes line by line multiple times, identifying content relevant to the ten defined categories while discarding unrelated material to maintain focus.

4. Category Formulation: Each category was carefully named based on the data and its abstraction level, such as "Interaction with Lutzi," which encompasses various interactions from different demographic groups.

5. Categorization Process: I assessed new passages to determine if they fit into existing categories or necessitated the creation of new ones, ensuring comprehensive coverage of the data.

6. Initial Revision: After reviewing 10-50% of my notes, I revised the category system as necessary to enhance clarity and relevance.

7. Fit to Research Questions: I ensured that the defined categories aligned with my research questions, making adjustments to category definitions to maintain coherence.

8. Generalization Check: I adjusted the level of abstraction based on the number of categories, refining them to achieve a balance between specificity and generality.

9. Reanalysis: If I modified any categories or abstraction levels, I restarted the analysis to ensure consistency throughout the document.

10. Consistent Application: I applied the category definitions and abstraction levels uniformly across all observations to maintain a systematic approach.

11. Grouping Categories: At the end of the analysis, I organized the categories into three main groups: "Interaction with Lutzi," "Perceptions of Lutzi's Interaction Capacities," and "Sociological Factors and Cultural Norms Influencing Interaction," to better address my research questions.

12. Summarization: I followed summarization guidelines for qualitative content analysis, ensuring that key findings were highlighted effectively.

13. Frequency Analysis: I considered performing a frequency analysis to identify which categories appeared most frequently across observations, such as children's interactions, to uncover patterns in behavior.

14. Interpretation: Finally, I analyzed the category system and frequencies in relation to my research questions, drawing connections between observed interactions and underlying sociocultural factors.

### 3.1.2 Category Definition

For the analysis of observations, ten specific codes were selected to categorize the data. These codes are listed alphabetically as follows:

Animals' interaction with Lutzi, Children's interaction with Lutzi, Interaction capacities of Lutzi, Lutzi's functionalities, Lutzi's appearance and design, customer's interaction with Lutzi, Role of Lutzi, Role of staff, Social and cultural expectations and norms, Staff's interaction with Lutzi.

These codes were then grouped into three main categories:

- *Interaction with Lutzi*
- *Perceptions of Lutzi's Interaction Capacities*
- *Sociological Factors and Cultural Norms Influencing Interaction*

The selection of these main categories was guided by the research questions, specifically those addressing the observational and qualitative aspects of this thesis. Each code and corresponding main category was reviewed multiple times to ensure accurate and meaningful analysis.

***Interaction with Lutzi:*** This category is about how different groups of people, including customers, staff and children interact with Lutzi. It examines the behaviors, actions, and responses of these groups in relation to the robot. Although children are technically part of customer's group, they were given a separate code due to the frequency and distinct nature of their interactions with the robot.

***Perceptions of Lutzi's Interaction Capacities*:** This category explores how people perceive and relate to the interaction capacities of Lutzi. It involves analyzing how well the robot's functionalities meet user expectations and the extent to which it can engage meaningfully with different individuals. Lutzi's design has been also considered a factor in its interaction capacities, which is why it has been included in this category.

***Sociological Factors and Cultural Norms Influencing Interaction*:** This category examines the broader social and cultural contexts that influence how people interact with Lutzi. It considers the role of Lutzi in comparison to the role of staff in social settings, the expectations people have based on cultural norms in Austria, and how these factors shape the overall interaction experience.

### 3.1.3 Results

Overall, at least 20 participants were observed interacting with Lutzi, showing a variety of responses and engagement levels:

*Animal's interaction with Lutzi:* The interaction between Lutzi and dogs, shows a range of reactions. One dog barked at Lutzi, indicating discomfort or confusion. In total, three interactions were noted: In the second instance another dog seated in a wagon did not have a direct interaction. A pet owner commented that Lutzi's movement in the restaurant might be unsettling for animals, particularly small dogs and scare them.

*Children's interaction with Lutzi:* As expected, children displayed a high level of curiosity and engagement with Lutzi. For instance, a toddler, initially calmed by Lutzi's presence, quickly became fascinated. Older children engaged by testing Lutzi's movements, standing in its path to observe its reactions. This aligns with [3], which described how children's interactions with autonomous robots often include playful exploration and intuitive engagement. Similarly, authors in [3], highlighted that such interactions in public spaces tend to feel intuitive for children, supporting short-term engagement.

In one observed case, a boy tried to place his glass on Lutzi's tray to halt its movement. When the robot didn't respond, he became frustrated, repeatedly shouting "stop." This mirrors communication issues outlined in [49], where unclear robot behavior can lead to frustration or even verbal hostility. The boy's mother intervened, calming the situation, underscoring [35] point that the presence of adults often prevents escalation to negative behaviors, thus maintaining the cultural and social expectations in public settings like restaurants.

*Interaction Capacities of Lutzi:* The materials used in Lutzi, such as its tray and screen, are central to its interactions. If someone touches its head and screen, Lutzi noted the warmth of their hands (I have experienced this myself). However, its inability to pause appropriately when a customer tried to place dishes. During the observation, an elderly woman attempted to place her dirty dishes on Lutzi's tray, but was unsuccessful because the robot did not pause to allow it.

*Lutzi's Functionalities:* Lutzi's functionality was influenced by the location and layout of the restaurant. At the XXXLutz restaurant on Mariahilferstrasse, which spans three floors with the kitchen accessible only by stairs, Lutzi's role was limited to the ground floor due to its inability to navigate stairs. As a result, Lutzi did not serve food from the kitchen to the tables and operated only on the ground floor. Its predictable path and limited navigation capabilities shaped how both customers and staff interacted with it in that space.

In contrast, the single-floor restaurant of the Vösendorf location allowed Lutzi to utilize more of its functionalities. Here, Lutzi was able to deliver food to various tables and interact with the environment more dynamically, including making sounds like "Meow" or announcing "Ihr Essen ist fertig" ("Food is ready"). The layout of the restaurant

thus significantly impacted how effectively Lutzi performed its roles and engage with its surroundings.

*Lutzi's Design:* Lutzi's design features a screen displaying a cat face that constantly smiles or winks. This seems intentionally crafted to make the robot more approachable and engaging, particularly for children. Adults also responded positively, with some smiling back at the robot. To determine whether Lutzi's design effectively captures attention and encourages interaction, interviews or surveys would be essential. These methods could provide insights into how different groups respond to this feature and its overall impact on user engagement.

*Customer's Interaction with Lutzi:* Customers engaged in various actions towards Lutzi, from placing items on its tray to adjusting their surroundings to make way for it. Some customer interactions were positive, with some curiosity or amusement (at least sixteen times have been observed) . Some customers even adjusted their behavior to accommodate Lutzi's movement, like moving chairs or bags out of its path, which shows a willingness to engage and adapt to the robot's presence. But also for instance an elderly woman's concern about being hit by Lutzi, and her subsequent glance at a staff member, suggests a reliance on human staff to manage or mitigate interactions with the robot.

*Role of Lutzi:* Lutzi's main activities included delivering food and transporting dirty dishes to the kitchen or a nearby location. It could be a supportive role which allowed the staff to concentrate on more complex or customer-focused duties especially in rush hours. However, there were instances when Lutzi's performance faltered, such as when it became confused by obstacles like baby strollers or dog wagons (two times), or failed to stop (four times) when customers tried to interact with it. In these situations, Lutzi was unable to operate independently and required staff assistance.

*Role of Staff:* Staff played a crucial role in managing the restaurant, including tasks such as delivering food to tables, collecting dishes, and facilitating Lutzi's operation. They were responsible for overseeing interactions with Lutzi and ensuring it navigated the space effectively. The observation indicates that the staff's workload is significantly more than that of Lutzi.

*Social and Cultural Expectations and Norms:* During the observation, an elderly woman attempted to place her dirty dishes on Lutzi's tray, but was unsuccessful because the robot did not pause to allow it. She remarked to her dining companion, "She's too quick", expressing her impression of the robot's speed. I then had a brief conversation with her, where she mentioned that she and her companion were tourists from Australia. She noted that similar robots are common in Australian restaurants but usually greet customers, unlike Lutzi, which she felt moved too quickly. Although she was familiar with robots like Lutzi and it seemed that she accepted their presence in public spaces, she found Lutzi's behavior different from what she had experienced in Australia. The customer mentioned that, unlike Australian restaurant robots which typically greet customers, Lutzi did not engage in such social behaviors, which made it feel more mechanical or impersonal. This suggests that Lutzi might not fully meet cultural expectations for customer service,

particularly in creating a welcoming atmosphere. However, it's important to assess whether this expectation is also present in Austrian society.

*Staff's Interaction with Lutzi:* Staff were observed placing dishes on Lutzi's tray and occasionally reorganizing them to prevent accidents, showing an active role in ensuring Lutzi's operation runs smoothly. In one instance, a staff member had to stop Lutzi manually, indicating that while Lutzi is functional, it still requires human support.

| Category | Count | Category Title | Example note |
|---|---|---|---|
| Interaction Capacities of the Lutzi Robot | 3 | *Animals towards Lutzi* | The dog barked at Lutzi as it passed by. The custumer commented: "These robots can indeed be intimidating for small dogs" |
| | 4 | *Interaction capacities of Lutzi* | A woman stood up to place her dirty dishes on the robot's tray but was unsuccessful as the robot did not pause to allow this action. |
| | 13 | *Lutzi funtionalities* | Lutzi uses always the same route, pausing briefly at certain spot, its station near to the kitchen before starting its path again. When a dog wagon was on the way. It moved slightly forward and backward, clearly confused by the obstacle. |
| | 2 | *Lutzi's design* | Constantly smiling or winking. |
| Interaction of different group of people with Lutzi | 6 | *Children* | Additionally, a small child stood directly in the robot's path, observing what it would do. |
| | 16 | *Customer's interaction with Lutzi* | However, when an elderly woman and her younger companion seated near me placed their bags on an extra chair, they noticed Lutzi approaching and moved the chair to clear its path |
| | 3 | *Staff's interaction with Lutzi* | In one instance, a staff member reorganized the dishes on the tray to prevent them from falling. |
| Sociological factors and cultural norms contributing to the role of the Lutzi robot | 2 | *Role of Lutzi* | It assisted staff |
| | 8 | *Role of staff* | The staff member quickly noticed the situation, came over and moved other chairs to clear its path |
| | 7 | *Social and cultural expectation and norm* | Another older woman found herself in Lutzi•s path but quickly stepped aside, laughed and said: "she walks toward me". |

Figure 3.1: Observation Category Coding

## 3.2 Interview

In this thesis, I conducted qualitative semi-structured interviews to gain insights from people who interacted with the Lutzi robot in a restaurant setting. The aim was to understand how customers, staff, and managers perceive and interact with the robot. After observing their interactions, I approached some of these individuals for interviews to hear their thoughts directly. I interviewed a total of six participants (3 woman, 3 male) who had interacted with Lutzi. These interviews were conducted randomly, targeting those who had a direct interaction with the robot. Each interview lasted about ten minutes and took place immediately after the participants had finished their meals or, in the case of staff, during which they interacted most with Lutzi. The interviewees were informed about the study and provided with a consent form 6.2.8 to sign prior to participation. However, two participants, while willing to be interviewed, declined to sign the consent form. Despite their refusal to provide written consent, their verbal agreement to participate was noted, and their interviews were conducted with the understanding that their responses would be used in the study under the conditions outlined in the consent information.

The interviews aimed to explore participants' perceptions of the robot and their overall experiences with it. The questions had been set based on the main research questions and

not directly adhere to specific scales like ASOR, Morality, or Cuteness/Kawaii. Instead, the questions were designed to capture a broader range of impressions and experiences. To better understand the participants' perspectives, I developed three types of interview questions tailored to different groups: guests, restaurant staff, and the manager. The following questions were developed for the different groups:

**RQ1: Perceptions of Robot Sociality**

*For Restaurant customers:*

1. Can you describe your first impression of Lutzi when you encountered it in the restaurant?
2. How do you feel when interacting with Lutzi compared to human staff?
3. In what ways does Lutzi's behavior make it seem more or less social to you?
4. What were your initial thoughts upon seeing Lutzi in the restaurant?
5. How did Lutzi's presence affect your dining experience?
6. How would you compare Lutzi to other robots you've interacted with, if any?

*For Service Staff and Manager:*

1. How do you perceive Lutzi's role in the restaurant compared to your own?
2. Can you describe any differences in how customers interact with Lutzi versus human staff?
3. How has Lutzi changed the dynamics of your daily work routine?

**RQ2: Sociological Factors**

*For everyone:*

1. What aspects of Lutzi's design make it appear social or unsocial to you?
2. Can you describe any specific features of Lutzi that help it seem more human-like?
3. How important do you think a robot's social behavior is in its acceptance by humans?
4. How do you think robots like Lutzi can be better integrated into everyday social settings?
5. What societal factors do you believe influence how robots are perceived as social beings?

6. Can you provide examples of how Lutzi's social interactions have influenced your perception of robots in general?

**RQ3: Role of Social Robots in a Restaurant**

*For Manager:*

1. How do you feel the roles assigned to Lutzi and human staff complement or conflict with each other?

*For Service Staff:*

1. Can you describe an instance where Lutzi's role impacted your interaction with other people in the restaurant?

*For Service Staff and Manager:*

1. How do you think Lutzi's role as a service robot affects the overall atmosphere of the restaurant?

*For Manager:*

1. How have you seen staff and customers respond to Lutzi over time?

*For Staff and Manager:*

1. Were you given any training or information about interacting with Lutzi?

*For everyone:*

1. In what ways do you think Lutzi could be better integrated into the restaurant environment?

*For Staff and Manager:*

1. What expectations did you have of Lutzi before interacting with it, and how were those expectations met or unmet?
2. How do you think the presence of a social robot like Lutzi shapes customer expectations of service in the restaurant?
3. What changes would you suggest to improve Lutzi's role and interaction within the restaurant?

The interview with manager was unstructured, with no predefined questions, allowing for an open-ended conversation. In subsequent interviews, I introduced more structured questions but kept them flexible to ensure a natural flow of discussion.

### 3.2.1 Conduct

All interviews were conducted in German with participants who were all over the age of 30. While interviews with guests were recorded and fully transcribed 6.2. Two interviews with staff were not recorded. One of them due to busy hours and one due to or their concerns about participating during work hours, despite having permission from the restaurant manager. Instead, detailed notes were taken during these interviews to capture the key insights as accurately as possible. All six interviews were uploaded to a local PC and no cloud service of any kind.

### 3.2.2 Analysis

Same as observations, interviews have been analysed through Qualitative Content Analysis (QCA) according to Philipp Mayring [43] and based on our RQs. The analysis aimed to uncover the meanings behind participants' actions and behaviors. I coded the interviews based on three factors: perceptions of robot sociality, sociological factors, and the role of social robots. For instance, under the perception of robot sociality, I explored how participants interpreted the robot's predictable and responsive actions as signs of social agency, leading them to engage with it in a more human-like manner. Sociological factors were considered through participants' descriptions of the robot's integration into the social environment of the restaurant. The role of social robots focused on how the restaurant's social dynamics influenced the way Lutzi was perceived and accepted. Interestingly, most participants had prior experience with Lutzi, as they had visited the restaurant before and were familiar with its functions. This familiarity likely influenced their interactions and perceptions during the study.

### 3.2.3 Category Definition

For the analysis of interviews, three main categories and fourteen subcategories specific categories were chosen which are divided to three main categories as follows:

- Interaction of different groups of people with Lutzi: This main category includes 2 categories of "children" and "others". Since again the interaction of children with Lutzi was noticed and mentioned in every interview, one category has been attributed to them. The "others" category includes any other people in different gender or age who were mentioned in the interview.

- People's meaning-making of the interaction with anthropomorphizing and sociomorphing the robot: Lutzi appearance/design, dining experience, Lutzi functionalities, first impressions towards Lutzi, social factors, acceptance of Lutzi, thoughts and expectations towards Lutzi, acceptance of new technologies.

- People's values and norms influencing their perception of Lutzi's role: comparison of interaction with Lutzi and staff, interaction with Lutzi, comparison of Lutzi with other social robots, role of Lutzi.

| Category | Count | Category Title | Example quote |
|---|---|---|---|
| Interaction of different groups of people with Lutzi | 10 | *Children* | "Wir fahren jetzt zu der Mama in die Arbeit, dann sagen sie, wir sehen Lutzi... das ist schon cool." |
| | 6 | *Others* | "Es gibt zum Beispiel ältere Leute, die sagen, bitte, bitte, bitte, Lutzi komm, bitte, Lutzi komm. Und dann gibt es halt jüngere, die sagen, naja, und voll cool und bla bla bla." |
| People's meaning-making of the interaction with anthropomorphizing and sociomorphing the robot | 12 | *Lutzi appearance/design* | "Das Aussehen finde ich auf jeden Fall süß." |
| | 4 | *Acceptance of new technologies* | "Es ist ja alles schwer für unsere Generation, wenn Sie nicht in einem englisch sprechenden Land viel weißt." |
| | 16 | *Thoughts and expectation towards Lutzi* | "Selbstständig abesenvieren" |
| | 10 | *First impression towards Lutzi* | "Meine ersten Gedanken waren, ich bin mir jetzt nicht sicher, ob das Ding von Nutzen ist oder nicht." |
| | 6 | *Dining experience* | "Mein Esserlebnis gar nicht, weil mit der Küche hat, Lutzi ja nichts zu tu." |
| | 26 | *Acceptence of Lutzi* | "Ich denke mir, möchte das eigentlich nicht unbedingt haben, dass nur ein Roboter da ist. Ja, ich habe kein Problem damit, meinen Teller draufzustellen und ich habe vielleicht auch kein Problem damit, meinen Teller zu bekommen, doch da schon wieder eher, weil ich immer denke, was passiert auf dem Weg? Schmeißt irgendjemand etwas drauf auf mein Gericht, wenn der Roboter serviert? Oder nimmt jemand anderen meinen Teller vorher runter aus Versehen und gibt ihn wieder drauf?" |
| | 16 | *Social Factors* | "Indem die Funktionalität einfach so gut. Aber für sozial integrierte Menschen, die unter Menschen sind, kann ein Roboter und wird ein Roboter wahrscheinlich auch niemals eine Option sein, den als soziales Wesen wahrzunehmen." |
| | 15 | *Lutzi funtionalities* | "Ich glaube, dass man den Roboter Wahrscheinlich mit einer Art Ruffunktion ausstatten könnte. Wenn ich sage, ich möchte jetzt meinen Teller absverviert haben oder ich möchte jetzt keine Ahnung, Bestellung aufgeben, die ich vielleicht über das Gerät machen könnte, wäre das interessant. Vielleicht auch Themen wie, ich möchte meine Rechnung bezahlen. Das ist sicher eine Option, aber nochmal, wenn ich das Ganze jetzt Betrachte im Kontext, wenn ich gehe in ein Restaurant und möchte ein Erlebnis dort haben, dann ist es für mich eher uninteressant. Wenn ich aber jetzt in eine Kantine gehe oder in eine Fast-Food-Kette, dann könnte ich mir das gut vorstellen, dass das funktioniert." |
| People's values and norms influencing their perception of Lutzi's role | 7 | *Interaction with Lutzi* | "Da hat er sich irgendwie so etwas runtergenommen und dann guten Appetit und ist wieder weggefahren." |
| | 19 | *Role of Lutzi* | "Zum Beispiel jetzt, gerade in diesem Restaurant, kann ich sagen, ich habe mit der Hüfte Probleme. Ich stelle ihm das schwere Zeug einfach rauf, dann geht man direkt zu der Küche und ich räume es nur noch runter. Das heißt, ich kann ihm 40 Teller rauf tun, wie zum Beispiel morgen beim Brunch. Wir haben wirklich viele Teller und da stehen meistens 15 Teller auf einem Tisch, die habe ich ihm aufgeladen zum nächsten Tisch und wir sind dann immer aufgeräumt. Das ist schon Arbeitserleichterung ist tatsächlich schon." |
| | 4 | *Comparison of Lutzi with other social robots* | "Ich besitze einen Staubsaugerroboter und den habe ich sehr liebgewonnen. Aber weniger als soziales Wesen, sondern als Arbeiter, der mir die Arbeit abnimmt." |
| | 24 | *Comparison of intraction with Lutzi and staff* | "Weil das Problem ist, das, was da rauskommt ist eine computergenerierte Antwort, wie auch immer, ob jetzt gut oder schlecht, intelligent oder nicht intelligent, aber das hat nichts vom menschlichen Geist, sondern das ist einfach eine Antwort, die generiert wird, in irgendeiner Form." |

Figure 3.2: Interview Category Coding

### 3.2.4 Discussion and Conclusion

Here's a breakdown of the analysis for each category:

*Children:* The interview highlights that children are particularly fascinated by Lutzi. They enjoy playing with it and find its functionalities entertaining. It is noted that children are one of the main groups that keep the robot's use relevant: "Unsere Kinder erhalten den Nutzen." (Our children benefit from it)

For children, Lutzi represents something new and exciting, which contrasts with the more reserved reactions of adults. The playful interaction ("Children love playing with Lutzi") shows their interest in engaging with the robot.

*Comparison of Interaction with Lutzi and Staff:* There's a clear preference for human interaction over interaction with Lutzi; interviewees express that while Lutzi might be practical, it lacks the personal touch that human waitstaff provide: "Persönlich ist es für mich noch immer mehr wert als dieser Roboter." (Personally, it is still worth more to me than this robot.)

Lutzi is perceived as impersonal and while it might be accepted in some environments like fast food restaurants, it is not favored in more traditional or personal dining settings: "ich würde es mir persönlich nicht reintun, weil trotzdem der persönliche Touch von der Gastronomie fehlt" (I personally wouldn't include it because it still lacks the personal touch of the restaurant experience). "hier ist eh wurscht, das ist ein Kaufhaus mit einem Restaurant, aber in meinem Lieblingsspeiselokal brauche den nicht." (Here, it doesn't matter; this is a department store with a restaurant, but I don't need it in my favorite dining place.)

*Different Group of People:* The reactions varied, with some older guests being enthusiastic, while others, including some younger people, were indifferent or resistant to presence of Lutzi. One staff answered: "Ein paar finden es gut, ein paar zucken aus."(Some find it good, while others flinch).

*Dining Experience:* For most interviewees, Lutzi does not significantly alter their dining experience. The robot's presence doesn't distract or affect their meal: "Mein Esserlebnis gar nicht, weil mit der Küche hat Lutzi ja nichts zu tun. (My dining experience has nothing to do with Lutzi, as it is not related to the kitchen). However some participants noted that the presence of children who interact with the robot might be more influential in shaping their experience than the robot itself: "Nein, mich hat beeinflusst weil sich die Kinder lustig gemacht haben" (No, I was influenced because the children were making fun.)

*First Impression towards Lutzi:* Initial reactions to Lutzi are mixed, ranging from amusement and curiosity to indifference. While some find it "süß" (cute) or "lustig" (funny) which link to Kawaii, others are not particularly impressed.

The robot is viewed as a novelty, something new that people are curious about, but there's skepticism regarding its long-term utility or appeal: "Meine ersten Gedanken waren, ich bin mir jetzt nicht sicher, ob das Ding von Nutzen ist oder nicht".(My initial thoughts were, I'm not sure whether this thing is useful or not.)

*Interaction with Lutzi:* The interactions with Lutzi are mostly functional, with the robot serving specific roles like delivering food or clearing plates. There's little social engagement with the robot: "Ich rede nicht mit dem Roboter." (I do not talk to the robot.)

Despite the primarily functional role, one staff engages with Lutzi in "playful" ways, testing its responses or enjoying its reactions: "Das war voll lustig weil ich nichts zu tun gehabt hab: Wenn man bei den Ohren so lang streichelt, dann wird er voll narrisch, dann wird er voll böse" "voll geil". (It was really funny because I had nothing to do: When

you stroke its ears for too long, it gets really crazy and then really angry. It's totally awesome). Robot bullying, however, has been mentioned in some literature, particularly among children.[45]

*Lutzi Appearance/Design:* Positive Reception: The design of Lutzi is generally well-received, described as "süß" (cute) and appealing, which might contribute to its acceptance: "Das Aussehen finde ich auf jeden Fall süß." (I definitely find its appearance cute) There's also a mention that the design plays a role in making the robot more acceptable, especially if it appears less like a traditional robot and more like an animate being: "Das Rundliche...das er aussehen vielleicht wie eine Katze." (the roundness...that it looks like a cat).

*Lutzi Functionalities:* Lutzi's functionalities, such as delivering food or clearing tables, are valued for their practicality. However, the robot's entertainment functions, like playing music or singing, are seen as less relevant. The limitations of Lutzi's functionalities are acknowledged, with some staff noting that not all features are useful in every setting: "Das Happy Birthday bringt dir da in dem Fall gar nichts"(The Happy Birthday doesn't benefit you at all here).

*Role of Lutzi:* Lutzi is generally viewed as a support tool for the waitstaff, helping with tasks like clearing tables or delivering dishes: "Der Roboter ist für mich als Abräumhilfe super" (The robot is great for me as a dish clearing assistant). There is a consensus that Lutzi serves not as a feature but merely as a tool, complementing human staff rather than replacing them, especially during busy times:"Lutzi serviert nur dann, wenn viel los ist" (Lutzi only serves when it's busy.)

*Social Factors:* There seems to be a perceived cultural resistance in Austria, towards fully embracing robotic service due to the preference for human interaction: "Ich glaube, das ist vielleicht die Mentalität der Österreicher" (I believe this might be the mentality of the Austrians). This perspective reflects not only how people perceive it but also how the restaurant and staff use it.

*acceptance of Lutzi* Lutzi is not seen as a social entity; its responses and interactions are perceived as purely functional and lacking in human empathy: "Aber für sozial integrierte Menschen... wird ein Roboter wahrscheinlich auch niemals eine Option sein" (But for socially integrated individuals, a robot will probably never be an option.) But it would be accepted as a functional tool.

*Thoughts and Expectations Towards Lutzi:* There's skepticism about social robots like Lutzi. Concerns are raised about safety, reliability, and the potential loss of human elements in service "ich möchte mir gar nicht vorstellen, dass es einen Roboter gibt, der wie ein Mensch agiert" (I do not want to even imagine a robot acting like a human.)

While there's an acknowledgment of the utility of robots, the acceptance is conditional on the setting and the specific tasks being performed: "Ich muss ihn in mein eigenes Restaurant nicht haben" (I don't need to have it in my own restaurant.)

This qualitative content analysis shows a complex landscape of acceptance, skepticism, and conditional approval towards the use of social service robots like Lutzi in restaurants. The interaction between robots and human value and preference plays a crucial role in shaping opinions, with significant variations across different groups.

## 3.3 Survey

To address RQ1, a survey was designed to evaluate the sociality perceptions of the Lutzi robot in comparison with two other robots - the Starship delivery robot and the Vetor companion robot. The aim was to gather quantitative data with validated scales to benchmark how Lutzi is perceived relative to other service robots with different embodiments.

### 3.3.1 Setting

The survey comprised 17 items from the ASOR scale, 10 items from the Moral Agency scale, 6 items from the Moral Patiency scale, and 6 items from the Cuteness scale. Participants were exposed to three different experimental conditions featuring three distinct robots: (1) Vector, a small desktop robot; (2) Starship, a commercial autonomous delivery robot; and (3) Lutzi, a service robot designed for food delivery in a restaurant setting.

A total of n=96 participants were recruited using the online, a self-hosted survey platform Unipark with the aim of having minimum 30 participants per robot type. The sample included both 44 male (45.83%), 52 female (54.17%) and 0 non-binary participants from Austria, with an average age of 39 years (SD = 10) for Lutzi, 41 years (SD = 12) for Starship and 40 (SD = 12) years for Vector. The survey took approximately 11 minutes 25 seconds to complete and the survey was available for one month.

All participants volunteered to take part in the survey and were either friends, colleagues, or acquaintances and no compensation was provided. Three participants were excluded from the analysis: one due to an issue with the video display (which may have resulted from not pressing the play button, as the video did not play automatically), another due to an unrealistically short survey completion time, and the third due to inconsistent responses and an inappropriate answer to the gender question.

### 3.3.2 Survey Procedure

After providing and confirming informed consent, participants were asked to answer two demographic questions concerning their age and gender. They were then randomly assigned to view one of three videos. Following the video, participants were asked to describe it in an open text box using one or two sentences.

Participants then completed the 17 ASOR scale items, which were presented in a different order from [22]. A 4-point Likert scale was used for ASOR questionnaires, ranging from 1

(not at all) to 4 (to a high degree), with an additional option to select "Not Applicable" (NA) if items did not apply. Subsequently, participants responded to 10 items from the Moral Agency scale and 6 items from the Moral Patiency scale, using a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree), also including the "Not Applicable" option. The survey concluded with 6 items from the Cuteness scale, employing a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), plus the "Not Applicable" option. All items from the survey can be found in 6.3

### 3.3.3 Video Content

The videos were selected to highlight the social affordances of each robot and to depict realistic use case scenarios:

- *Lutzi Robot (79 seconds):* This video demonstrated the Lutzi robot's main function of delivering food within a restaurant. It showed staff placing meals on the robot's tray and entering table numbers. As the robot delivered the food, it communicated with phrases such as "Be careful, your order is on the way" and "Dear guest, your order is here" upon reaching the table. The video also featured staff explaining the robot's operation in the kitchen. The video is in English.
- *Starship Robot (80 seconds):* This video featured the Starship robot delivering a package. It began with the robot introducing itself, followed by its journey as it asked a pedestrian to press a traffic light button and thanked the person. The video is presented in English.
- *Vector Robot (72 seconds):* The video showcased interactions between the compact desktop Vector robot and a woman. It included the robot responding to commands, identifying the woman, reacting to being "petted", and reporting the weather. The video is in English.

All videos included English subtitles for accessibility.

### 3.3.4 Analysis

To evaluate participants' assessments of the three robots across various scales, the average score of each item on the scales was calculated. The data were analyzed using IBM SPSS Statistics.

To analyze how people assessed the three robots on the ASOR scale, we computed the scales by averaging the items. Through this process, the subscales—Socio-Practical Relatedness (SPR), Intimate-Personal Relatedness (IPR), Psychological Moral Relatedness (PMR), as well as Moral Agency and Moral Patiency and Cuteness—were transformed into continuous variables. Table 3.1 presents the means and standard deviations for each robot across these subscales, to provide insight into how participants perceived the robots' social attributes and moral considerations.

In the Cuteness scale, one of the items is: “I think the design of the robot is scary”. To ensure consistency in the results, the values for this item were reversed, as the original scoring would have been in the opposite direction of the overall scale.

| | Lutzi | | | Starship | | | Vector | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | mean | SD | n | mean | SD | n | mean | SD |
| SPR scale | 30 | 2.76 | .69 | 32 | 2.66 | .63 | 34 | 2.74 | .45 |
| IPR scale | 30 | 2.25 | .69 | 32 | 2.38 | .80 | 34 | 2.37 | .68 |
| PMR scale | 30 | 1.55 | .65 | 32 | 1.51 | .52 | 34 | 1.58 | .65 |
| Moral Agency | 30 | 3.70 | .85 | 32 | 3.87 | .98 | 34 | 3.82 | .82 |
| Moral Patiency | 30 | 2.96 | 1.55 | 32 | 3.08 | 1.27 | 34 | 2.84 | 1.55 |
| Cuteness | 30 | 3.49 | .80 | 32 | 3.24 | .79 | 34 | 3.66 | .91 |

Table 3.1: Ratings of Sub-scales for Lutzi, Starship and Vector

A surprising result is related to the cuteness scale. The ranking makes sense, Vector was rated as the cutest, followed by Lutzi, with Starship ranked last. However, we would have expected larger differences between these robots. Our hypothesis was reinforced by analysing the participants’ responses to open-text questions where Vector’s "cuteness" was mentioned at least eight times in a total of 34 responses, alongside terms like "entzückend" (adorable), "lieb" (cute), "nett" (nice), and descriptors related to its size, such as "tiny" or "small." In contrast, Lutzi was described as cute only twice, and Starship not at all.

Despite the distinct characteristics of these robots in terms of functionality, size, and appearance, the mean values across the cuteness scale were surprisingly close. We had expected these differences to result in more varied ratings.

This result provides us with an overall indication of perceived cuteness, as the highest rating observed was 4, meaning that participants attributed a near-maximum value. However, it seems participants hesitated to give a perfect 5 to the robots because they may have perceived a limit to how "cute" a robot could be, acknowledging that it is, after all, still a machine. This could also explain the subtle distinction seen in Vector, which, although rated as cuter than the other robots, did not consistently receive the highest possible rating

Additionally, one possible explanation for why the robots received similar scores is that participants may have approached the survey questions with a general mindset about robots rather than focusing on the specific characteristics of the robot depicted in the video they viewed. This term describes the tendency of participants to respond based on their pre-existing feelings and attitudes rather than the specific behaviors or features demonstrated by the robots in the videos. Such biases pose a significant limitation to

video-based experiments, underscoring the importance of evaluating interactions with robots in more naturalistic settings to capture genuine user perceptions. Observing robots in real-life situations would likely provide participants with a richer context, allowing for more accurate assessments.

Interestingly, the PMR (Psychological Moral Relatedness) scale scores yielded significantly lower scores compared to the other sub scales. This finding raises questions about the validity of the anthropomorphism hypothesis in this context. Instead of perceiving the robots as possessing human-like mental states or behaviors, participants appear to be engaging in a process more aligned with sociomorphing. In this case, they seem to be making socio-practical attributions, focusing on the robots' functional roles and capabilities rather than ascribing them human-like attributes. This means that individuals are evaluating the robots based on their roles and functionalities within specific social contexts, such as their capacity to assist in tasks, rather than viewing them as entities with human-like psychological characteristics.

The contrast between PMR and the other scale scores highlights a significant shift in how participants interact with and perceive these robots. Instead of recognizing the robots as social agents capable of feelings or thoughts, they appear to regard them as tools or assistants fulfilling specific societal functions. This finding has implications for robot design and integration into various environments, as it emphasizes the need to understand user perceptions of robots not just as anthropomorphic beings but also as practical entities that serve specific purposes.

Overall, these insights contribute to a nuanced understanding of how individuals relate to robots, suggesting that the design and interaction strategies for robots should consider these socio-practical dimensions to enhance user engagement and satisfaction.

As expected, the concept of moral patiency in comparison to moral agency is challenging for people when it comes to forming attitudinal decisions about whether to treat robots as moral agents. Additionally, as seen in the standard deviation, participants' ratings for this scale show more variability compared to other scales. This suggests that moral patiency is harder for people to assess, or that opinions differ more widely on this topic. This could become clearer when we calculate the individual items of the moral patiency scale and identify which specific questions are causing the larger standard deviations.

Additionally a one-way ANOVA was conducted to compare the effects of different robots on participants attitudes across the six sub-scales (see Table 3.2). However, there was no significant effect of robot type on the SPR, IPR, PMR, Moral Agency and Moral Patiency. On Cuteness scale, the results approached significance, suggesting robot type might have an impact on cuteness rating, $F(2, 93) = 2.090$, $p = 0.129$, but this effect was not even close to being statistically significant.

In addition to the overall scores, we calculated the mean and standard deviation for each item for all robot types, as well as the number of answered items and participants' minimum and maximum ratings. (see 6.3.2, table "Descriptive Statistics"). For example, Lutzi received an average rating of (M = 3.00) with a low standard deviation (SD =

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| SPR | Between Groups | 0.174 | 2 | .087 | .247 | .782 |
| | Within Groups | 32.710 | 93 | .352 | | |
| | Total | 32.884 | 95 | | | |
| IPR | Between Groups | .335 | 2 | .168 | .322 | .726 |
| | Within Groups | 48.397 | 93 | .520 | | |
| | Total | 48.732 | 95 | | | |
| PMR | Between Groups | .084 | 2 | .042 | .113 | .894 |
| | Within Groups | 34.609 | 93 | .372 | | |
| | Total | 34.693 | 95 | | | |
| Moral Agency | Between Groups | .476 | 2 | .238 | .306 | .737 |
| | Within Groups | 72.432 | 93 | .779 | | |
| | Total | 72.909 | 95 | | | |
| Moral Patiency | Between Groups | .949 | 2 | .474 | .222 | .801 |
| | Within Groups | 198.573 | 93 | 2.135 | | |
| | Total | 199.522 | 95 | | | |
| Cuteness | Between Groups | 2.950 | 2 | 1.475 | 2.090 | .129 |
| | Within Groups | 65.640 | 93 | .706 | | |
| | Total | 68.590 | 95 | | | |

Table 3.2: ANOVA Table for Different Scales

0.514) for one SPR item "Do you trust the robot to perform its task well?" and high rating for item like "If you owned this robot, would you give it a name."

The contrast between functional trust and personal attachment is notable here. Lutzi performs decently in terms of trust, but participants show a greater emotional connection by being willing to name it. Why do users exhibit emotional attachment even when the functional trust rating is moderate?

One possible explanation is that emotional connections to robots can arise from social interaction elements that go beyond mere functionality. Naming a robot may signal a desire for personalization and a deeper relationship, suggesting that participants are not

only assessing the robot's capability but also imagining it within the context of their daily lives.

Understanding the distinctions between functional trust and emotional attachment is critical for improving user experience. When developers and designers recognize that users may form emotional bonds with robots regardless of their perceived efficiency, they can create more engaging and relatable robot designs. By fostering environments where emotional connections can flourish, robots can be better integrated into social contexts, enhancing their acceptance and utility in everyday life.

For the Starship robot, the same item ("Do you think you trust the robot to perform its task well?") yielded a mean score of 3.03 with a standard deviation of 0.822. This high mean score indicates that participants generally have a positive view of Starship's task performance. The low standard deviation reflected a general consensus about the robot's reliability. This finding highlights Starship's strong perceived performance in its task. The relatively high mean and low standard deviation could suggest that participants have a generally favorable view of Starship's functionality. This emphasizes that Starship is perceived as a reliable robot, which could make it more appealing for task-oriented purposes.

For Vector, as expected the mean score of cuteness item "I think the design of the robot is cute" is 4.0 (SD = 1.101). In contrast with to Lutzi and Starship, the item "Do you trust the robot to perform its task well?" has a lower mean score of 2.79 for Lutzi, although it is still relatively high. While participants found Vector visually engaging, they seemed somewhat less convinced of its ability to perform tasks effectively. From my perspective, this suggests that design elements such as cuteness may create emotional bonds, even if these feelings do not necessarily translate into functional trust. However, this is my interpretation based on the participants' responses, emphasizing the complex interplay between emotional engagement and perceived functionality.

Based on observations and interview results, some hypotheses emerged. One suggests that there is no significant difference in the acceptance or rejection of robots between genders. However, another hypothesis indicates a potential difference in how males and females perceive and interact with robots.

Since our sample included only male and female participants, with no non-binary individuals, we conducted a T-test across all robot types on various scales. We found a significant difference in the perception of moral patiency. Specifically, slightly more females than males rated the robots as morally patient, with females attributing significantly higher moral patiency to robots than males. This suggests that, in general, females assign a higher level of moral consideration to robots compared to males.(See table 3.3)

Another hypothesis suggested that age may play a significant role in the study, predicting that older participants would rate the robot lower, indicating a negative correlation. To test this, Spearman's Correlation Coefficient $r_s$, a non-parametric statistic appropriate for ordinal data, was used to assess the relationship between age and the various scales.

| | Gender | N | M | SD | S. Error Mean |
|---|---|---|---|---|---|
| SPR scale | Male | 44 | 2.7500 | .58014 | .08746 |
| | Female | 52 | 2.6859 | .59925 | .08310 |
| IPR scale | Male | 44 | 2.1989 | .76950 | .11601 |
| | Female | 52 | 2.4526 | .65284 | .09053 |
| PMR scale | Male | 44 | 1.4220 | .55873 | .08423 |
| | Female | 52 | 1.6533 | .62613 | .08683 |
| Moral Agency | Male | 44 | 3.7075 | .87949 | .13259 |
| | Female | 52 | 3.8748 | .87426 | .12124 |
| Moral Patiency | Male | 44 | 2.5777 | 1.25242 | .18881 |
| | Female | 52 | 3.2731 | 1.53742 | .21320 |
| Cuteness | Male | 44 | 3.5587 | .85279 | .12856 |
| | Female | 52 | 3.3904 | .84764 | .11755 |

Table 3.3: Gender Statistics

As seen in table 3.4, there was a weak but statistically significant positive correlation between age and SPR scale, $r_s = .25$, $p = .015$. This result suggests that older participants tend to rate the social practicality of the robot slightly higher than younger participants. Contrary to our original hypothesis, which predicted that older adults would be less inclined to interact with robots, this finding indicates that they are more likely to perceive the robot as socially practical, potentially sociomorphing it more than younger people.

This finding also suggests that the closer people are to technology in terms of age, may be less inclined to sociomorphize to robots, as they have a more accurate view of what robots are. However, for older adults, interpreting robots through a social lens—sociomorphizing them—becomes an easier mental model to adopt because it simplifies their interaction and understanding of the technology.

Ultimately, this points to the idea that older adults view robots more in terms of their social practicality, rather than purely functional roles.

Furthermore, a moderate, positive correlation was found between PMR and IPR scale, $r_s = .46$, $p < .001$, which was also statistically significant. This result is logical, as both scales are designed to measure sociomorphistic attitudes towards robots, reflecting how participants attribute human-like characteristics and moral agency to robots. (see 6.3.2 table "Correlations")

| | | Age |
|---|---|---|
| Age | Correlation Coefficient | 1.000 |
| | Sig. (2-tailed) | |
| | N | 96 |
| SPR scale | Correlation Coefficient | .247 |
| | Sig. (2-tailed) | .015 |
| | N | 96 |
| IPR scale | Correlation Coefficient | .009 |
| | Sig. (2-tailed) | .928 |
| | N | 96 |
| PMR scale | Correlation Coefficient | .105 |
| | Sig. (2-tailed) | .307 |
| | N | 96 |
| Moral Agency | Correlation Coefficient | .040 |
| | Sig. (2-tailed) | .699 |
| | N | 96 |
| Moral Patiency | Correlation Coefficient | .026 |
| | Sig. (2-tailed) | .798 |
| | N | 96 |
| Cuteness | Correlation Coefficient | -.148 |
| | Sig. (2-tailed) | .150 |
| | N | 96 |

Table 3.4: Nonparametric Correlations

Additionally, there was a moderate negative correlation between the cuteness scale and age, suggesting that older participants tend to rate the robot as less cute than younger participants. This finding aligns with research that older individuals may place less emphasis on appearance-based attributes, focusing more social practicality.

Also, there was a moderate positive correlation between Moral Patiency and IPR scale, $r_s = .37$, $p < .001$, which was statistically significant. This suggests that participants who perceive robots as having moral patiency—attributing the capacity for suffering

or harm—are more likely to perceive robots as social entities capable of human-like interaction.

There was also a strong positive correlation between SPR and PMR scale, $r_s = .59$, $p = .573$, although this result was not statistically significant. The relationship between these two scales, while high in correlation, may require further investigation with a larger sample size to achieve statistical significance.

Interestingly, the correlation between Moral Agency and age was weak, $r_s = .04$, $p = .699$, and not statistically significant. This implies that there is little to no relationship between participants' age and their perception of robots' moral agency, or the capacity of robots to act with moral intent.

A weak but statistically significant positive correlation was found between Cuteness and the IPR scale, $r_s = .242$, $p = .018$, indicating that participants who rated the robot as cute also perceived it as more socially interactive. This aligns with the notion that perceived cuteness can enhance social bonding and engagement.

However, the relationship between Cuteness and the PMR scale was negligible, $r_s = .06$, $p = .546$, and not statistically significant, suggesting that perceptions of a robot's cuteness have little to no effect on whether participants attribute moral responsibility to the robot.

Finally, the correlation between SPR and Moral Agency was weak and non-significant, $r_s = .8$, $p = .447$, indicating that participants' social perceptions of the robot were not strongly related to their views on the robot's moral agency.

To gain a deeper understanding of the relationship between age and SPR, we conducted a correlation analysis for each individual item within the SPR scale. Interestingly, the correlation was not consistent across the entire scale but was particularly evident in one specific item: "Do you think the R always gives correct information?". This item showed a moderate correlation with age, $r_s = .312$, $p = .002$, suggesting that older participants were more likely to believe that the robot provided correct information.

This finding is intriguing for several reasons. First, it highlights that age influences certain perceptions of the robot, specifically in terms of information accuracy. Second, it raises a critical issue: the potential for older adults to overtrust robotic systems. While a positive view of the robot's reliability can be beneficial, it also suggests that older individuals may be more vulnerable to overestimating the robot's capabilities, which could lead to uncritical acceptance of the information provided by the system.

| | | Age |
|---|---|---|
| Age | Correlation Coefficient | 1.000 |
| | Sig. (2-tailed) | |
| | N | 96 |
| SPR$_5$4/$SPR_D$05[$SQ$0054] Do you think you will trust the information that the R gives you? | Correlation Coefficient | .180 |
| | Sig. (2-tailed) | .081 |
| | N | 95 |
| SPR$_0$4/$SPR_D$01[$SQ$004] Do you think the R always gives correct information? | Correlation Coefficient | .312 |
| | Sig. (2-tailed) | .002 |
| | N | 95 |
| SPR$_0$7/$SPR_D$01[$SQD$007]. Do you think you trust the R to perform its task well? | Correlation Coefficient | .048 |
| | Sig. (2-tailed) | .640 |
| | N | 96 |

Table 3.5: Nonparametric Correlations

CHAPTER 4

# Discussion

The following chapter presents a discussion of the results derived from the literature review and the user research. It puts the insights gained from observations, interviews, and surveys in relation to the reviewed literature, while also addressing the limitations encountered during the study and offering design takeaways.

## 4.1 Related Work

Exploring how people perceive and interact with robots reveals significant insights into the underlying principles of HRI. At the heart of this discourse is the concept of anthropomorphism, which posits that endowing robots with human-like features [29] can enhance user perception and acceptance. As noted in the literature, robots equipped with facial features or expressive behaviors [48] are often perceived more positively, facilitating smoother interactions. However, the “Uncanny Valley” phenomenon effect [65] illustrates a critical limitation: robots that appear almost human can evoke discomfort among users. This highlights the delicate balance that designers must strike to create robots that are relatable without crossing that unsettling line. In my user research, the positive reception of Lutzi’s design aligns with the literature that suggests anthropomorphic features, such as appearance, enhance user acceptance and engagement. Participants in the observation described Lutzi as "cute" and more relatable, noting its round, cat-like appearance, which made it more acceptable in social contexts. This finding supports previous mentioned works, which found that robots with more human-like or familiar features tend to be perceived more positively. However, the surprising lack of significant variation in cuteness ratings across different robots in my survey contrasts with some expectations in the literature that larger differences in design would lead to more varied ratings. This suggests that factors other than just appearance may be influencing user perception of cuteness and acceptance in social robots.

Moreover, the alignment of a robot's appearance and behavior with the context of its task significantly influences user reactions [37]. For example, while cheerful robots may be effective in social roles like museum guides, a serious demeanor might be essential for robots performing sensitive tasks, such as those in medical settings.[30] This indicates that emotional expression in robots must be context-sensitive to build trust and enhance user experience.In my thesis, while participants found Vector visually engaging, they appeared somewhat less convinced of its ability to perform tasks effectively. This suggests that design elements such as cuteness do not necessarily translate into functional trust. Similarly, the relatively high mean and low standard deviation of the Starship robot's ratings suggest that participants perceived it as reliable and task-oriented, emphasizing its appeal for practical, functionality-driven purposes.

Specifically, participants attributed socio-practical roles to the robots, focusing on their functional capacities and social utility rather than ascribing them human-like psychological traits. This finding highlights that participants evaluated the robots based on their ability to fulfill specific roles and tasks within defined social contexts, such as assisting with service functions, rather than perceiving them as entities with human-like characteristics.

Ethical considerations surrounding anthropomorphism [18] also emerge as a critical theme. While human-like features can improve interaction, they can also lead to ethical dilemmas, especially in cases like sex robots designed with harmful traits. This duality underscores the necessity for a robust ethical framework in robot design to mitigate potential risks associated with misinterpretations of robotic intentions. In my observations, parents closely monitored their children's interactions with Lutzi, reflecting an emerging negotiation of social norms and responsibilities around robots in public spaces. This behavior suggests that cultural values, such as respect for public property, are being extended to robots, integrating them into the social fabric of shared environments. Ethical considerations also surfaced, as parents and children discussed whether it was appropriate to touch Lutzi, further highlighting that humans are negotiating new social contracts with robots. These findings support the literature's claim that anthropomorphism can lead to the perception of robots as entities requiring ethical consideration, reinforcing the idea that robots, like Lutzi, are increasingly seen as part of the social fabric and subject to cultural expectations and norms.

In light of the cognitive mechanisms at play, it is evident that lay people often engage with robots as if they were social beings, despite an awareness of their mechanical nature. [16] This tendency to treat robots as "representations" rather than mere tools opens up exciting possibilities for interactions that go beyond simple human-like characteristics. In my observations, I noted that participants frequently engaged in conversational behaviors with the robots, even when aware that the robots were not "real" humans, indicating a tendency to socially engage with robots as if they were sentient beings, further supporting cognitive theories of social interaction with robots.

The concept of sociomorphing offers a refreshing perspective, encouraging designers to focus on a robot's unique social behaviors rather than human-like attributes [17]. This approach not only broadens the ways we can interact with robots but also embraces

cultural differences [47] in how we connect socially. Culture plays a crucial role in shaping users' expectations and experiences with robots. In some communities, people even host social events around their robots, demonstrating the potential for genuine relationships formed through these interactions [36]. Moreover, communication styles [50] vary widely across cultures, affecting how users perceive robot interactions. For instance, subtle communication preferred by some cultures contrasts with the directness favored in others. Understanding these preferences is crucial for designing robots that resonate well with diverse user bases. In my user research, I observed that cultural context significantly influenced how users interacted with robots. For instance, participants from diverse cultural backgrounds expressed varying levels of comfort with robots depending on their perceived level of social engagement. Some cultures preferred more direct communication with robots, while others favored subtler forms of interaction, aligning with cultural preferences for communication styles (e.g., directness in Western cultures vs. subtlety in Eastern cultures) [52].

In summary, the research highlights the complexity of HRI, where factors like anthropomorphism, ethical considerations, cognitive mechanisms, sociomorphing, cultural influences, social dynamics, and communication styles all come into play. By integrating these elements into robot design, we can create more effective and culturally aware robotic systems that enhance user experiences across different contexts.

## 4.2 Observation

In response to RQ1: *Perceptions of Robot Sociality*, the findings from the observations indicate that different groups—restaurant customers, service staff, and manager—perceive and interact with Lutzi in diverse ways. The older guests generally exhibited positive attitudes, (at least 12 observed interactions) often smiling or engaging with Lutzi when placing dishes on its tray. This response suggests that for many, Lutzi's presence is accepted as a helpful, even charming, addition to the restaurant environment.

Children were particularly fascinated by Lutzi, frequently interacting with it and showing a high level of curiosity, which reflects their perception of the robot as a playful figure which align to related works. However, some customers, particularly those with pets, expressed discomfort or confusion, especially when Lutzi moved near their dogs, indicating that not all interactions are uniformly positive.

These reactions align with the concept of sociomorphing, where people project social attributes onto the robot based on their own expectations and cultural experiences. Lutzi was perceived less as a companion or anthropomorphized being and more as a functional entity with some social qualities. Survey responses further supported this perspective, with participants finding Lutzi cute but primarily perceiving it as a practical aid with some social attributes. This perception contributed to its acceptance in task-oriented environments, such as restaurants.

*Sociological Factors* (RQ2): The findings suggest that beyond design features, several key

sociological elements contribute to how Lutzi is perceived as a social entity. One of the most significant factors is familiarity and cultural background. For example, guests with prior exposure to robots, such as the Australian woman who mentioned similar robots in her home country, had specific expectations of how Lutzi should behave, including how fast it should move or how interactive it should be. This aligns with previous studies that have shown how past experiences with technology shape users' expectations and perceptions of robot behavior (e.g., Banks et al., 2023). These findings support the idea that people's expectations are shaped by cultural and experiential factors, influencing how they interpret a robot's social role.

In answering RQ3: *Role of Social Robots (Lutzi),* the observations reveal that Lutzi's primary role in the restaurant was functional—helping to transport dishes and alleviate some of the workload from the staff. However, there was a clear expectation from both staff and guests for Lutzi to perform more interactive. For instance, some staff members and customers referred to Lutzi using female pronouns and expressed a desire for the robot to engage in more human-like behaviors, such as greeting guests or stopping when someone moves in its path. This highlights the evolving role of social robots in public settings, where they are expected to integrate more seamlessly into social dynamics, much like human staff members. Despite these expectations, Lutzi's integration into the restaurant's workflow still required human oversight, with staff monitoring its movements and ensuring its tasks were completed smoothly. This dynamic suggests that while Lutzi is seen as a helpful assistant, its role is still limited by its technical functionality. There is potential for service robots like Lutzi to take on more socially embedded roles, but this will depend on further developments in robot autonomy and interaction design. Ultimately, Lutzi's presence underscores the importance of role clarity—both in terms of its functional contributions and the expectations placed upon it as a social actor within the restaurant setting.

## 4.3 Interview

In response to RQ1: *Perceptions of Robot Sociality*, the interview data reveal a mix of anthropomorphism and sociomorphing tendencies in how customer and staff interact with Lutzi. Several interviewees described Lutzi using human-like qualities, with terms like "süß" (cute) and "lustig" (funny), indicating that people often project social attributes onto the robot, similar to how they would with a playful pet or an amusing toy. This suggests that even though Lutzi's design is not human-like, its round shape, facial features, and interactive behavior, such as reacting when petted, similar to other studies [48, 23] where robot design influences emotional engagement and evoke social responses from users. However, the extent of these social attributions appears limited. While children especially enjoyed getting reactions from Lutzi, adults mostly viewed these traits as novelties rather than indicators of a deeper social connection. These findings highlight the importance of sociomorphing. People ascribing social characteristics based on their interactions with the robot, even though Lutzi is seen more as a tool than a genuine social entity.

In contrast, there were also moments of skepticism and concern regarding Lutzi's social role. One elderly interviewee expressed doubts about the safety of having Lutzi around babies, indicating a level of caution regarding how well robots can be trusted in human-centric environments. This sentiment reflects a more guarded perspective on the sociality of robots, where their usefulness is questioned, and their potential risks are considered, especially in public or family-friendly settings.

Addressing *RQ2: Sociological Factors*, it became evident that people's values and norms play a crucial role in shaping their interactions with Lutzi. Cultural preferences, particularly in the Austrian context, were highlighted in the interviews, where two participants mentioned a general hesitation toward robotic service in Austria. There is a strong preference for human interaction, especially in more formal or personal dining settings. This cultural resistance reflects an underlying belief that social experiences, particularly in hospitality environments, are best facilitated by human beings rather than machines. While Lutzi is accepted in casual or fast-food restaurant settings, it was clear from the interviews that patrons would not want robots in more traditional or favorite dining spaces, where the value of personal interaction is considered paramount.

The functional interactions that Lutzi facilitated also point to how sociality is contextual. Most interviewees viewed their interactions with Lutzi as more task-oriented than social. The robot was primarily seen as a practical tool—useful for clearing dishes or assisting with small tasks—but not a social companion that could engage in meaningful interactions. For example, two guests suggested that Lutzi could be more useful if it could perform additional functions, such as processing payments at the table, which would further cement its role as a functional service tool rather than a social entity. The interviews reveal that while Lutzi can perform simple tasks, it lacks the deeper social touch that patrons expect from human staff, emphasizing the cultural expectation that robots remain secondary to human interactions in service environments.

As for *RQ3: Role of Social Robots (Lutzi),* the interviewees' responses underscore the idea that Lutzi is seen primarily as a support tool rather than a social companion. While it helps to alleviate the staff's workload by assisting with tasks like clearing tables, it does not contribute to enhancing the dining experience on a social level. Several participants made it clear that Lutzi lacked the "personal touch" that only human staff can provide, reinforcing the idea that role clarity is key in these settings. Lutzi is appreciated for its practical contributions but is not seen as replacing human staff when it comes to social interactions.

This functional role was further supported by observations where staff monitored Lutzi's tasks and ensured it functioned smoothly, but the robot was still viewed as needing human oversight. The interaction between staff and Lutzi reflects a human-robot collaboration, but one that remains largely dependent on human intervention to ensure efficiency. This suggests that while robots like Lutzi can integrate into restaurant workflows, their roles are still limited by technical functionality and the ongoing need for human guidance.

## 4.4 Survey

*Sociomorphing vs. Anthropomorphism:* The survey results provide intriguing insights into how people perceive social robots like Lutzi, emphasizing both functional and social dimensions. The lower scores on the Psychological Moral Relatedness (PMR) scale indicate that participants were not attributing human-like mental states to the robots. This finding aligns with the findings of observation and interview, which most interactions with Lutzi were more task-oriented than social, reinforcing the notion that sociomorphing—where people assign practical social roles to robots—is more prevalent than anthropomorphism. While customers engaged with Lutzi for practical purposes, they rarely socialized with it, consistent with the survey's results indicating that participants did not perceive Lutzi as possessing human-like qualities.

*Moral Patiency vs. Moral Agency:* Survey data show a lower mean value of moral patiency compared to moral agency, highlighting the challenges humans face in forming attitudinal decisions about whether to treat robots as moral agents. This finding aligns with ethical discussions surrounding anthropomorphism [18]. While anthropomorphic design can foster social engagement by encouraging users to attribute social and moral qualities to robots, it also raises significant ethical concerns. For instance, anthropomorphic features can blur the line between a robot's perceived capabilities and its actual functional limitations, potentially leading to misinterpretations of its role and intentions [5].

This complexity was highlighted in interviews, where staff expressed skepticism about Lutzi's social capabilities, emphasizing its functional role over any moral consideration. As noted by [6], humans are more likely to attribute moral agency to entities they perceive as capable of intentional action. However, Lutzi's limited interactivity and reliance on human oversight constrained such attributions, despite its anthropomorphic design. These findings suggest that while anthropomorphic traits can enhance interaction, they do not necessarily result in moral consideration, reinforcing the need for ethical frameworks that account for the gap between a robot's design and its actual capabilities. The ethical tension identified here reflects an ongoing negotiation between functionality and perceived agency in human-robot interactions, as robots like Lutzi are integrated into public spaces.

*Gender:* The survey revealed gender differences, with women rating robots higher in moral patiency than men, suggesting that women are more likely to view the robot as deserving of some moral consideration. In contrast, men exhibited more skepticism regarding the moral role of robots during interview, which is reflected in their lower moral patiency ratings in the survey. These findings align with research by Kislev [41], which highlights that women tend to be more open to attributing social and moral characteristics to robots, whereas men often adopt a more functional or utilitarian perspective. This dichotomy in moral patiency ratings suggests that women may be more receptive to robots as social entities, while men focus more on their practical and funcional utility.

*Age and Sociomorphing:* The survey revealed that older participants rated the Socio-Practical Relatedness (SPR) higher than younger participants, which contrasts with

the assumption that older adults would be less inclined to interact with robots. This finding raises a concern: older adults may be more tend to overtrusting robots. As noted by Aroyo et al.[2], older users are more vulnerable to overtrusting automation due to a tendency to misjudge the capabilities of robots. This is especially relevant when a robot's emotional appeal creates a strong emotional bond, to lead older adults to attribute capabilities that the robot may not actually possess. During observation underscores the need for clearly defined roles for social robots like Lutzi. These findings emphasize the importance of managing expectations for older users to mitigate the risks of overreliance. A clear understanding of the robot's limitations and the roles it is designed to fulfill is crucial, particularly for older adults who may be more inclined to trust the robot's abilities.

*Cultural Effects and Attitudinal Bias:* While the interviews revealed cultural factors influencing attitudes towards robotic service, the survey did not demonstrate significant cultural effects. This discrepancy may stem from the nature of the survey questions and the fact that it was conducted in Austria. Additionally, one reason for the similar scores across different robot perceptions—specifically between Lutzi, Vector, and Starship—may be that participants responded based on general biases rather than specific observations. This underscores the limitations of relying on survey data without direct interaction, highlighting the need for future studies to incorporate real-world interactions to assess the sociality perception of robots effectively.

## 4.5 Limitations

This thesis has some limitations that should be acknowledged:

*Video-based Interaction:* The reliance on video-based interactions may not fully capture participants' responses as they would manifest in real-life scenarios. Interactions with robots in person often differ significantly from observing them through a screen, which can lead to variations in perceptions and engagement[4, 61].

*Biased Responses:* Participants appeared to rely on pre-existing biases when responding to the survey questions, as evidenced by research highlighting how response biases introduce systematic errors into psychological assessments. [44]. Their answers may reflect pre-formed opinions rather than direct observations of the robots. As a result, their evaluations may not accurately represent their experiences or perceptions of the robots.

*Survey Participants:* The survey was conducted with participants who may have been familiar with the researcher, which could introduce bias into their responses. Ideally, surveys should involve participants who are unfamiliar with the researcher to minimize the influence of personal relationships on their answers.

*Scale Limitations:* The measurement of moral patiency proved to be particularly challenging, as participants found it difficult to assess this construct accurately. This difficulty may have contributed to the lower mean scores observed in this study.

*Questionnaire Limitations:* While questionnaires can provide valuable insights, they often fail to capture the nuanced details or underlying reasons behind participants' responses. This limitation restricts the depth of understanding regarding how individuals perceive and interact with social robots.

## 4.6 Take-away for Design

The findings of this thesis highlight a significant distinction between better functionality, social practicality and individual ascription of moral and mental attributions to social robots. Lay people exhibit varying attitudes toward these robots based on their functional capabilities versus their aesthetic appeal and the social attributions they evoke. Specifically, while robots like Lutzi and Starship are primarily evaluated based on their reliability and social practicality, connection through social attributions like cuteness, metnal and moral attributions seem to play a more pivotal role in the acceptance of robots like Vector.

Based on the findings of this thesis, designers must carefully balance the relative importance of social practicality and emotional engagement- individual ascription of moral and mental attributions- to create social robots for specific context. In the case of Lutzi, which was evaluated for its features in a restaurant environment, the following functionalities could enhance both its practical utility and sociality:

*Task reliability:* Ensuring that Lutzi can consistently perform essential tasks, such as delivering food or assisting staff without errors, is critical to its success. This aligns with the study's findings, where participants preferred robots that reliably support their environment, ensuring smooth service during busy periods.

*Simple social interaction features:* Incorporating basic conversational abilities (such as polite greetings) and culturally appropriate non-verbal cues (like nodding or smiling) can enhance Lutzi's approachability. These features would encourage positive social engagement with customers, making the robot more relatable and emotionally engaging while maintaining its practical function.

These functionalities, drawn from the study's findings, emphasize the importance of balancing practical utility with emotional appeal. By doing so, developers can increase robot acceptance, ensuring the robot feels both functional and emotionally engaging to users in real-world settings.

Furthermore, interviews with participants revealed additional areas for improvement. Integrating features like payment processing capabilities could streamline operations, especially during busy periods, where delays in service were noted as a concern. Similar to the self-service screens at McDonald's, Lutzi could also help facilitate a more efficient and seamless dining experience, supporting both its socio-practical function and emotional engagement with users.

To better serve customers with disabilities, Lutzi could incorporate voice commands to assist visually impaired users and guide those with mobility issues to their tables. These

features would be especially suitable in a fast food restaurant context, where customers typically expect quick, practical service and value functional interactions. By proactively engaging with customers—such as approaching those who may need assistance or offering reminders about special offers—Lutzi could enhance the overall customer experience, creating a more personalized and efficient interaction. These interactions could contribute positively to the perception of Lutzi as a socially engaging and practical robot, improving its sociality perception within the fast-paced environment.

However, in a more formal restaurant context, where the dining experience is typically slower-paced and focused more on atmosphere and service quality, such functionalities may not be enough to foster the desired level of engagement. In this setting, while functional support remains important, the emphasis would likely shift more toward creating a refined, unobtrusive experience, where a robot like Lutzi may need to adapt its interactions to be more discreet and elegant. Here, balancing practical assistance with more nuanced, socially intelligent behaviors—such as offering personalized conversation or integrating into the ambiance—would be key to improving sociality perception and acceptance.

Moreover, integrating Lutzi with a mobile app would empower customers to place orders and check their order status seamlessly. A specific incident highlighted the necessity of such functionality: during a busy day with nine waitstaff, a customer received the wrong order, which could have been avoided through an app-based interaction that provides real-time updates and order confirmations.

In summary, these insights illustrate the importance of balancing functionality and social practicality and individual ascription of moral and mental attributions in the design of social robots. By prioritizing both dimensions, developers can create more effective and relatable robotic systems that enhance user experiences across diverse settings.

CHAPTER 5

# Conclusion

## 5.1 Conclusion

This thesis exploresd the complex interplay between human perceptions and interactions with social robots, focusing specifically on the Lutzi robot in a restaurant setting. Through addressing three key research questions, the thesis provided insights into how various groups perceive and engage with Lutzi (RQ1), the sociological factors influencing these perceptions(RQ2), and the roles that social robots play in facilitating social interactions (RQ3).

The exploration of perceptions of Robot Sociality (RQ1) revealed that different groups—such as restaurant customers, service staff, and manager—interact with Lutzi in distinct ways. While customers often engage with Lutzi from a functional standpoint, service staff's interactions are shaped by practical considerations and expectations. Comparatively, Lutzi is sociomorphized differently from other social robots like Starship and Vector. Customers are more inclined to view Lutzi as a tool for facilitating their dining experience rather than as a social entity, which highlights the significance of understanding the context in which a robot operates. This understanding informs the design and development of social robots by emphasizing their functional capabilities alongside their potential for social engagement.

Sociological Factors (RQ2) extend beyond design features to include the emotional and cultural dimensions that influence how robots are perceived as social entities. This study demonstrates that factors such as gender and age play pivotal roles in shaping users' attitudes toward social robots. For instance, the findings indicate that older adults may be more prone to attributing social qualities to robots, which leads to a higher degree of sociomorphing. In contrast, younger individuals tend to engage with robots from a more functional perspective, which highlights the necessity of considering diverse demographic factors when designing and deploying social robots.

Finally, the exploration of the Roles of Social Robots (RQ3) in a restaurant setting illustrates how the roles and expectations surrounding Lutzi shape the dynamics of human-robot interactions. The expectations for Lutzi as a service assistant highlight the importance of clarity in its functional role to enhance acceptance and integration into social environments. Participants expressed a desire for Lutzi to assist with tasks like payment processing and proactive customer engagement, reflecting the need for robots to perform practical functions effectively while also fostering a sense of connection with users.

In conclusion, this thesis underscores the multifaceted nature of human-robot interactions and the importance of considering functional trust and sociocultural factors when designing social robots. By understanding these dynamics, designers and developers can create robots like Lutzi that not only fulfill practical roles but also enhance the social fabric of the environments in which they operate. As social robots continue to become integrated into various sectors, insights from this study can guide future developments to ensure that these social robots are not only effectively practical but also socially accepted and embraced by diverse user groups.

CHAPTER 6

# Appendix

## 6.1 Observation

### 6.1.1 Observation Day I

***Location: XXXLutz restaurant, Mariahilfer Straße***

***Date: Friday, 10.05.2024***

***Time: 18:20 – 20:40***

We arrived at the restaurant during dinner time, it was observed that nearly every table was occupied. The Lutzi robot was positioned in a corner near the kitchen. This particular XXXLutz restaurant is divided with three floors, with the main dining salon on the ground floor and the kitchen accessible via stairs, separated from the main salon. The robot's functionality was limited to the ground floor due to its inability to navigate stairs, which made staff to bring food from the kitchen and deliver it to customers, as well as to collect dirty dishes from the first floor and bring them to Lutzi.

Lutzi uses always the same route, pausing briefly at certain spot, its station near to the kitchen before starting its path again.

During the observation period, the Lutzi robot primarily assisted staff by moving through the restaurant every two minutes. Its movements took approximately 3 minutes and 40 seconds and were confined to the ground floor, where it consistently returned to its starting point. The Lutzi's screen displayed a cat face, which was constantly smiling or winking. Several interactions were particularly noteworthy:

An elderly customer, noticing Lutzi approaching, stood up, smiled at it, and placed his dirty plate on it's tray, indicating a positive and curious engagement.

Another elderly lady exhibited interest by watching Lutzi each time it passed her table. On one occasion, she attempted to place her dirty dishes on the robot's tray but was

unsuccessful as the robot did not pause to allow this action. She remarked to her dining companion, "She's too quick," indicating her perception of the robot's speed.

Following this, I engaged in a brief conversation with her, during which she explained that she and her companion were tourists from Australia. She mentioned that similar robots are common in Australian restaurants and noted that they usually greet customers, unlike Lutzi, which she felt moved too quickly. She expressed an interest when I explained that my thesis focused on social robots, with Lutzi as a case study.

As expected, children showed a high level of curiosity and fascination with Lutzi. One toddler, estimated to be around one year old, was initially crying but stopped and stared at Lutzi when brought closer by a caregiver. The child was visibly intrigued, and when Lutzi began moving again, the toddler reached out to touch it. Another older kid approached Lutzi closely, touching its screen with excitement.

Lutzi demonstrated its ability to recognize obstacles during the observation. When I intentionally positioned myself in the robot's path, it paused for some seconds and then took an alternate path beside me to continue its movement. However, when an elderly woman and her younger companion seated near me placed their bags on an extra chair, they noticed Lutzi approaching and moved the chair to clear its path.

Additionally, two women seated near Lutzi's starting position frequently glanced at the robot, whispering to each other and laughing, indicating a mix of amusement and curiosity. At around 19:00, a group of elderly tourists, likely from the USA based on their accents, entered the restaurant. The ground floor was crowded, and as they searched for a table, Lutzi moved through the area. The tourists made way for it, laughing and exchanging amused glances.

In another interaction, a woman entered the restaurant with a dog, which barked at Lutzi as it passed by. The woman restrained the dog, showing an interesting dynamic between animals and robots.

Additionally, a small child stood directly in the robot's path, observing what it would do. An elderly couple, noticing my attention to Lutzi, looked at the robot and then at each other without much reaction, indicating neutrality or indifference to the robot's presence.

### 6.1.2 Observation Day II

***Location: XXXLutz restaurant, Vösendorf***

***Date: Wednesday 24.07.2024***

***Time: 16:15 – 17:55***

This particular XXXLutz restaurant, located on the first floor of the store, closes at 18:00 and includes a small indoor playground, making it an ideal spot for families with children after a long shopping day. When we arrived, the restaurant was about half-occupied, with many families and children present.

Unlike the Mariahilferstrasse branch, this location offered the Lutzi robot more opportunities to stop and interact with its surroundings. The single-floor restaurant allowed Lutzi to utilize more of its functionalities, such as delivering food to various tables and making sounds like "Meow" or announcing "Essen ist fertig" ("Food is ready") in German.

The presence of many children in the restaurant led to frequent interactions with Lutzi. One boy, approximately eight years old, attempted to place his glass on Lutzi's tray, hoping to make it stop. When the robot did not stop, the boy shouted "Stop" several times. His mother, as I assumed, intervened, calming him down and clearing the path for Lutzi. Children were particularly fascinated by the robot. One child asked his father for permission to approach and touch Lutzi, and after receiving approval, the child eagerly interacted with the robot.

As part of my observation, I experimented by touching Lutzi's head and placing an item on its tray. The robot paused and responded with "Ihre Hände sind richtig warm" ("Your hands are really warm"), indicating its interactive capabilities. This capability had not been discovered by any other customers, but I was aware of it due to my prior knowledge of Lutzi's functionalities. I also made another attempt to place an item on the tray without standing up, but Lutzi moved too quickly to notice and did not stop.

Throughout the observation, I noticed that the restaurant staff would place dirty dishes on Lutzi's tray as it moved around the restaurant. In one instance, a staff member reorganized the dishes on the tray to prevent them from falling.

A small incident occurred when an elderly woman began to stand up, pulling her chair out just as Lutzi was passing by. She did not see the robot approaching and became concerned that it might hit her. The robot did not stop. She quickly glanced at a staff member who was standing a bit further away. The staff member quickly noticed the situation, came over and moved other chairs to clear its path, and ensured the woman's safety.

The staff appeared to have a positive and friendly attitude toward the robot, assisting it whenever necessary to facilitate its operation within the restaurant.

These observations provided valuable insights into the diverse ways individuals engage with the Lutzi, revealing varying levels of curiosity, amusement, and interaction depending on the age and background of the participants.

### 6.1.3 Observation Day III

***Location: XXXLutz restaurant, Mariahilfer Straße***

***Date: Saturday, 17.08.2024***

***Time: 12:06 – 13:40***

On Saturday, this branch of the restaurant was busy and overbooked. I would estimate that around 80 percent of the guests were elderly. When we arrived, we asked the waitress

for a seat, and she inquired if we had a reservation. Since we did not, she kindly searched for an available spot for us.

She led us to a table in the corner, which offered a great view of almost the entire restaurant. However, the station where the Lutzi robot usually stands was out of sight. Since I didn't see Lutzi after a few minutes, I asked the waitress if Lutzi was still in operation. She smiled and assured me, "Yes, she's always at work, every day!"

As we settled in at our table, we noticed an elderly couple interacting with Lutzi each time it passed by, three times in total. They seemed to enjoy the little encounters. Another older woman found herself in Lutzi's path but quickly stepped aside, laughed and said: "she walks toward me".

Another elderly couple entered the restaurant with a walker and a dog in a small wagon. They chose a table and placed the walker and wagon beside them. As Lutzi made its usual rounds, it reached their table and encountered the wagon. It moved slightly forward and backward, clearly confused by the obstacle. A waitress noticed and approached the couple, politely asking if they could move the walker and wagon to a corner, away from Lutzi's programmed path. She also stopped Lutzi by pressing a button on its screen, explaining that the walker and wagon were causing it to be confused.

Later, another woman with a small dog came in. Lutzi crossed her path, and she commented to her partner that the robot might scare her pet. I smiled at her, and she looked at me and noted that robots can indeed be intimidating for small dogs.

The elderly couple who had been watching Lutzi continued to observe it closely each time it came by, exchanging smiles with each other and at the robot.

At one point, I attempted to reach out to the restaurant manager to have a brief chat or, preferably, an interview. However, due to the busy day, he declined, explaining that they were overwhelmed with customers.

Besides Lutzi, I counted nine other waiters and waitresses who were all working to keep up with the demands of the busy restaurant.

## 6.2 Interview

### 6.2.1 Transcription

The following pages include the transcribed conducted interviews either with staff, customers or manager of restaurants. The following quotation has been used within this thesis:

[INT1]: Interviewee (no. 1) [INT2]: Interviewee (no. 2) [INT3]: Interviewee (no. 3) [INT4]: Interviewee (no. 4) [INT5]: Interviewee (no. 5) [INT26]: Interviewee (no. 6)

[YEG]: Yegan, Interviewer

Moreover, the consent form are provided after the transcriptions:

### 6.2.2 Interview 1, customer, female, 35 years old

[00:00:00] **YGN:** Können Sie Ihre ersten Eindrücke von Lutzi beschreiben, als Sie ihm im Restaurant begegneten?

[00:00:05] **INT 1:** Sehr nett eigentlich und sehr... ja, ich glaube, dass ich mit jeder hinschaue und sie eigentlich freut sich auf die Unterstützung.

[00:00:12] **YGN:** Ich habe gesehen auch,

[00:00:13] **INT 1:** ja, die Kleine war ganz fasziniert von ihm. (Sie deutete auf ihre Tochter

[00:00:19] **YGN:** Ja stimmt. Wie fühlen Sie sich im Vergleich zur Interaktion mit menschlichem Personal, wenn Sie mit Lutzi interagieren?

[00:00:27] **YGN:** Also wie ist das eigentlich der Unterschied zwischen Luzi und Personal im Restaurant

[00:00:33] **INT 1:** Mit der Person kann ich halt sprechen und mit Lützi würde ich eigentlich nur das leere Geschirr hinstellen. Wenn der herkommt. Persönlich ist es für mich noch immer mehr wert als dieser Roboter. Der Roboter ist für mich als Abräumhilfe super, dass man wirklich das leere Geschirr hinstellt.

[00:00:52] **INT 1:** Aber wenn jetzt das Essen kommt, finde ich die Persönlichkeit der Menschen noch besser als der Roboter.

[00:00:58] **YGN:** Aber ich habe gehört, Lützi hat etwas gesagt. Ich habe nicht wirklich gemerkt, was war genau, ich hoffe, ...?!

[00:01:05] **INT 1:** ja, das Essen hat geschmeckt, oder was irgendwie (Sie lächelte)

[00:01:08] **YGN:** passt. Auf welche Weise lässt Lutzi's Verhalten ihn für Sie sozialer oder weniger sozial erscheinen?

[00:01:19] **INT 1:** Hmmm...

[00:01:20] **YGN:** Also ich habe zum Beispiel gesehen in vielen Videos, man kann mehr Funktionen von Lutzi nutzen. Es ist halt nicht so hier.

[00:01:33] **INT 1:** ja, hier gibt es nur eine Funktion oder nur abräumen und herbringen,

[00:01:45] **INT 1:** Also das Aussehen finde ich auf jeden Fall süß, also es ist sehr anspruchsvoll und sehr nett gestaltet, so dass man zumindest hinschaut. Es sieht nicht aus wie so ein typischer Roboter so eigentlich niedlich oder süß aber ja. Also das hilft glaube ich schon mehr, als wie es kommt, als irgend so eine Viereckig-Rechteckig-Styling oder so.

[00:02:11] **YGN:** Ich glaube das haben wir eh gesprochen, was waren Ihre ersten Gedanken, wenn Sie Lutzi im Restaurant sehen?

[00:02:18] **INT 1:** Ja so dass man gleich hinschaut ... und gleich sagt, okay, ah, was Neues, aber es sieht süß aus und ja.

[00:02:25] **YGN:** Sehr gut.

[00:02:26] **YGN:** Wie hat Lutzis Anwesenheit Ihr Esserlebnis beeinflusst?

[00:02:31] **INT 1:** Gar nicht. Also der ist da vorbeigefahren, da bin ich vielleicht kurz hingesehen, so eine Sekunde, aber jetzt nicht, dass ich abgelenkt werde, also gar nicht eigentlich.

[00:02:43] **YGN:** Haben Sie vielleicht andere Roboter oder spezielle Roboter gesehen?

[00:02:50] **INT 1:** Noch gar nicht. Nein...

[00:02:54] **YGN:** Staubsaugerroboter oder so auch nicht?!.

[00:02:56] **INT 1:** Ja, schon. Staubsaugerroboter schon, aber so jetzt wirklich in einem Lokal,

[00:03:00] **YGN:** in einem Restaurant oder Public Spaces aber nicht?

[00:03:05] **INT 1:** Nein, klar nicht. So im privaten Rahmen natürlich schon. Mit Saugwischroboter und Mähroboter im Garten und so, das schon. Aber so jetzt wirklich, wo man mit mehreren Gästen und Leuten kommuniziert, so ein Roboter Also wirklich nur da jetzt bei der Lutzi.

[00:03:25] **YGN:** Welche Aspekte von Lutzis Design lassen ihn für Sie sozial oder unsozial erscheinen?

[00:03:32] **INT 1:** Ich glaube das Rundliche, ja... das runde Design.

[00:03:35] **YGN:** Das ist unsozial oder sozial?

[00:03:38] **INT 1:** Sozial.

[00:03:39] **YGN:** Und was ist unsozial?

[00:03:41] **INT 1:** Wenn wirklich ein echter Klick wie eine Box herkommen würde, ohne viel Gesicht und ohne...ja

[00:03:50] **YGN:** von ihm selber ist alles angesehen

[00:03:53] **INT 1:** Ja, finde ich sehr anspruchsvoll

[00:03:57] **INT 1:** Bisschen eher persönliche so

[00:04:03] **YGN:** wie wichtig ist ihre Meinung nach das soziale Verhalten eines Roboters von seiner Akzeptanz durch Menschen?

[00:04:13] **INT 1:** Sehr wichtig eigentlich. So wie wenn er merkt, dass da jetzt ein Sessel im Weg steht oder ein Tisch, dass er gleich stehen bleibt und dann vielleicht eine andere Route wählt als wie er pippst dann gleich und sagt, Pipp, Pipp Fehler oder so.

[00:04:26] **INT 1:** Sondern dass er sich wirklich der Roboter selber dann den Weg sucht und kurz stehen bleibt, wenn vielleicht wer aufsteht vom Tisch und dann erst nachher weiterfährt, so wie es davor der Fall war.

[00:04:42] **YGN:** Wie glauben Sie, können Roboter wie Lutzi besser in alltägliche soziale Umgebungen integriert werden?

[00:04:50] **INT 1:** In irgendwelche anderen Möglichkeiten quasi?

[00:04:53] **YGN:** Ja.

[00:04:54] **INT 1:** hmm

[00:04:54] **YGN:** Oder auch zum Beispiel wie hier im Restaurant oder in den publiken Spaces

[00:05:01] **INT 1:** Vielleicht so mit Bezahlen und Rechnung oder so, dass vielleicht einer kommt, wo man dann vielleicht die Tischnummer auswählen könnte und dann so mit Kassenzahlung und die Karte hinleiten.

[00:05:11] **INT 1:** Vielleicht so irgendwie, dass man da nicht warten muss, zahlen bitte, Rechnung kommt, dann doch mit Karte, doch wieder zum Tisch hin mit der Karte, sondern dass da vielleicht so ein Roboter da herfährt, so ein Bezahlroboter oder so irgendwie, wo man dann die Tischnummer auswählt und dann die Rechnung sieht digital und dann so einfach mit Karte hin, und dann kommt vielleicht die Rechnung gleich raus oder so irgendwie.

[00:05:40] **INT 1:** Ja, weil so müssten wir da jetzt warten wieder, wo ist ein Kellner, dann bittet die Rechnung mit Karte, ja, wieder dorthin, ok, wieder dorthin. Und so wird vielleicht der Roboter kommen und man kann selber auswählen und ist dann vielleicht schneller, ohne dass jetzt, wenn viel los ist.

[00:05:54] **YGN:** Und... vertrauen Sie an die Roboter in dem Fall?

[00:05:57] **INT 1:** Ja, wenn ich dann sehe, die Rechnung aufgelistet was alles [00:06:00] ist, ja eigentlich schon

[00:06:06] **YGN:** Wollen sie ihr spezifische Vermerkmale von Luzi beschreiben, die ihm helfen, menschlicher zu werden?

[00:06:13] **INT 1:** Vielleicht. Dass er aussehen vielleicht. Dass er so wie eine Katze oder so aussieht.

[00:06:21] **YGN:** Okay?!

[00:06:24] **INT 1:** Das wär's eigentlich, hätte ich gesagt. Es wird mir jetzt nicht so störend wahrgenommen, sagen wir mal so. Ich hab mir jetzt das gleiche, also das zweite Mal erst gesehen, wir sind normal in Eisenstadt und da gibt's gerade nicht.

[00:06:35] **YGN:** ja, stimmt...

[00:06:37] **INT 1:** also das war das zweite Mal seit einem Jahr oder so und jetzt wäre es für mich nicht so, dass es mich stört, sondern eher, dass ja eigentlich mal etwas anderes ist, dass man das noch sieht.

[00:06:53] **YGN:** Welche gesellschaftlichen Faktoren beeinflussen Ihrer Meinung nach, wie Roboter als soziale Wesen wahrgenommen werden?

[00:07:05] **INT 1:** Welche?

[00:07:07] **YGN:** Vielleicht auch das ist Kultur und auch Social Marketing.In Österreich haben wir vielleicht weniger Welche Faktoren fehlen?

[00:07:30] **INT 1:** Ich glaube, das ist vielleicht die Mentalität der Österreicher, dass wir da so etwas so skeptisch dem gegenüber sind. Ob er mir das Essen bringt und eine vermutete Stimme mir Mahlzeit sagt und guten Appetit es will. Oder vielleicht ein persönliches Gesicht sagt, hat es geschmeckt? Ich glaube, das ist eher unsere Mentalität, die das uns da vielleicht etwas macht. Skeptischer gegenüber. Vielleicht wirken lässt, ja. Also in anderen Ländern ist das halt so ein bisschen komplizierter, wie jetzt gesehen.

[00:08:09] **YGN:** ich glaube wir sind fast fertig. Auf welche Weise glauben Sie, dass Luzi besser in das Restaurant in das Restaurantumfeld integriert werden könnte?

[00:08:22] **INT 1:** Das mit dem Bezahlen vielleicht,

[00:08:26] **INT 1:** ich finde das mit dem Absiedeln schon sehr praktisch und auch letztes Mal hat uns das Essen gebracht, dass man sich selber runternehmen muss,

[00:08:34] **INT 1:** das war letztes Mal, das war schon vor einem halben Jahr oder so. Ja, genau. Aber das mit dem Bezahlen wäre vielleicht etwas ansonsten, ja.

[00:08:49] **YGN:** Und wenn er was gebraucht hat und hat auch etwas dazu gesagt?

[00:08:53] **INT 1:** Ja,

[00:08:54] **INT 1:** der war so programmiert, dass er genau bei uns beim Tisch stehen geblieben ist, vor dem letzten Mal und gesagt hat,

[00:08:58] **YGN:** Tischnummer?

[00:08:59] **INT 1:** genau, die Tischnummer, ihr Essen ist fertig. Da hat er sich irgendwie so etwas runtergenommen und dann guten Appetit und ist wieder weggefahren.

[00:09:06] **YGN:** Ah, gut

[00:09:07] **INT 1:** Ja genau, also der hat wirklich die Tische programmiert, aber da war ja ziemlich viel los. Also da waren fast alle Tische voll und dann ist quasi der Luzi dahergekommen

[00:09:16] **INT 1:** sind wir vielleicht mit der Person an. Vielleicht wenn es viel los ist. Ja.

[00:09:21] **YGN**: Vielen lieben Dank für Ihre Teilnahme.

[00:09:30] **INT 1:** Sehr gerne, viel Erfolg!

### 6.2.3 Interview 2, customer, male, 80 years old, musician

[00:00:11] **YGN:** Ihnen ist ja aufgefallen, dass der Roboter herumfährt. Wie war der erste Eindruck? Wie würden Sie den ersten Eindruck mit dem Lutzi...

[00:00:20] **INT 2:** Naja, ich gehe da schon jahrelang im Alten also wie sie das überhaupt gebaut haben. Zuerst war es ein Kantin dann ist es ein Restaurant und dann haben sie es noch erweitert und jetzt haben sie es umgebaut und ist das.

[00:00:34] **INT 2:** Also ich gehe da eher seit dem X-Lutz gibt es und das ist dann das erste Mal, war ich da in Begleitung, wir haben gelacht und meine verstorbene Frau hat auch Luci geheißen aber nicht mit T Z sondern Lucia das war der richtige Name. (Er lachte)

[00:00:54] **INT 2:** und ja wir haben halt gelacht, aber es ist ja die künstliche Intelligenz, KI, und das in meinem Jahrgang, ja, tun wir ja auch schwer. Man sollte die Zeitung lesen mit den vielen englischen Begriffen. Ich habe schon Englisch, aber das war nie so mein. . . .leider nicht meine Stärke, bin aber beruflich da durchgekommen. Es ist ja alles schwer für unsere Generation, wenn Sie nicht in einem englisch sprechenden Land viel weißt oder so, also wenn ich viel rede, dann sagen Sie es gleich.

[00:01:34] **YGN:** Alles gut. Wenn Sie mit diesem Roboter interagieren, wenn Sie mit dem quasi arbeiten oder der vorbeifahren, ist es Ihnen das lieber, dass das ein Mensch macht oder ist es für Sie okay, wenn das ein Roboter macht?

[00:01:47] **INT 2:** Ja, ich bin an sich schon ein moderner Mensch. aber.... Da ist eh Wurst, das ist ein Kaufhaus mit einem Restaurant, aber in meinem Lieblingsspeiselokal brauche den nicht.

[00:02:02] **INT 2:** Da ist mir schon lieber der Kellner macht einen Puckerl vor mir, dann macht es sich hier bemerkbar. nicht?

[00:02:13] **YGN:** Wenn Sie den Roboter anschauen, finden Sie den irgendwie integriert in die Gesellschaft? Ist der sozial angepasst oder ist das einfach ein Gerät, das herumfährt?

[00:02:23] **INT 2:** Nein mit meiner Antwort habe ich das eigentlich da in dem Laden es wurscht aber in meinem Restaurant möchte ich das nicht haben.

[00:02:37] **YGN:** Wenn Sie jetzt Ihre Speisen oder Getränke konsumiert haben, hat Sie die Roboter in irgendeiner Form beeinflusst hat . . . .das irgendwann Einfluss gehabt auf Sie?

[00:02:45] **INT 2:** Nein, mich hat beeinflusst weil sich die Kinder lustig gemacht haben und sind mitgemacht Mitgegangen und haben da, das beeindruckt mich mehr als die Technik

[00:03:01] **YGN:** Haben Sie mit anderen sozialen Robotern oder mit Robotern generell schon zu tun gehabt? Jetzt im öffentlichen Raum oder auch zuhause, was weiß ich, ein Staubsaugerroboter oder sowas?

[00:03:14] **INT 2:** Nein. . . ein Staubsaugerroboter. In dem Wiesel wenn das Grundstück das zulässt ich habe nämlich einen Stufenquart, da geht es.

[00:03:22] **INT 2:** Da brauche ich drei. Also das finde ich ganz gut. Aber auf der anderen Seite, die Roboter haben auch schon Kinder verletzt, also Babys oder größere Babys. Das ist einmal die Zeit drin und die Erwachsenen müssen dann auf die Kinder aufpassen. Aber wenn ich das mit der Hand mache, brauche ich auf meine Kinder nicht aufpassen.

[00:04:01] **YGN:** Was lässt denn für Sie integriert erscheinen oder was ist jetzt überhaupt nicht sozial an dem Gerät?

[00:04:15] **INT 2:** Eine geistreiche Antwort kann ich auf das nicht geben.

[00:04:20] **INT 2:** Macht

[00:04:21] **YGN:** das einen Unterschied zum Beispiel, dass der jetzt ausschaut wie eine Katze ein Catface, oder ist das etwas, was den einfach nicht abhebt von einer Maschine?

[00:04:33] **INT 2:** Ich würde es jetzt einmal so formulieren, so wirklich ankommt es nicht bei der Bevölkerung, weil sonst hätten ja die Wirtshäuser, es ist eine Seltenheit da.

[00:04:46] **INT 2:** Mehr kann ich dazu nicht sagen.

[00:04:50] **YGN:** Und was sagen Sie zu Shape oder dieser Form von Robotern?

[00:04:55] **INT 2:** Lustig.

[00:04:56] **YGN:** [00:05:00] Wenn Sie den jetzt anschauen diesen Roboter, Was würden Sie verändern, dass da einfach mehr akzeptiert wird? Oder dass Sie akzeptieren könnten, quasi als...

[00:05:23] **INT 2:** Ich glaube, da müsste man nachdenken.

[00:05:26] **YGN:** Also fällt einem irgendwo was ein? Irgendeine Funktion

[00:05:30] **INT 2:** So wichtig ist mir das Ganze nicht. Ich habe mit meinen Paar Fragen.

[00:05:34] **INT 2:** Es ist die Kinder. Sind begeistert, ja, die haben sogar das Essen runternehmen wollen oder haben sich das eh gemacht. Aber ich glaube nicht, dass da irgendein Erwachsener von dem begeistert ist, das ist meine persönliche Meinung.

[00:05:57] **YGN:** Ich glaube die wesentlichen Fragen haben wir eh schon besprochen. Also ich glaube, im Groben haben wir die Fragen einmal durch. Herzlichen Dank.

### 6.2.4 Interview 3, staff, female, 44 years old, waitress

***unstructured Interview:***

**YGN:** Wie nehmen Sie Lutzis Rolle im Restaurant im Vergleich zu Ihrer eigenen wahr?

**INT 3:** Lutzi hilft bei holen Kunden?? speziell beim absolvieren?!

**YGN:** Können Sie Unterschiede beschreiben, wie Gäste mit Lutzi im Vergleich zu menschlichem Personal interagieren?

**INT 3:** Leute wollen Lutzi nicht so gerne –> Lieber Personal sepeziell ältere Personen bevorzugen Personal. Kinder lieben Lutzi. Ältere Personen beschweren sich teilweise über den Robotter!

**YGN:** Wie hat Lutzi die Dynamik Ihres täglichen Arbeitsablaufs verändert?

**INT 3:** Lutzi serviert nur dann, wenn viel los ist. Lutzi fährt dann direkt von den Künde.

Können Sie spezifische Merkmale von Lutzi beschreiben, die ihm helfen, menschlicher zu wirken?

**INT 3:** Hier gibt es Problem den Gäste nehmen falsche Gerichte vom Robotter! Beim abservieren?! ist es eine große Hilfe. Er ist kein Kellner Ersatz.

**YGN:** Auf welche Weise lässt Lutzi's Verhalten ihn für Sie sozialer oder weniger sozial erscheinen?

**INT 3:** Das Design von Lutzi kommt generell bei den Gästen gut an. Kellnern geht das prechen vom Robotter eher auf die Wande?!

**YGN:** Wie nehmen Sie Lutzis Rolle im Restaurant im Vergleich zu Ihrer eigenen wahr?

**INT 3:** Robottor ist kein Mensch und wird auch keinen sein. Die ?????? mit dem Gast fehlt?! weil sie unpersönlich sind.

**YGN:** Wie denken Sie, dass Lutzis Rolle als Serviceroboter die allgemeine Atmosphäre im Restaurant beeinflusst?

**INT 3:** Robotter stört das Personal nicht. Er wird als Hilfreich wahrgenommen.

**YGN:** Wie hat Lutzis Anwesenheit Ihr Esserlebnis beeinflusst?

**INT 3:** Robbotter beinflußt das Klima im Lokal nicht.

**YGN:** Wurden Sie über die Interaktion mit Lutzi geschult oder informiert?

**INT 3:** Es gibt eine Einschulung bei den Inbetriebnahme.

**YGN:** Welche Erwartungen hatten Sie an Lutzi, bevor Sie mit ihm interagiert haben, und wie wurden diese Erwartungen erfüllt oder nicht erfüllt?

**INT 3:** ???? : Selbstständig abesenvieren?!

### 6.2.5 Interview 4, staff, female, 38 years old, waitress

[00:00:00] **YGN:** Von der Stimme, wenn man das dann ganz zu einer AI geht, die das dann transkribiert, das heißt, wir haben das dann schriftlich in der Arbeit drin.

[00:00:08] **INT 4:** Okay

[00:00:14] **YGN:** Also im Endeffekt da steht nichts anderes drin, also dass wir das für die Arbeit vernehmen und dann jetzt gehören.

[00:00:19] **INT 4:** Okay, ja passt.

[00:00:21] **YGN:** Gut, äh... Dann das ist die erste Frage, wie nehmen Sie Lutzis Rolle im Restaurant im Vergleich zu Ihrer eigenen Wahl?

[00:00:32] **INT 4:** Wie die zu meiner eigenen Wahl? Ich meine, das kannst du nicht vergleichen. Ich bin trotzdem eher die persönliche Rolle. Sie sitzen einfach nur da und tun das eine.

Wir konnten zwar stoppen aber... Er ist praktisch, aber er ist auch unpraktisch. Sage ich ehrlich. Also die Lutzi ich habe jetzt schon in ein paar Restaurants gearbeitet vom Lutz, bei den einen bringt er das Essen, bei den anderen serviert er es an. Da ist jetzt zum Beispiel, da serviert er deswegen habe ich zuerst gesagt, Da muss man das Wecker tun, weil der ist so programmiert also ich weiß nicht, ob das jetzt beim Boden so einprogrammiert ist oder nicht. Aber er fährt seine Dinger, das heißt, er ist schon praktisch. Aber das kannst du halt nicht direkt mit meiner Arbeit vergleichen, weil ich tue nicht da aufnehmen, da die Getränke hintragen. Und er tut nicht der Auserwählung.

[00:01:26] **YGN:** Können sich Unterschiede beschreiben, wie Gäste mit Lutzi im Vergleich zu menschlichem Personal interagieren.

[00:01:36] **INT 4:** Ein paar finden es gut, ein paar... zucken aus. Also habe ich wirklich schon mitgekriegt, in der Welser Filiale war es so, dass die Leute wirklich zu mir gesagt haben, eben weil er das Essen bringt, bitte nicht von der Lutzi.

[00:01:51] **YGN:** Echt?

[00:01:52] **INT 4:** Ja. Das haben wir dann sogar dazu schreiben müssen, dass es wirklich so ist, bitte nicht von der Lutzi.

[00:01:56] **YGN:** Wieso?

[00:01:57] **INT 4:** Da hat es viele Affekte. Also eben weil einer das nicht zusagt, weil der persönliche Touch dann trotzdem da ist. Nah?!

[00:02:09] **YGN:** Hat das was mit dem Alter zu tun oder hat das, was mit der Persönlichkeit zu tun?

[00:02:15] **INT 4:**: Nein hab das so wie als ob, ich hab junge, ich hab aber auch ältere gehabt, die gesagt haben, bitte tun wir das nicht mit der Lutzi bringen. Ich meine für die Kinder ist es ein Highlight, wenn ich mit meinen Kindern sage, wir fahren jetzt zu

der Mama in die Arbeit, dann sagen sie, wir sehen Lutzi wir sehen Lutzi das ist schon cool. Ich sage mir selber aus, hätte ich jetzt ein Restaurant, ich würde es mir persönlich nicht reintun, weil trotzdem der persönliche Touch von der Gastronomie fehlt. Für die Systemgastronomie ist es ein Wahnsinn. Es hilft für die Systemgastronomie, aber mit einer schönen Gastronomie hat es nichts mehr zu tun. Bin ich auch ehrlich, ich bin voll ehrlich.

[00:02:55] **YGN:** Alles gut. Es gibt keine falsche oder richtige Antwort, das ist halt Ihre Meinung.

[00:02:58] **INT 4:** Also das ist meine persönliche Meinung. Also ich arbeite jetzt seit ein einhalb Jahren beim Lutz. Er ist eine Hilfe, aber bei ihm ist es zum Beispiel so, er fährt da einfach rein. Ich hab 10 Teller zu abservieren in die Hand und fährt einfach in mich rein. Er checkt es einfach nicht.... Er checkt einfach nicht und er hat sein eigenes Tempo nicht mit drauf, das heißt, er fährt da rein. Du musst ihm praktisch antupfen, dass er stehen bleibt.

[00:03:30] **YGN:** Aber kann man nicht auch Tempo ein bisschen reduzieren?

[00:03:33] **INT 4:** Das weiß ich nicht. Aber ich glaube, das geht hundertprozentig. Er kann auch Musik spielen, er kann Happy Birthday singen.

[00:03:42] **YGN:** Nutzt ihr auch diese Funktionen hier oder nicht? Singen, oder?

[00:03:47] **INT 4:** Im Wels zum Beispiel in Oberösterreich nutzen wir schon , eben weil da wird es Essen gebracht. Das heißt, wenn ein Kind jetzt Happy Birthday gesungen haben will, dann stelle ich ihm an, schaue, weil du hier bist. Weil er sich dann das Essen runternehmen kann, drückt auf Fertig und der fährt wieder. Aber bei ihm ist es halt so, er tut halt nur da abservieren. Das heißt, das Happy Birthday bringt dir da in dem Fall gar nichts. Weil er fährt ja wirklich alle Stationen an. Das heißt, ich kann nicht einmal, also ich kann schon programmieren, dass er genau zu dem Tisch hinfährt, aber es wird man nicht so gewonnen

[00:04:19] **YGN:** und wie ist das Publikum hier? Also ich habe heute zum Beispiel gesehen, mehr ältere Generationen zum Essen da sind. Ist das jeden Tag so oder nur am Samstag?

[00:04:28] **INT 4:** Also ich muss ehrlich sagen, Am Abend sind schon viele junge, aber es gleicht sich aus, also es gleicht sich wirklich aus. Ich sage jetzt einmal, ich habe viele 20, 25-jährige, ich habe aber auch so viele ältere. Also es kommt immer darauf an und es kommt auch beim Lutz darauf an, auf die Werbung, welche Werbungen sind draußen, auf das Essen. Der Lutz ist ja nicht wirklich ein Restaurant, wo er sein Geld machen will. Der Lutz ist ja mehr für die Werbemarketing vom Möbelhaus, das heißt, wir repräsentieren das Möbelhaus.

[00:05:03] **YGN:** Gibt es einen Unterschied der Reaktionen von den Älteren und den Jüngeren oder ist das tatsächlich egal?

[00:05:09] **INT 4:** Für mich ist es keiner. Ob es einen Unterschied macht, ob jetzt mit Ihnen rede oder mit Älteren?

[00:05:13] **YGN:** Nein, nein, nein nicht von Ihnen, sondern die Reaktion auf den Lutzi, das heißt...

[00:05:17] **INT 4:** Das ist wurscht. Das ist wurscht. Also mir war es selbst nicht persönlich, ich meine, es gibt schon Ältere.

[00:05:25] **YGN:** Also die Ablehnung oder Zusage ist über generationsübergreifend.

[00:05:30] **INT 4:** Beiderseits. Es gibt zum Beispiel ältere Leute, die sagen, bitte, bitte, bitte, Lutzi komm, bitte, Lutzi komm. Und dann gibt es halt jüngere, die sagen, naja, und voll cool und bla bla bla. Aber ich sage es Ihnen zu 99,9 Prozent sind es unsere Kinder. Unsere Kinder erhalten den Nutzen.

[00:05:45] **YGN:** Die faszinieren sich!

[00:05:46] **INT 4:** Ja!

(Ein Gast kommt zur Kellnerin)

[00:05:47] **Gast**: Sind Sie sicher, dass das geklappt hat mit der Bestellung?

[00:05:51] **INT 4:** Ja Ja, heute sind wir ein bisschen voll.

[00:05:57] **YGN:** Wie hat Lutzi Dynamik ihres täglichen Arbeitslaufs verändert?

[00:06:03] **INT 4:** Hat er einiges... um einiges. Zum Beispiel jetzt, gerade in diesem Restaurant, kann ich sagen, ich habe mit der Hüfte Probleme. Ich stelle ihm das schwere Zeug einfach rauf, dann geht man direkt zu der Küche und ich räume es nur noch runter. Das heißt, ich kann ihm 40 Teller rauf tun, wie zum Beispiel morgen beim Brunch. Wir haben wirklich viele Teller und da stehen meistens 15 Teller auf einem Tisch, die habe ich ihm aufgeladen zum nächsten Tisch und wir sind dann immer aufgeräumt. Das ist schon Arbeitserleichterung ist tatsächlich schon.

[00:06:32] **YGN:** Sehr gut! Welche Aspekte von Lutzis Design lassen ihn für Sie sozial oder unsozial erscheinen.

[00:06:41] **INT 4:** Puh.

[00:06:49] **YGN:** Kann es auch sein, wie Lutzi ausschaut...

[00:06:51] **INT 4:** Wie ein normaler Roboter hätte ich gesagt Nein weißt du.... Nein, viele sagen zum Beispiel, dass sie es halt nicht mögen, wie er ausschaut wie es sich gibt. Kann ich auch sprechen. Wenn er zum Beispiel eine Minute da ist, bleibt er bei der Küche stehen und sagt, bitte räumen Sie mich ab. Da ist es halt wieder.

[00:07:19] **YGN:** Weil es voll ist?

[00:07:20] **INT 4:** Ja, oder zum Beispiel in Wels da war ich immer diejenige... Das war voll lustig weil ich nichts zu tun gehabt hab: Wenn man bei den Ohren so lang streichelt,

dann wird er voll narrisch, dann wird er voll böse. Dann sagt er immer, ja, hör auf damit, und da wird er voll lästig, da wird er wirklich voll lästig... das ist voll geil. Da bin ich einfach immer hinten nachschauen gegangen und habe ihn immer gestreichelt.

(YGN and INT 4 beide lachten)

[00:07:44] **YGN:** Können Sie spezifische Merkmale von Lutzi beschreiben, die ihm helfen, menschlicher zu werden? [00:07:54] **INT 4:** Menschlicher, glaube ich nein. Da glaube ich muss...ich leider.

[00:08:00] **YGN:** Und wie wichtig,.... ich glaube, wir haben ja darüber gesprochen, aber ich frage nochmal, wie wichtig ist Ihrer Meinung nach das Sozialverhalten eines Roboters für seine Akzeptanz durch Menschen?

[00:08:15] **INT 4:** Ob er akzeptiert wird, oder wie?

[00:08:16] **YGN:** Ja.

[00:08:16] **INT 4:** Ja, wird schon akzeptiert. Aber wie gesagt, das haben wir eh schon. 50 Prozent sagt er es, 50 Prozent das. Zu 99,9 Prozent sind es wirklich die Kinder, die das Ding am Leben erhalten Aber ja, von der Arbeit her zählt das ja aus, aber akzeptiert wird er fast nicht so für jeden, weil es eigentlich trotzdem ein Highlight ist. Nah?!Wo siehst du das denn eigentlich?!

[00:08:37] **YGN:** Also interessant wäre der Grund, wenn sie den Kontakt mit dem Kunden haben, warum er den ablehnt. Also wenn er ihn nicht mag, warum er den nicht mag.

[00:08:46] **INT 4:** Das habe ich zum Beispiel, ehrlich gesagt, nie wirklich erlebt.

[00:08:49] **YGN:** Ist es einfach, weil die menschliche Komponente fehlt, oder ist es...

[00:08:54] **INT 4:** Sicher, zum Beispiel, wenn wir trotzdem als Mensch ansprechen, da wehe ich nicht mehr die Zeit und quatsche mit meinen Leuten. Ob es jetzt 15 oder 20 Minuten sind, ob es jetzt 15 oder 20 Minuten sind, ich nehme mir trotzdem die Zeit. Der Robert, der fährt einfach vorbei, sagt, ja, da hast du Essen, und tschüss Baba. Also unter dem Strich, ne? Okay Also ja, es ist schon cool. Ich muss ihn in mein eigenes Restaurant nicht haben.

[00:09:17] **YGN:** Mhm, okay. Und können Sie eine Situation beschreiben, in der Lutzi Rolle ihre Interaktion mit anderen Personen im Restaurant beeinflusst hat?

[00:09:28] **INT 4:** Ob er Einfluss hat auf andere Leute?

[00:09:32] **YGN:** Nein .Sie haben gesagt, es hilft beim Brunch oder was auch immer, wo die Interaktion mit den Leuten zum Beispiel über den Roboter.

(derselbe Gast kommt wieder zur Kellnerin)

[00:09:50] **Gast:** Entschuldigung, Sie stehen jetzt eine Viertelstunde da. Jetzt ist meine Bestellung falsch gekommen. Einpackt Schnitzel einpackt die Pommes, jetzt gibt's mir aufs Teller alles in Lächert und Sie stehen so lange da. Warum?

[00:10:04] **YGN:** Sorry. Wir halten Sie gar nicht länger.

[00:10:07] **INT 4:** Ich komm später noch.

[00:10:08] **YGN:** Dankeschön, Dankeschön.

### 6.2.6 Interview 5, customer, male, 45 years old, software engineer

[00:00:00] **YGN:** Okay. So, können Sie Ihren ersten Eindruck von Lutzi beschreiben, als Sie ihm im Restaurant begegneten?

[00:00:11] **INT 5:** Ich war ein wenig überrascht, dass in einem Restaurant ein Roboter fährt. Das hat mich aber nicht sonderlich gestört. Es hat mich überrascht, dass ich den gesehen habe, aber es hat mich jetzt nicht besonders aufgeregt oder besonders gestört oder beeindruckt.

[00:00:31] **YGN:** Wie fühlen Sie sich im Vergleich zur Interaktion mit menschlichem Personal, wenn Sie mit Lutzi interagieren?

[00:00:40] **INT 5:** Lutzi hat für mich keine Persönlichkeit, das ist einfach ein Gerät, das fährt und das einen Nutzen hat, also da ist schon ein Unterschied, wenn ich mit jemandem spreche der ein Mensch ist oder der Gedanken und Gefühle hat, als eine Maschine, die ich. . . ..einfach nur bediene oder mich bediene auf jeden Fall.

[00:01:06] **YGN:** Auf welche Weise lässt Lutzis Verhalten ihn für Sie sozial oder weniger sozial erscheinen?

[00:01:15] **INT 5:** Für mich ist es kein soziales Wesen, also insofern ist die Frage ein bisschen eigenartig, weil der Roboter hat nichts menschliches.

[00:01:30] **YGN:** Was waren Ihre ersten Gedanken, als Sie Lutzi im Restaurant sahen?

[00:01:37] **INT 5:** Meine ersten Gedanken waren, ich bin mir jetzt nicht sicher, ob das Ding von Nutzen ist oder nicht..... nach Beobachtung, nach dem Sehen denke ich schon, dass es einen Nutzen hat. Ob ich das jetzt mag oder nicht, weiß ich nicht.

[00:01:58] **YGN:** Wie hat Lutzis Anwesenheit ihr Erlebnis, ihr Esserlebnis beeinflusst?

[00:02:07] **INT 5:** Mein Esserlebnis gar nicht, weil mit der Küche hat, Lutzi ja nichts zu tun. Aber.... ich denke mir, möchte das eigentlich nicht unbedingt haben, dass nur ein Roboter da ist. Ja, ich habe kein Problem damit, meinen Teller draufzustellen und ich habe vielleicht auch kein Problem damit, meinen Teller zu bekommen, doch da schon wieder eher, weil ich immer denke, was passiert auf dem Weg? Schmeißt irgendjemand etwas drauf auf mein Gericht, wenn der Roboter serviert? Oder nimmt jemand anderen meinen Teller vorher runter aus Versehen und gibt ihn wieder drauf? Das ist mir wesentlich lieber, wenn ein Mensch macht das weiter. Dann weiß ich, dass die Fehlerquelle geringer ist.

[00:02:58] **YGN:** Wie wurden Sie, Lutzi im Vergleich zu anderen Robotern? Haben Sie überhaupt andere Roboter gesehen?

[00:03:04] **INT 5:** Ich besitze einen Staubsaugerroboter und den habe ich sehr liebgewonnen. Aber weniger als soziales Wesen, sondern als Arbeiter, der mir die Arbeit abnimmt.

[00:03:13] **YGN:** Aber Interaktion zwischen, also im Vergleich.....?

[00:03:16] **INT 5:** Also ich rede nicht mit dem Roboter, nein. Also ich interagiere auch nicht. Die Interaktion liegt darin, dass ich den Staubbehälter ausleere und ich dann die Antwort erhalte danke für Staubsaugerbeutel entfernen oder der Staubsaugerbeutel ist entfernt. Das ist die Interaktion zwischen mir und meinem Roboter.

[00:03:41] **YGN:** Welche Aspekte von Lutzis Design lassen ihn für Sie sozial oder unsozial erscheinen?

[00:03:47] **INT 5:** Naja, man hat versucht hier ein Tier nachzubauen, offensichtlich eine Katze. Ändert jetzt aber nichts daran, dass das Ding ein Roboter ist. Und vielleicht ist das interessant für Kinder, die dieses Gerät nicht greifen können und für die das halt eher was Neues ist und vielleicht lustig ist, dass es hin und her fährt und dann Töne von sich gibt. Aber ich glaube nicht, dass ein Erwachsener großartig mit dem Ding interagieren möchte oder will. Und wenn, wahrscheinlich nur einmal zum Ausprobieren und zu sagen, puh wie toll.

[00:04:28] **YGN:** Können Sie spezifische Merkmale von Lutzi beschreiben, die Ihnen helfen, menschlicher zu werden?

[00:04:37] **INT 5:** Ja, noch einmal, ich sehe das Ding nicht in irgendeiner Form als Lebewesen, sondern das ist ein Gerät. Aber ja, der Designer hat offensichtlich versucht, mit Katzenohren und mit Display einer Katze das Ding menschlicher oder. . . oder Lebewesen artiger zu machen, aber mich beeindruckt das jetzt eher weniger.

[00:05:05] **YGN:** Mhm. Aber Wenn Sie aber beispielsweise die Möglichkeit haben, mit dem Roboter zu sprechen, denken Sie, dass da eher ein menschlicher Faktor im Spiel ist?

[00:05:21] **INT 5:** Nein, weil das Problem ist, das, was da rauskommt ist eine computergenerierte Antwort, wie auch immer, ob jetzt gut oder schlecht, intelligent oder nicht intelligent, aber das hat nichts vom menschlichen Geist, sondern das ist einfach eine Antwort, die generiert wird, in irgendeiner Form.

[00:05:42] **YGN:** Und wie wichtig ist Ihrer Meinung nach das soziale Verhalten eines Roboters für seine Akzeptanz durch Menschen?

[00:05:51] **INT 5:** Vollkommen uninteressant. Vollkommen unwichtig. Also in meiner Meinung nach muss der Roboter eine Funktion erfüllen und dafür sind die wahrscheinlich auch sehr gut und sehr geeignet. Aber ich glaube nicht, dass da irgendeine Möglichkeit besteht, einen Menschen durch einen Roboter zu ersetzen. Einfach durch die Empathie, die der Mensch ausstrahlt und die der Roboter niemals ausstrahlen wird können und ich möchte mir gar nicht vorstellen, dass es einen Roboter gibt, der wie ein Mensch agiert.

[00:06:27] **YGN:** Warum wollen Sie nicht vorstellen, wenn wir in einigen Jahren wenig Personal haben?

[00:06:34] **INT 5:** Es geht nicht ums Personal, es geht nicht um die Arbeit, aber weil im Ganzen eine Maschine keinen Menschen ersetzen soll. Das ist nicht das, wo ich glaube, wo es hinführen sollte. Die Maschine soll die Arbeit des Menschen verrichten, aber die Maschine soll nicht einen Menschen ersetzen.

[00:06:57] **YGN:** Gut, ein paar Fragen hätte ich noch . .. Wie glauben Sie, können Roboter wie Lutzi besser in alltägliche Soziale Umgebungen integriert werden?

[00:07:21] **INT 5:** Mhm... Indem die Funktionalität einfach so gut wird, dass das jeder haben möchte. Aber ich glaube nicht, dass man das Gerät selber für... für Gespräche oder für tiefgreifende Gespräche verwenden kann, können, soll. Also wie gesagt, ich glaube einfach, dass es wichtig ist, dass die Geräte ihre Funktion so gut erfüllen und sich vielleicht so in einen Tagesablauf eines Menschen einfügen können, dass er einfach eine Hilfe ist, aber nicht mehr und auch nicht weniger.

[00:07:59] **YGN:** Mhm, Welche gesellschaftlichen Faktoren beeinflussen Ihrer Meinung nach, wie Roboter als Sozialwesen wahrgenommen werden?

[00:08:17] **INT 5:** Das hängt ganz vom Umfeld des Menschen ab. Wenn jemand wahrscheinlich... Wenig Sozialkontakte hat, dann wird der Roboter genauso interessant sein wie eine Katze oder genauso interessant sein wie ein Hund als Lebensgefährte oder als Beisitzer. Aber für sozial integrierte Menschen, die unter Menschen sind, kann ein Roboter und wird ein Roboter wahrscheinlich auch niemals eine Option sein, den als soziales Wesen wahrzunehmen Also ich glaube eher, das ist ein Phänomen, wenn jemand diesen Roboter als soziales Wesen wahrnimmt von Vereinsamung.

[00:09:13] **YGN:** Mhm, Können Sie Beispiele nennen, wie Lutzi soziale Interaktionen ihre Wahrnehmung von Robotern im Allgemeinen beeinflusst haben?

[00:09:24] **INT 5:** Nochmal, wie?

[00:09:26] **YGN:** Können Sie Beispiele nennen, wie Lutzis soziale Interaktionen ihre Wahrnehmung von Robotern im Allgemeinen beeinflusst haben?

[00:09:39] **INT 5:** Dadurch, dass ich den Roboter nicht als soziales Wesen sehe, ist die Frage schwierig zu beantworten. Mit Miau und mit Danke fürs Aufladen und für, ich weiß nicht, was er noch alles sagt. Begeistert mich jetzt eher weniger in dem Zusammenhang.

[00:10:00] **YGN:** Mhm

[00:10:00] **INT 5:** Aber nochmal, das ist für mich kein soziales Wesen.

[00:10:07] **YGN:** Auf welche Weise glauben Sie, dass Lutzi besser in das Restaurantfeld integriert werden konnte?

[00:10:14] **INT 5:** Ich glaube, dass man den Roboter Wahrscheinlich mit einer Art Ruffunktion ausstatten könnte. Wenn ich sage, ich möchte jetzt meinen Teller abserviert haben oder ich möchte jetzt keine Ahnung, Bestellung aufgeben, die ich vielleicht über das Gerät machen könnte, wäre das interessant. Vielleicht auch Themen wie, ich möchte meine Rechnung bezahlen. Das ist sicher eine Option, aber nochmal, wenn ich das Ganze jetzt Betrachte im Kontext, wenn ich gehe in ein Restaurant und möchte ein Erlebnis dort haben, dann ist es für mich eher uninteressant. Wenn ich aber jetzt in eine Kantine gehe oder in eine Fast-Food-Kette, dann könnte ich mir das gut vorstellen, dass das funktioniert.

[00:11:08] **INT 5:** Also, dass das Sinn macht. Man sieht ja auch jetzt als Beispiel McDonald's, das Bestellwesen ja eigentlich komplett elektronisch abwickeln und da hat man am Anfang auch geglaubt, das wird niemals funktionieren. Mittlerweile gibt es, glaube ich, nur noch eine Handvoll Leute, die dort reingehen und bestellen und das über den Menschen oder über den Kassier machen, weil es einfach einfacher ist, das über die Maschine zu machen. Und man sich nicht anstellen muss und in dem Fall glaube ich schon, dass die Roboter, Maschinen oder elektronisch gestützten Services einen Vorteil und eine Akzeptanz erhalten, aber sicher nicht in einem Zusammenhang, wo ich sage, ich gehe jetzt zu dem Roboter und möchte mit ihm Gespräche führen oder möchte mit ihm interagieren in irgendeiner Form, weil ich das als soziales Wesen empfinde das, glaube ich, wird nicht passieren.

[00:12:19] **YGN:** Zu guter Letzt dürfte ich wissen, wie alt sind Sie und was machen Sie als Beruf?

[00:12:25] **INT 5:** Ich bin Software-Ingenieur und bin 45 Jahre alt.

[00:12:30] **YGN:** Perfekt danke schön. Herzlichen Dank für Ihre Teilnahme und ich hoffe, dass Sie Ihr Essen genießen können.

[00:12:40] **INT 5:** Danke. Wiederschauen.

[00:12:42] **YGN:** Wiedersehen

### 6.2.7 Interview 6, staff manager, male

***unstructured Interview***

We introduced ourselves and explained that we were observing and interviewing people about how they interact with social robots like Lutzi. We asked if it would be possible to speak with him for a few minutes. He agreed and shared that the reaction from all the guests has been overwhelmingly positive. Children, in particular, love playing with Lutzi, often staying in its path just to see how it will react. The waitstaff also appreciate the robot, as it provides significant assistance in their daily tasks.

He mentioned that people often engage with the robot in playful ways, such as placing items on it themselves or testing how it navigates around obstacles. The robot has become very helpful in the restaurant, contributing to both the guest experience and the efficiency of the service.

However, he explained that due to building restrictions and the presence of stairs near to the kitchen, they can not utilize all of Lutzi's functionalities at this location on Mariahilferstrasse. In contrast, at their branches in Linz and Wels, where the restaurants are huge, they might even need two robots with more functionalities.

He expressed how pleased he is with Lutzi, noting that they've had the robot for almost two years. During busy periods and rush hours, Lutzi is a tremendous help, reducing stress by handling tasks like collecting dirty plates. The robot allows the staff to focus on other responsibilities, as Lutzi transports dirty dishes to a spot near the kitchen. Many guests even take it upon themselves to place their plates on Lutzi's tray, while the waitstaff also find it convenient to offload dishes onto the robot during their rounds.

He explained that at the end of the day, Lutzi is plugged into its station in a corner near the kitchen, where it recharges overnight. The next day, it's ready to use for whole day.

When I asked about all of Lutzi's functionalities, such as singing, lighting up, bringing birthday cakes to tables, or interacting with guests, he was well aware of them. However, he noted that in this particular branch, Lutzi does not serve food, so many of those features are useless.

He did express a desire for an additional Lutzi robot in the restaurant but acknowledged that the cost is a significant barrier, as each unit costs around 16,000 euros. Despite this, he remains very satisfied with the impact Lutzi has had on both the staff and the guests, making it a valuable asset to the restaurant.

### 6.2.8 Consent Form

# Consent Form

***Research Area:*** TU Wien: Human-Computer Interaction (E193/5)
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+43 (01) 58801-18703
Argentinierstraße 8
AT-1040 Vienna

***Interviewer:*** Farzaneh Yegan, BSc
(e1349214@student.tuwien.ac.at)

***Supervisor:*** Dr. Astrid Weiss
(astrid.weiss@tuwien.ac.at)

The following consent form is for an interview conducted as part of the master's thesis on "Development of Social Robots for Public Spaces: Lessons Learned from a Case Study with the Lutzi (XXXLutz) Robot."

For the master's thesis, we aim to conduct interviews to gain insights into the topic " How is sociality enacted with robots, particularly in the context of service robots?" I observed that you interacted with the robot and would therefore like to ask you about this experience.

Procedure

The interview will last approximately 15 to 20 minutes and will be audio and video recorded for later transcription and analysis. These recordings will be stored locally and not published.

Data Usage

The results will be anonymized for the master's thesis evaluation and usage. Your name will not be mentioned. The master's thesis is a public publication; you may contact the researchers for prior review and necessary corrections.

Data Privacy

The recorded interview and transcription will be archived and stored locally by the interviewer and will not be published. Only non-identifiable information may be shared with other researchers for secondary use (i.e., for research and teaching purposes). You can request the deletion of your data at any time without providing reasons, or you can discontinue or end the interview. Even after or during the interview, you can object to the use of the information, and all recordings will be immediately deleted. This consent form can also be revoked at any time before the master's thesis submission. The recordings will be deleted after the completion of the master's thesis unless you request a copy beforehand.

We would like to emphasize that contact regarding the interview is always possible and welcome using the provided contact details.

Thank you for your support and trust.

**Consent form:**

By signing below, I, _____ (full name), agree to participate in the interview under the conditions described above and consent to the use of my data for analysis purposes as explained.

Location, Date: Signature:

_____ _____

# Einverständniserklärung

***Forschungsbereich:*** TU Wien: Human-Computer Interaction (E193/5)
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***Interviewer:*** Farzaneh Yegan, BSc
(e1349214@student.tuwien.ac.at)

***Betreuerin:*** Dr. Astrid Weiss
(astrid.weiss@tuwien.ac.at)

Die folgende Einverständniserklärung gilt für das Interview im Rahmen der Masterarbeit zum Thema „Entwicklung sozialer Roboter für den öffentlichen Raum: Erkenntnisse aus einer Fallstudie mit dem Lutzi (XXXLutz)-Roboter“.

Für die Masterarbeit möchten wir Interviews durchführen, um Erkenntnisse zum Thema „Wie wird Sozialität mit Robotern wahrgenommen?“ zu gewinnen. Ich habe beobachtet, dass Sie mit dem Roboter in Kontakt waren und möchte Sie daher über diese Erfahrung befragen.

Durchführung
Das Interview wird etwa 15 bis 20 Minuten dauern, und wird in Ton und Video aufegzeichnet, um die Interviews später zu transkribieren und analysieren. Diese Aufzeichnungen werden nur lokal gespeichert und nicht veröffentlicht.

Datennutzung
Die Ergebnisse werden anonymisiert für die Masterarbeit ausgewertet und verwendet. Sie werden nicht namentlich genannt. Die Masterarbeit stellt eine öffentliche Publikation dar; Sie können vorab zu Einsicht und für notwendige Korrekturen den Forschenden kontaktieren.

Datenschutz
Das aufgezeichnete Interview und die Transkription werden nur lokal von der Interviewerin archiviert, gespeichert und nicht veröffentlicht werden. Nur nicht-identifizierbare Informationen für die sekundäre Nutzung (d.h. für Forschungs- und Lehrzwecke) werden gegebenenfalls an andere Forschende weitergegeben.

Selbstverständlich können Sie jederzeit ohne Angabe von Gründen eine Löschung der Daten verlangen oder das Interview abbrechen bzw. beenden. Auch im Nachhinein oder während des Interviews können Sie der Verwendung der Informationen widersprechen. In diesem Fall werden wir alle bis dahin gemachten Aufzeichnungen umgehend löschen. Auch diese Einverständniserklärung kann jederzeit, selbstverständlich vor Einreichung der Masterarbeit, widerrufen werden. Die Aufzeichnungen werden in jedem Fall nach Abschluss der Masterarbeit gelöscht, es sei denn, Sie fordern vorher eine Kopie an.

Abschließend weisen wir darauf hin, dass eine Kontaktaufnahme bezüglich des Interviews unter den angegebenen Kontaktdaten jederzeit möglich und erwünscht ist.

Vielen Dank für Ihre Unterstützung und Ihr Vertrauen.

---

**Einverständniserklärung:**

Mit der folgenden Unterschrift erkläre ich,_____ (vollständiger Name), mich einverstanden, an dem Interview unter den obig beschriebenen Bedingungen teilzunehmen und, dass, entsprechend der damit verbundenen Erläuterungen, meine Daten im Rahmen der Auswertung verwendet werden.

Ort, Datum: Unterschrift:

_____ _____

## 6.3 Survey

### 6.3.1 Online Survey

# Questionnaire

## 1 Welcome

How old are you?

What is your gender?

- [ ] woman
- [ ] man
- [ ] non-binary
- [ ] prefer not to disclose
- [ ] prefer to self-describe

## 2 Random Videos

Please watch the video attentively and respond to the following questions.

Please watch the video attentively and respond to the following questions.

Please watch the video attentively and respond to the following questions.

Please describe what you saw in the video at least in one/two sentences:

# 3 Fragen

Please rate whether you agree with the following questions on a scale 1 (not at all) to 4 (to a high degree) or "not applicable"

Do you believe the robot can feel pain?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ not applicable

Do you think you will trust the information that the robot gives you?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ not applicable

Do you believe the robot can feel sad?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ not applicable

Do you think the robot always gives correct information?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ not applicable

Would you feel you have company if the robot was with you in the same room?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ not applicable

Do you believe the robot can be happy?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ not applicable

If you owned this robot, do you think you would evolve an emotional connection to it?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ not applicable

Do you think the robot can feel hopeful?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ not applicable

Do you think that the robot can have hobbies?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ not applicable

Do you think you trust the robot to perform its task well?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ not applicable

If you owned this robot, do you think it would be a source of joy to you?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ not applicable

People have wishes. For example, they can wish for a better future. Do you think the robot can have a wish?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ not applicable

If you owned this robot, would you give it a human name?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ not applicable

If you owned this robot, would you think about it when you are away e.g., on holidays?

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ not applicable

Do you think the robot can feel lonely?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ not applicable

Would you feel compassionate towards the robot if you saw people kicking it or treating it badly?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ not applicable

Do you think the robot can feel angry?

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ not applicable

## 4 Fragen 2

Please rate whether you agree with the following questions on a scale from 1 (strongly disagree) to 7 (strongly agree) or “not applicable”

This robot has a sense for what is right and wrong.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot can think through whether an action is moral.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot can only do what humans tell it to do.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot might feel obligated to behave in a moral way.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot can only behave how it is programmed to behave.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot is capable of being rational about good and evil.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot behaves according to moral rules.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot's actions are the result of its programming.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot would refrain from doing this that have painful repercussions.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot would never do anything it was not programmed to do.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot should be helped to achieve its goals.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot should be treated as humans are treated.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot should be admired for its skills.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot should have someone who always has their back.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot should be protected from harsh realities of humanity.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

This robot should be freed from control by others.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ 6
- ○ 7
- ○ not applicable

## 5 Fragen 3

Please rate whether you agree with the following questions on a scale from 1 (strongly disagree) to 5 (strongly agree) or “not applicable”

I think the design of the robot is cute.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ not applicable

I think the design of the robot is cool.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ not applicable

I think the design of the robot is beautiful.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ not applicable

I think the design of the robot is approachable.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ not applicable

I think the design of the robot is scary.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ not applicable

I think the design of the robot is comfortable.

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ not applicable



# 6 Final page

Thank You for Your Participation!

We appreciate your time and insights. Your feedback is valuable to us.
If you have any additional comments or questions, please feel free to contact me at e1349214@student.tuwien.ac.at

Best regards,

Farzaneh Yegan BSc.

### 6.3.2 Results

```
 * Custom Tables.
CTABLES
  /VLABELS VARIABLES=SPR IPR PMR MA MP CUTE robot
    DISPLAY=LABEL
  /TABLE SPR [COUNT F40.0, MEAN, STDDEV] + IPR [COUNT F40.0, MEAN, STDDEV]
+ PMR [COUNT F40.0,
    MEAN, STDDEV] + MA [COUNT F40.0, MEAN, STDDEV] + MP [COUNT F40.0, MEAN,
 STDDEV] + CUTE [COUNT
    F40.0, MEAN, STDDEV] BY robot
  /CATEGORIES VARIABLES=robot ORDER=A KEY=VALUE EMPTY=INCLUDE
  /CRITERIA CILEVEL=95.
```

# Custom Tables

## Notes

| | | |
|---|---|---|
| Output Created | | 13-SEP-2024 13:46:04 |
| Comments | | |
| Input | Data | /Users/astridweiss/Downloads/data_project_1036132_2024_09_11 (1).sav |
| | Active Dataset | DataSet0 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Syntax | | CTABLES<br>/VLABELS VARIABLES=SPR IPR PMR MA MP CUTE robot<br>DISPLAY=LABEL<br>/TABLE SPR [COUNT F40.0, MEAN, STDDEV] + IPR [COUNT F40.0, MEAN, STDDEV] + PMR [COUNT F40.0,<br>MEAN, STDDEV] + MA [COUNT F40.0, MEAN, STDDEV] + MP [COUNT F40.0, MEAN, STDDEV] + CUTE [COUNT<br>F40.0, MEAN, STDDEV] BY robot<br>/CATEGORIES VARIABLES=robot ORDER=A KEY=VALUE EMPTY=INCLUDE<br>/CRITERIA CILEVEL=95. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.00 |

| | Type of robot | | | | | |
|---|---|---|---|---|---|---|
| | Lutzi | | | Starship | | |
| | Count | Mean | Standard Deviation | Count | Mean | Standard Deviation |
| SPR scale | 30 | 2.76 | .69 | 32 | 2.66 | .63 |
| IPR scale | 30 | 2.25 | .69 | 32 | 2.38 | .80 |
| PMR scale | 30 | 1.55 | .65 | 32 | 1.51 | .52 |
| Moral Agency | 30 | 3.70 | .85 | 32 | 3.87 | .98 |
| Moral Patiency | 30 | 2.96 | 1.55 | 32 | 3.08 | 1.27 |
| Cuteness | 30 | 3.49 | .80 | 32 | 3.24 | .79 |

| | Type of robot | | |
|---|---|---|---|
| | Vector | | |
| | Count | Mean | Standard Deviation |
| SPR scale | 34 | 2.74 | .45 |
| IPR scale | 34 | 2.37 | .68 |
| PMR scale | 34 | 1.58 | .65 |
| Moral Agency | 34 | 3.82 | .82 |
| Moral Patiency | 34 | 2.84 | 1.55 |
| Cuteness | 34 | 3.66 | .91 |

```
ONEWAY SPR IPR PMR MA MP CUTE BY robot
  /MISSING ANALYSIS
  /CRITERIA=CILEVEL(0.95).
```

## Oneway

# Notes

| | | |
|---|---|---|
| Output Created | | 13-SEP-2024 13:46:49 |
| Comments | | |
| Input | Data | /Users/astridweiss/Downloads/data_project_1036132_2024_09_11 (1).sav |
| | Active Dataset | DataSet0 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on cases with no missing data for any variable in the analysis. |
| Syntax | | ONEWAY SPR IPR PMR MA MP CUTE BY robot /MISSING ANALYSIS /CRITERIA=CILEVEL (0.95). |
| Resources | Processor Time | 00:00:00.01 |
| | Elapsed Time | 00:00:00.00 |

## ANOVA

| | | Sum of Squares | df | Mean Square | F |
|---|---|---|---|---|---|
| SPR scale | Between Groups | .174 | 2 | .087 | .247 |
| | Within Groups | 32.710 | 93 | .352 | |
| | Total | 32.884 | 95 | | |
| IPR scale | Between Groups | .335 | 2 | .168 | .322 |
| | Within Groups | 48.397 | 93 | .520 | |
| | Total | 48.732 | 95 | | |
| PMR scale | Between Groups | .084 | 2 | .042 | .113 |
| | Within Groups | 34.609 | 93 | .372 | |
| | Total | 34.693 | 95 | | |
| Moral Agency | Between Groups | .476 | 2 | .238 | .306 |
| | Within Groups | 72.432 | 93 | .779 | |
| | Total | 72.909 | 95 | | |
| Moral Patiency | Between Groups | .949 | 2 | .474 | .222 |
| | Within Groups | 198.573 | 93 | 2.135 | |
| | Total | 199.522 | 95 | | |
| Cuteness | Between Groups | 2.950 | 2 | 1.475 | 2.090 |
| | Within Groups | 65.640 | 93 | .706 | |
| | Total | 68.590 | 95 | | |

## ANOVA

| | | Sig. |
|---|---|---|
| SPR scale | Between Groups | .782 |
| | Within Groups | |
| | Total | |
| IPR scale | Between Groups | .726 |
| | Within Groups | |
| | Total | |
| PMR scale | Between Groups | .894 |
| | Within Groups | |
| | Total | |
| Moral Agency | Between Groups | .737 |
| | Within Groups | |
| | Total | |
| Moral Patiency | Between Groups | .801 |
| | Within Groups | |
| | Total | |
| Cuteness | Between Groups | .129 |
| | Within Groups | |
| | Total | |

```
 USE ALL.
COMPUTE filter_$=(robot = 1).
VARIABLE LABELS filter_$ 'robot = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
DESCRIPTIVES VARIABLES=v_152_PMR v_153_SPR v_154_PMR v_155_SPR v_156_IPR v_
157_PMR v_158_IPR
    v_159_PMR v_160_PMR v_161_SPR v_162_IPR v_163_PMR v_164_PMR v_165_IPR v
_166_PMR v_167_IPR v_168_PMR
    v_129_MA v_130_MA v_131_MA v_132_MA v_133_MA v_134_MA v_135_MA v_136_MA
 v_137_MA v_138_MA v_139_MP
    v_140_MP v_141_MP v_142_MP v_143_MP v_144_MP v_145_C v_146_C v_147_C v_
148_C v_149_C v_151_C
  /STATISTICS=MEAN STDDEV MIN MAX.
```

# Descriptives LUTZI

## Notes

| | | |
|---|---|---|
| Output Created | | 13-SEP-2024 13:49:13 |
| Comments | | |
| Input | Data | /Users/astridweiss/Downloads/data_project_10 36132_2024_09_11 (1).sav |
| | Active Dataset | DataSet0 |
| | Filter | robot = 1 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 30 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | All non-missing data are used. |

## Notes

| | | |
|---|---|---|
| Syntax | | DESCRIPTIVES VARIABLES=v_152_PMR v_153_SPR v_154_PMR v_155_SPR v_156_IPR v_157_PMR v_158_IPR v_159_PMR v_160_PMR v_161_SPR v_162_IPR v_163_PMR v_164_PMR v_165_IPR v_166_PMR v_167_IPR v_168_PMR v_129_MA v_130_MA v_131_MA v_132_MA v_133_MA v_134_MA v_135_MA v_136_MA v_137_MA v_138_MA v_139_MP v_140_MP v_141_MP v_142_MP v_143_MP v_144_MP v_145_C v_146_C v_147_C v_148_C v_149_C v_151_C /STATISTICS=MEAN STDDEV MIN MAX. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.00 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| PR_310/PR_D03 [SQD0310]. Do you believe the R can feel pain? | 25 | 1 | 4 | 1.24 | .663 |
| SPR_54/SPR_D05 [SQ0054]. Do you think you will trust the information that the R gives you? | 30 | 1 | 4 | 2.93 | .980 |
| PR_57/PR_D05 [SQD0057]. Do you believe the R can feel sad? | 26 | 1 | 4 | 1.23 | .652 |
| SPR_04/SPR_D01[SQ004] Do you think the R always gives correct information? | 29 | 1 | 3 | 2.31 | .850 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| IPR_58/ IPR_D05 [SQD0058]. Would you feel you have company if the R was with you in the same room? | 28 | 1 | 4 | 2.11 | 1.257 |
| PR_02/PR_D01[SQD002] Do you believe the R can be happy? | 27 | 1 | 4 | 1.30 | .669 |
| IPR_09/IPR_D01 [SQD009] If you owned this R, do you think you would evolve an emotional connection to it? | 28 | 1 | 4 | 1.93 | .940 |
| PR_06/PR_D01[SQD006]. Do you think the R can feel hopeful? | 26 | 1 | 3 | 1.23 | .514 |
| MR_38/MR_D03 [SQD0038]. Do you think that the R can have hobbies? | 27 | 1 | 4 | 1.37 | .792 |
| SPR_07/SPR_D01 [SQD007]. Do you think you trust the R to perform its task well? | 30 | 1 | 4 | 3.00 | .910 |
| IPR_39/IPR_D03 [SQD0039]. If you owned this R, do you think it would be a source of joy to you? | 28 | 1 | 4 | 2.11 | 1.227 |
| MR_08/MR_D01 [SQD008]. People have wishes. For example, they can wish for a better future. Do you think the R can have a wish? | 27 | 1 | 4 | 1.22 | .698 |
| IPR_56/IPR_D05 [SQD0056]. If you owned this R, would you give it a human name? | 30 | 1 | 4 | 2.83 | 1.117 |
| IPR_33/IPR_D03 [SQD0033] If you owned this R, would you think about it when you are away e.g., on holidays? | 28 | 1 | 4 | 1.71 | .897 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| PR_34/PR_D03[SQ0034]. Do you think the R can feel lonely? | 28 | 1 | 3 | 1.14 | .448 |
| PR_510/PR_D05 [SQD0510]. Would you feel compassionate towards the R if you saw people kicking it or treating it badly? | 28 | 1 | 4 | 2.46 | 1.036 |
| PR_D31/PR_D03 [SQD0031]. Do you think the R can feel angry? | 28 | 1 | 4 | 1.32 | .819 |
| This robot has a sense for what is right and wrong. | 29 | 1 | 7 | 2.48 | 1.939 |
| This robot can think through whether an actior is moral. | 28 | 1 | 6 | 1.96 | 1.688 |
| This robot can only do what humans tell it to do. | 29 | 2 | 7 | 6.07 | 1.412 |
| This robot might feel obligated to behave in a moral way. | 27 | 1 | 5 | 1.96 | 1.315 |
| This robot can only behave how it is programmed to behave. | 30 | 2 | 7 | 6.43 | 1.135 |
| This robot is capable of being rational about good and evil. | 28 | 1 | 7 | 2.04 | 1.774 |
| This robot behaves according to moral rules. | 29 | 1 | 7 | 2.14 | 1.642 |
| This robot's actions are the result of its programming. | 30 | 1 | 7 | 6.20 | 1.730 |
| This robot would refrain from doing this that have painful repercussions. | 25 | 1 | 5 | 1.88 | 1.269 |
| This robot would never do anything it was not programmed to do. | 30 | 1 | 7 | 5.37 | 1.991 |
| This R should be helped to achieve its goals | 26 | 1 | 7 | 4.77 | 1.925 |
| This R should be treated as humans are treated | 27 | 1 | 7 | 2.74 | 1.852 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| This R should be admired for its skills | 25 | 1 | 7 | 2.80 | 1.979 |
| This R should have someone who always has their back | 26 | 1 | 7 | 2.69 | 1.975 |
| This R should be protected from harsh realities of humanity | 25 | 1 | 7 | 2.04 | 1.947 |
| This R should be freed from control by others | 27 | 1 | 7 | 2.22 | 2.172 |
| I think the design of the R is cute | 30 | 1 | 5 | 3.60 | 1.133 |
| I think the design of the R is cool | 30 | 1 | 5 | 3.37 | 1.066 |
| I think the design of the R is beautiful | 30 | 1 | 5 | 2.77 | 1.073 |
| I think the design of the R is approachable | 30 | 1 | 5 | 3.53 | 1.306 |
| I think the design of the R is scary | 30 | 1 | 5 | 4.40 | 1.192 |
| I think the design of the R is comfortable | 29 | 1 | 5 | 3.28 | .996 |
| Valid N (listwise) | 16 | | | | |

```
 USE ALL.
COMPUTE filter_$=(robot = 2).
VARIABLE LABELS filter_$ 'robot = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
DESCRIPTIVES VARIABLES=v_152_PMR v_153_SPR v_154_PMR v_155_SPR v_156_IPR v_
157_PMR v_158_IPR
    v_159_PMR v_160_PMR v_161_SPR v_162_IPR v_163_PMR v_164_PMR v_165_IPR v
_166_PMR v_167_IPR v_168_PMR
    v_129_MA v_130_MA v_131_MA v_132_MA v_133_MA v_134_MA v_135_MA v_136_MA
 v_137_MA v_138_MA v_139_MP
    v_140_MP v_141_MP v_142_MP v_143_MP v_144_MP v_145_C v_146_C v_147_C v_
148_C v_149_C v_151_C
  /STATISTICS=MEAN STDDEV MIN MAX.
```

## Descriptives: Starship

# Notes

| | | |
|---|---|---|
| Output Created | | 13-SEP-2024 13:52:58 |
| Comments | | |
| Input | Data | /Users/astridweiss/Downloads/data_project_1036132_2024_09_11 (1).sav |
| | Active Dataset | DataSet0 |
| | Filter | robot = 2 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 32 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | All non-missing data are used. |
| Syntax | | DESCRIPTIVES VARIABLES=v_152_PMR v_153_SPR v_154_PMR v_155_SPR v_156_IPR v_157_PMR v_158_IPR v_159_PMR v_160_PMR v_161_SPR v_162_IPR v_163_PMR v_164_PMR v_165_IPR v_166_PMR v_167_IPR v_168_PMR v_129_MA v_130_MA v_131_MA v_132_MA v_133_MA v_134_MA v_135_MA v_136_MA v_137_MA v_138_MA v_139_MP v_140_MP v_141_MP v_142_MP v_143_MP v_144_MP v_145_C v_146_C v_147_C v_148_C v_149_C v_151_C /STATISTICS=MEAN STDDEV MIN MAX. |
| Resources | Processor Time | 00:00:00.01 |
| | Elapsed Time | 00:00:00.00 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| PR_310/PR_D03 [SQD0310]. Do you believe the R can feel pain? | 28 | 1 | 3 | 1.21 | .568 |
| SPR_54/SPR_D05 [SQ0054]. Do you think you will trust the information that the R gives you? | 32 | 1 | 4 | 2.75 | .803 |
| PR_57/PR_D05 [SQD0057]. Do you believe the R can feel sad? | 30 | 1 | 3 | 1.27 | .583 |
| SPR_04/SPR_D01[SQ004] Do you think the R always gives correct information? | 32 | 1 | 4 | 2.19 | .896 |
| IPR_58/ IPR_D05 [SQD0058]. Would you feel you have company if the R was with you in the same room? | 32 | 1 | 4 | 2.22 | 1.211 |
| PR_02/PR_D01[SQD002] Do you believe the R can be happy? | 29 | 1 | 3 | 1.17 | .468 |
| IPR_09/IPR_D01 [SQD009] If you owned this R, do you think you would evolve an emotional connection to it? | 32 | 1 | 4 | 2.22 | 1.157 |
| PR_06/PR_D01[SQD006]. Do you think the R can feel hopeful? | 29 | 1 | 4 | 1.28 | .649 |
| MR_38/MR_D03 [SQD0038]. Do you think that the R can have hobbies? | 29 | 1 | 4 | 1.55 | .948 |
| SPR_07/SPR_D01 [SQD007]. Do you think you trust the R to perform its task well? | 32 | 1 | 4 | 3.03 | .822 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| IPR_39/IPR_D03 [SQD0039]. If you owned this R, do you think it would be a source of joy to you? | 31 | 1 | 4 | 2.35 | .877 |
| MR_08/MR_D01 [SQD008]. People have wishes. For example, they can wish for a better future. Do you think the R can have a wish? | 29 | 1 | 4 | 1.24 | .689 |
| IPR_56/IPR_D05 [SQD0056]. If you owned this R, would you give it a human name? | 32 | 1 | 4 | 2.94 | 1.014 |
| IPR_33/IPR_D03 [SQD0033] If you owned this R, would you think about it when you are away e.g., on holidays? | 31 | 1 | 4 | 1.90 | .978 |
| PR_34/PR_D03[SQ0034]. Do you think the R can feel lonely? | 29 | 1 | 3 | 1.10 | .409 |
| PR_510/PR_D05 [SQD0510]. Would you feel compassionate towards the R if you saw people kicking it or treating it badly? | 31 | 1 | 4 | 2.71 | 1.131 |
| PR_D31/PR_D03 [SQD0031]. Do you think the R can feel angry? | 29 | 1 | 3 | 1.17 | .468 |
| This robot has a sense for what is right and wrong. | 32 | 1 | 7 | 3.25 | 1.832 |
| This robot can think through whether an actior is moral. | 32 | 1 | 7 | 2.75 | 1.918 |
| This robot can only do what humans tell it to do. | 32 | 1 | 7 | 5.34 | 1.789 |
| This robot might feel obligated to behave in a moral way. | 30 | 1 | 7 | 2.70 | 2.070 |
| This robot can only behave how it is programmed to behave. | 32 | 1 | 7 | 5.41 | 1.949 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| This robot is capable of being rational about good and evil. | 28 | 1 | 7 | 2.75 | 2.102 |
| This robot behaves according to moral rules. | 28 | 1 | 7 | 2.93 | 2.159 |
| This robot's actions are the result of its programming. | 32 | 1 | 7 | 5.81 | 1.731 |
| This robot would refrain from doing this that have painful repercussions. | 30 | 1 | 7 | 2.70 | 1.784 |
| This robot would never do anything it was not programmed to do. | 32 | 1 | 7 | 4.75 | 2.286 |
| This R should be helped to achieve its goals | 29 | 1 | 7 | 4.76 | 2.231 |
| This R should be treated as humans are treated | 31 | 1 | 7 | 2.94 | 1.896 |
| This R should be admired for its skills | 31 | 1 | 6 | 2.81 | 1.869 |
| This R should have someone who always has their back | 29 | 1 | 6 | 2.59 | 1.570 |
| This R should be protected from harsh realities of humanity | 29 | 1 | 7 | 3.10 | 2.257 |
| This R should be freed from control by others | 31 | 1 | 7 | 2.39 | 2.076 |
| I think the design of the R is cute | 31 | 1 | 5 | 2.77 | 1.283 |
| I think the design of the R is cool | 31 | 1 | 5 | 2.84 | 1.098 |
| I think the design of the R is beautiful | 31 | 1 | 5 | 2.55 | 1.261 |
| I think the design of the R is approachable | 32 | 1 | 5 | 3.41 | 1.073 |
| I think the design of the R is scary | 32 | 1 | 5 | 4.59 | .946 |
| I think the design of the R is comfortable | 31 | 1 | 5 | 3.19 | 1.108 |
| Valid N (listwise) | 19 | | | | |

```
 USE ALL.
COMPUTE filter_$=(robot = 3).
VARIABLE LABELS filter_$ 'robot = 3 (FILTER)'.
```

```
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
DESCRIPTIVES VARIABLES=v_152_PMR v_153_SPR v_154_PMR v_155_SPR v_156_IPR v_
157_PMR v_158_IPR
    v_159_PMR v_160_PMR v_161_SPR v_162_IPR v_163_PMR v_164_PMR v_165_IPR v
_166_PMR v_167_IPR v_168_PMR
    v_129_MA v_130_MA v_131_MA v_132_MA v_133_MA v_134_MA v_135_MA v_136_MA
 v_137_MA v_138_MA v_139_MP
    v_140_MP v_141_MP v_142_MP v_143_MP v_144_MP v_145_C v_146_C v_147_C v_
148_C v_149_C v_151_C
  /STATISTICS=MEAN STDDEV MIN MAX.
```

# Descriptives: Vector

## Notes

| | | |
|---|---|---|
| Output Created | | 13-SEP-2024 13:55:47 |
| Comments | | |
| Input | Data | /Users/astridweiss/Downloads/data_project_1036132_2024_09_11 (1).sav |
| | Active Dataset | DataSet0 |
| | Filter | robot = 3 (FILTER) |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 34 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | All non-missing data are used. |

## Notes

| | | |
|---|---|---|
| Syntax | | DESCRIPTIVES VARIABLES=v_152_PMR v_153_SPR v_154_PMR v_155_SPR v_156_IPR v_157_PMR v_158_IPR v_159_PMR v_160_PMR v_161_SPR v_162_IPR v_163_PMR v_164_PMR v_165_IPR v_166_PMR v_167_IPR v_168_PMR v_129_MA v_130_MA v_131_MA v_132_MA v_133_MA v_134_MA v_135_MA v_136_MA v_137_MA v_138_MA v_139_MP v_140_MP v_141_MP v_142_MP v_143_MP v_144_MP v_145_C v_146_C v_147_C v_148_C v_149_C v_151_C /STATISTICS=MEAN STDDEV MIN MAX. |
| Resources | Processor Time | 00:00:00.01 |
| | Elapsed Time | 00:00:01.00 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| PR_310/PR_D03 [SQD0310]. Do you believe the R can feel pain? | 33 | 1 | 3 | 1.21 | .545 |
| SPR_54/SPR_D05 [SQ0054]. Do you think you will trust the information that the R gives you? | 33 | 1 | 4 | 2.94 | .609 |
| PR_57/PR_D05 [SQD0057]. Do you believe the R can feel sad? | 34 | 1 | 4 | 1.35 | .774 |
| SPR_04/SPR_D01[SQ004] Do you think the R always gives correct information? | 34 | 1 | 4 | 2.50 | .749 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| IPR_58/ IPR_D05 [SQD0058]. Would you feel you have company if the R was with you in the same room? | 34 | 1 | 4 | 2.18 | .936 |
| PR_02/PR_D01[SQD002] Do you believe the R can be happy? | 34 | 1 | 4 | 1.50 | .896 |
| IPR_09/IPR_D01 [SQD009] If you owned this R, do you think you would evolve an emotional connection to it? | 33 | 1 | 4 | 2.12 | .927 |
| PR_06/PR_D01[SQD006]. Do you think the R can feel hopeful? | 34 | 1 | 4 | 1.56 | .894 |
| MR_38/MR_D03 [SQD0038]. Do you think that the R can have hobbies? | 32 | 1 | 4 | 1.56 | .840 |
| SPR_07/SPR_D01 [SQD007]. Do you think you trust the R to perform its task well? | 34 | 2 | 4 | 2.79 | .592 |
| IPR_39/IPR_D03 [SQD0039]. If you owned this R, do you think it would be a source of joy to you? | 33 | 1 | 4 | 2.55 | .971 |
| MR_08/MR_D01 [SQD008]. People have wishes. For example, they can wish for a better future. Do you think the R can have a wish? | 34 | 1 | 4 | 1.35 | .774 |
| IPR_56/IPR_D05 [SQD0056]. If you owned this R, would you give it a human name? | 33 | 1 | 4 | 2.91 | 1.042 |
| IPR_33/IPR_D03 [SQD0033] If you owned this R, would you think about it when you are away e.g., on holidays? | 33 | 1 | 4 | 1.82 | .983 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| PR_34/PR_D03[SQ0034]. Do you think the R can feel lonely? | 33 | 1 | 3 | 1.27 | .626 |
| PR_510/PR_D05 [SQD0510]. Would you feel compassionate towards the R if you saw people kicking it or treating it badly? | 34 | 1 | 4 | 2.71 | 1.001 |
| PR_D31/PR_D03 [SQD0031]. Do you think the R can feel angry? | 34 | 1 | 4 | 1.38 | .779 |
| This robot has a sense for what is right and wrong. | 33 | 1 | 7 | 2.42 | 1.786 |
| This robot can think through whether an actior is moral. | 32 | 1 | 6 | 2.50 | 1.723 |
| This robot can only do what humans tell it to do. | 34 | 1 | 7 | 5.24 | 1.892 |
| This robot might feel obligated to behave in a moral way. | 32 | 1 | 7 | 2.69 | 1.786 |
| This robot can only behave how it is programmed to behave. | 34 | 1 | 7 | 5.74 | 1.781 |
| This robot is capable of being rational about good and evil. | 34 | 1 | 7 | 2.88 | 1.788 |
| This robot behaves according to moral rules. | 31 | 1 | 6 | 2.42 | 1.432 |
| This robot's actions are the result of its programming. | 34 | 1 | 7 | 6.21 | 1.388 |
| This robot would refrain from doing this that have painful repercussions. | 28 | 1 | 5 | 2.57 | 1.451 |
| This robot would never do anything it was not programmed to do. | 34 | 2 | 7 | 5.21 | 1.591 |
| This R should be helped to achieve its goals | 31 | 1 | 7 | 3.48 | 2.219 |
| This R should be treated as humans are treated | 32 | 1 | 6 | 2.41 | 1.739 |

## Descriptive Statistics

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| This R should be admired for its skills | 32 | 1 | 7 | 3.00 | 1.778 |
| This R should have someone who always has their back | 32 | 1 | 7 | 2.75 | 1.984 |
| This R should be protected from harsh realities of humanity | 28 | 1 | 7 | 2.29 | 1.718 |
| This R should be freed from control by others | 31 | 1 | 7 | 2.39 | 1.892 |
| I think the design of the R is cute | 34 | 1 | 5 | 4.00 | 1.101 |
| I think the design of the R is cool | 33 | 1 | 5 | 3.73 | 1.153 |
| I think the design of the R is beautiful | 32 | 1 | 5 | 3.00 | 1.414 |
| I think the design of the R is approachable | 33 | 1 | 5 | 3.67 | 1.109 |
| I think the design of the R is scary | 33 | 1 | 5 | 4.36 | 1.342 |
| I think the design of the R is comfortable | 31 | 1 | 5 | 3.10 | 1.165 |
| Valid N (listwise) | 22 | | | | |

```
 FILTER OFF.
USE ALL.
EXECUTE.
* Custom Tables.
CTABLES
  /VLABELS VARIABLES=v_90 v_91 v_92 v_89 robot DISPLAY=LABEL
  /TABLE v_90 [COUNT F40.0] + v_91 [COUNT F40.0] + v_92 [COUNT F40.0] + v_8
9 [MEAN] BY robot
  /CATEGORIES VARIABLES=v_90 v_91 v_92 robot ORDER=A KEY=VALUE EMPTY=INCLUD
E
  /CRITERIA CILEVEL=95.
```

## Socio-Demographics

## Notes

| | | |
|---|---|---|
| Output Created | | 13-SEP-2024 14:00:36 |
| Comments | | |
| Input | Data | /Users/astridweiss/Downloads/data_project_1036132_2024_09_11 (1).sav |
| | Active Dataset | DataSet0 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Syntax | | CTABLES /VLABELS VARIABLES=v_90 v_91 v_92 v_89 robot DISPLAY=LABEL /TABLE v_90 [COUNT F40.0] + v_91 [COUNT F40.0] + v_92 [COUNT F40.0] + v_89 [MEAN] BY robot /CATEGORIES VARIABLES=v_90 v_91 v_92 robot ORDER=A KEY=VALUE EMPTY=INCLUDE /CRITERIA CILEVEL=95. |
| Resources | Processor Time | 00:00:00.02 |
| | Elapsed Time | 00:00:00.00 |

| | | Type of robot | | | | | |
|---|---|---|---|---|---|---|---|
| | | Lutzi | | Starship | | Vector | |
| | | Count | Mean | Count | Mean | Count | Mean |
| woman | not quoted | 16 | | 11 | | 17 | |
| | quoted | 14 | | 21 | | 17 | |
| man | not quoted | 14 | | 21 | | 17 | |
| | quoted | 16 | | 11 | | 17 | |
| non-binary | not quoted | 30 | | 32 | | 34 | |
| | quoted | 0 | | 0 | | 0 | |
| Age | | | 39 | | 41 | | 40 |

```
 * Custom Tables.
CTABLES
  /VLABELS VARIABLES=v_90 v_91 v_92 v_89 robot DISPLAY=LABEL
  /TABLE v_90 [COUNT F40.0] + v_91 [COUNT F40.0] + v_92 [COUNT F40.0] + v_8
9 [MEAN, STDDEV] BY robot
```

```
  /CATEGORIES VARIABLES=v_90 v_91 v_92 robot ORDER=A KEY=VALUE EMPTY=INCLUD
E
  /CRITERIA CILEVEL=95.
```

# Custom Tables

## Notes

| | | |
|---|---|---|
| Output Created | | 13-SEP-2024 14:02:52 |
| Comments | | |
| Input | Data | /Users/astridweiss/Downloads/data_project_1036132_2024_09_11 (1).sav |
| | Active Dataset | DataSet0 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Syntax | | CTABLES /VLABELS VARIABLES=v_90 v_91 v_92 v_89 robot DISPLAY=LABEL /TABLE v_90 [COUNT F40.0] + v_91 [COUNT F40.0] + v_92 [COUNT F40.0] + v_89 [MEAN, STDDEV] BY robot /CATEGORIES VARIABLES=v_90 v_91 v_92 robot ORDER=A KEY=VALUE EMPTY=INCLUDE /CRITERIA CILEVEL=95. |
| Resources | Processor Time | 00:00:00.01 |
| | Elapsed Time | 00:00:00.00 |

| | | Type of robot | | | | |
|---|---|---|---|---|---|---|
| | | Lutzi | | | Starship | |
| | | Count | Mean | Standard Deviation | Count | Mean |
| woman | not quoted | 16 | | | 11 | |
| | quoted | 14 | | | 21 | |
| man | not quoted | 14 | | | 21 | |
| | quoted | 16 | | | 11 | |
| non-binary | not quoted | 30 | | | 32 | |
| | quoted | 0 | | | 0 | |
| Age | | | 39 | 10 | | 41 |

| | | Type of robot | | | |
|---|---|---|---|---|---|
| | | Starship | Vector | | |
| | | Standard Deviation | Count | Mean | Standard Deviation |
| woman | not quoted | | 17 | | |
| | quoted | | 17 | | |
| man | not quoted | | 17 | | |
| | quoted | | 17 | | |
| non-binary | not quoted | | 34 | | |
| | quoted | | 0 | | |
| Age | | 12 | | 40 | 12 |

```
 DATASET ACTIVATE DataSet0.

SAVE OUTFILE='/Users/astridweiss/Downloads/data_project_1036132_2024_09_11
(1).sav'
  /COMPRESSED.
T-TEST GROUPS=v_90(0 1)
  /MISSING=ANALYSIS
  /VARIABLES=SPR IPR PMR MA MP CUTE
  /ES DISPLAY(TRUE)
  /CRITERIA=CI(.95).
```

# T-Test

## Notes

| | | |
|---|---|---|
| Output Created | | 13-SEP-2024 14:06:22 |
| Comments | | |
| Input | Data | /Users/astridweiss/Downloads/data_project_1036132_2024_09_11 (1).sav |
| | Active Dataset | DataSet0 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Missing Value Handling | Definition of Missing | User defined missing values are treated as missing. |
| | Cases Used | Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis. |
| Syntax | | T-TEST GROUPS=v_90 (0 1) /MISSING=ANALYSIS /VARIABLES=SPR IPR PMR MA MP CUTE /ES DISPLAY(TRUE) /CRITERIA=CI(.95). |
| Resources | Processor Time | 00:00:00.03 |
| | Elapsed Time | 00:00:00.00 |

## Group Statistics

| | Gender Male Female | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| SPR scale | male | 44 | 2.7500 | .58014 | .08746 |
| | female | 52 | 2.6859 | .59925 | .08310 |
| IPR scale | male | 44 | 2.1989 | .76950 | .11601 |
| | female | 52 | 2.4526 | .65284 | .09053 |
| PMR scale | male | 44 | 1.4220 | .55873 | .08423 |
| | female | 52 | 1.6533 | .62613 | .08683 |
| Moral Agency | male | 44 | 3.7075 | .87949 | .13259 |
| | female | 52 | 3.8748 | .87426 | .12124 |
| Moral Patiency | male | 44 | 2.5777 | 1.25242 | .18881 |
| | female | 52 | 3.2731 | 1.53742 | .21320 |
| Cuteness | male | 44 | 3.5587 | .85279 | .12856 |
| | female | 52 | 3.3904 | .84764 | .11755 |

## Independent Samples Test

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | |
|---|---|---|---|---|---|
| | | F | Sig. | t | df |
| SPR scale | Equal variances assumed | .716 | .400 | .530 | 94 |
| | Equal variances not assumed | | | .531 | 92.276 |
| IPR scale | Equal variances assumed | 1.188 | .278 | -1.748 | 94 |
| | Equal variances not assumed | | | -1.724 | 84.805 |
| PMR scale | Equal variances assumed | 3.300 | .072 | -1.894 | 94 |
| | Equal variances not assumed | | | -1.912 | 93.717 |
| Moral Agency | Equal variances assumed | .002 | .965 | -.932 | 94 |
| | Equal variances not assumed | | | -.931 | 91.207 |
| Moral Patiency | Equal variances assumed | 2.262 | .136 | -2.401 | 94 |
| | Equal variances not assumed | | | -2.442 | 93.879 |
| Cuteness | Equal variances assumed | .040 | .843 | .967 | 94 |
| | Equal variances not assumed | | | .966 | 91.204 |

## Independent Samples Test

| | | t-test for Equality of Means | | |
|---|---|---|---|---|
| | | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| SPR scale | Equal variances assumed | .597 | .06410 | .12097 |
| | Equal variances not assumed | .596 | .06410 | .12064 |
| IPR scale | Equal variances assumed | .084 | -.25370 | .14515 |
| | Equal variances not assumed | .088 | -.25370 | .14715 |
| PMR scale | Equal variances assumed | .061 | -.23128 | .12213 |
| | Equal variances not assumed | .059 | -.23128 | .12097 |
| Moral Agency | Equal variances assumed | .354 | -.16735 | .17957 |
| | Equal variances not assumed | .354 | -.16735 | .17966 |
| Moral Patiency | Equal variances assumed | .018 | -.69543 | .28968 |
| | Equal variances not assumed | .016 | -.69543 | .28479 |
| Cuteness | Equal variances assumed | .336 | .16833 | .17411 |
| | Equal variances not assumed | .336 | .16833 | .17420 |

## Independent Samples Test

| | | t-test for Equality of Means | |
|---|---|---|---|
| | | 95% Confidence Interval of the Difference | |
| | | Lower | Upper |
| SPR scale | Equal variances assumed | -.17609 | .30430 |
| | Equal variances not assumed | -.17550 | .30370 |
| IPR scale | Equal variances assumed | -.54189 | .03449 |
| | Equal variances not assumed | -.54629 | .03889 |
| PMR scale | Equal variances assumed | -.47378 | .01122 |
| | Equal variances not assumed | -.47148 | .00892 |
| Moral Agency | Equal variances assumed | -.52389 | .18920 |
| | Equal variances not assumed | -.52421 | .18952 |
| Moral Patiency | Equal variances assumed | -1.27059 | -.12026 |
| | Equal variances not assumed | -1.26089 | -.12996 |
| Cuteness | Equal variances assumed | -.17737 | .51403 |
| | Equal variances not assumed | -.17769 | .51434 |

## Independent Samples Effect Sizes

| | | Standardizer[a] | Point Estimate | 95% Confidence Interval Lower | 95% Confidence Interval Upper |
|---|---|---|---|---|---|
| SPR scale | Cohen's d | .59059 | .109 | -.294 | .510 |
| | Hedges' correction | .59535 | .108 | -.291 | .506 |
| | Glass's delta | .59925 | .107 | -.296 | .508 |
| IPR scale | Cohen's d | .70859 | -.358 | -.762 | .048 |
| | Hedges' correction | .71431 | -.355 | -.756 | .047 |
| | Glass's delta | .65284 | -.389 | -.795 | .022 |
| PMR scale | Cohen's d | .59625 | -.388 | -.792 | .018 |
| | Hedges' correction | .60106 | -.385 | -.786 | .018 |
| | Glass's delta | .62613 | -.369 | -.775 | .040 |
| Moral Agency | Cohen's d | .87666 | -.191 | -.593 | .212 |
| | Hedges' correction | .88373 | -.189 | -.588 | .210 |
| | Glass's delta | .87426 | -.191 | -.594 | .213 |
| Moral Patiency | Cohen's d | 1.41420 | -.492 | -.898 | -.083 |
| | Hedges' correction | 1.42561 | -.488 | -.891 | -.082 |
| | Glass's delta | 1.53742 | -.452 | -.861 | -.039 |
| Cuteness | Cohen's d | .85000 | .198 | -.205 | .600 |
| | Hedges' correction | .85686 | .196 | -.203 | .595 |
| | Glass's delta | .84764 | .199 | -.206 | .601 |

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control group.

```
NONPAR CORR
  /VARIABLES=v_89 SPR IPR PMR MA MP CUTE
  /PRINT=SPEARMAN TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.
```

## Nonparametric Correlations

## Notes

| | | |
|---|---|---|
| Output Created | | 13-SEP-2024 14:12:10 |
| Comments | | |
| Input | Data | /Users/astridweiss/Downloads/data_project_1036132_2024_09_11 (1).sav |
| | Active Dataset | DataSet0 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics for each pair of variables are based on all the cases with valid data for that pair. |
| Syntax | | NONPAR CORR /VARIABLES=v_89 SPR IPR PMR MA MP CUTE /PRINT=SPEARMAN TWOTAIL NOSIG FULL /MISSING=PAIRWISE. |
| Resources | Processor Time | 00:00:00.01 |
| | Elapsed Time | 00:00:00.00 |
| | Number of Cases Allowed | 314572 cases [a] |

a. Based on availability of workspace memory

## Correlations

| | | | Age | SPR scale | IPR scale |
|---|---|---|---|---|---|
| Spearman's rho | Age | Correlation Coefficient | 1.000 | .247* | .009 |
| | | Sig. (2-tailed) | . | .015 | .928 |
| | | N | 96 | 96 | 96 |
| | SPR scale | Correlation Coefficient | .247* | 1.000 | .169 |
| | | Sig. (2-tailed) | .015 | . | .100 |
| | | N | 96 | 96 | 96 |
| | IPR scale | Correlation Coefficient | .009 | .169 | 1.000 |
| | | Sig. (2-tailed) | .928 | .100 | . |
| | | N | 96 | 96 | 96 |
| | PMR scale | Correlation Coefficient | .105 | .058 | .462** |
| | | Sig. (2-tailed) | .307 | .573 | .000 |
| | | N | 96 | 96 | 96 |
| | Moral Agency | Correlation Coefficient | .040 | .079 | .189 |
| | | Sig. (2-tailed) | .699 | .447 | .065 |
| | | N | 96 | 96 | 96 |
| | Moral Patiency | Correlation Coefficient | .026 | .053 | .366** |
| | | Sig. (2-tailed) | .798 | .609 | .000 |
| | | N | 96 | 96 | 96 |
| | Cuteness | Correlation Coefficient | -.148 | .249* | .242* |
| | | Sig. (2-tailed) | .150 | .015 | .018 |
| | | N | 96 | 96 | 96 |

## Correlations

| | | | PMR scale | Moral Agency |
|---|---|---|---|---|
| Spearman's rho | Age | Correlation Coefficient | .105 | .040 |
| | | Sig. (2-tailed) | .307 | .699 |
| | | N | 96 | 96 |
| | SPR scale | Correlation Coefficient | .058 | .079 |
| | | Sig. (2-tailed) | .573 | .447 |
| | | N | 96 | 96 |
| | IPR scale | Correlation Coefficient | .462** | .189 |
| | | Sig. (2-tailed) | .000 | .065 |
| | | N | 96 | 96 |
| | PMR scale | Correlation Coefficient | 1.000 | .290** |
| | | Sig. (2-tailed) | . | .004 |
| | | N | 96 | 96 |
| | Moral Agency | Correlation Coefficient | .290** | 1.000 |
| | | Sig. (2-tailed) | .004 | . |
| | | N | 96 | 96 |
| | Moral Patiency | Correlation Coefficient | .365** | .239* |
| | | Sig. (2-tailed) | .000 | .019 |
| | | N | 96 | 96 |
| | Cuteness | Correlation Coefficient | .062 | .134 |
| | | Sig. (2-tailed) | .546 | .193 |
| | | N | 96 | 96 |

## Correlations

| | | | Moral Patiency | Cuteness |
|---|---|---|---|---|
| Spearman's rho | Age | Correlation Coefficient | .026 | -.148 |
| | | Sig. (2-tailed) | .798 | .150 |
| | | N | 96 | 96 |
| | SPR scale | Correlation Coefficient | .053 | .249* |
| | | Sig. (2-tailed) | .609 | .015 |
| | | N | 96 | 96 |
| | IPR scale | Correlation Coefficient | .366** | .242* |
| | | Sig. (2-tailed) | .000 | .018 |
| | | N | 96 | 96 |
| | PMR scale | Correlation Coefficient | .365** | .062 |
| | | Sig. (2-tailed) | .000 | .546 |
| | | N | 96 | 96 |
| | Moral Agency | Correlation Coefficient | .239* | .134 |
| | | Sig. (2-tailed) | .019 | .193 |
| | | N | 96 | 96 |
| | Moral Patiency | Correlation Coefficient | 1.000 | .129 |
| | | Sig. (2-tailed) | . | .209 |
| | | N | 96 | 96 |
| | Cuteness | Correlation Coefficient | .129 | 1.000 |
| | | Sig. (2-tailed) | .209 | . |
| | | N | 96 | 96 |

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

```
NONPAR CORR
  /VARIABLES=v_89 v_153_SPR v_155_SPR v_161_SPR
  /PRINT=SPEARMAN TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.
```

## Nonparametric Correlations

## Notes

| | | |
|---|---|---|
| Output Created | | 13-SEP-2024 14:17:07 |
| Comments | | |
| Input | Data | /Users/astridweiss/Downloads/data_project_1036132_2024_09_11 (1).sav |
| | Active Dataset | DataSet0 |
| | Filter | <none> |
| | Weight | <none> |
| | Split File | <none> |
| | N of Rows in Working Data File | 96 |
| Missing Value Handling | Definition of Missing | User-defined missing values are treated as missing. |
| | Cases Used | Statistics for each pair of variables are based on all the cases with valid data for that pair. |
| Syntax | | NONPAR CORR /VARIABLES=v_89 v_153_SPR v_155_SPR v_161_SPR /PRINT=SPEARMAN TWOTAIL NOSIG FULL /MISSING=PAIRWISE. |
| Resources | Processor Time | 00:00:00.01 |
| | Elapsed Time | 00:00:00.00 |
| | Number of Cases Allowed | 449389 cases [a] |

a. Based on availability of workspace memory

## Correlations

| | | | Age | SPR_54/SPR_D05[SQ0054]. Do you think you will trust the information that the R gives you? |
|---|---|---|---|---|
| Spearman's rho | Age | Correlation Coefficient | 1.000 | .180 |
| | | Sig. (2-tailed) | . | .081 |
| | | N | 96 | 95 |
| | SPR_54/SPR_D05 [SQ0054]. Do you think you will trust the information that the R gives you? | Correlation Coefficient | .180 | 1.000 |
| | | Sig. (2-tailed) | .081 | . |
| | | N | 95 | 95 |
| | SPR_04/SPR_D01[SQ004] Do you think the R always gives correct information? | Correlation Coefficient | .312** | .515** |
| | | Sig. (2-tailed) | .002 | .000 |
| | | N | 95 | 94 |
| | SPR_07/SPR_D01 [SQD007]. Do you think you trust the R to perform its task well? | Correlation Coefficient | .048 | .279** |
| | | Sig. (2-tailed) | .640 | .006 |
| | | N | 96 | 95 |

## Correlations

| | | | SPR_04/SPR_D01[SQ004] Do you think the R always gives correct information? |
|---|---|---|---|
| Spearman's rho | Age | Correlation Coefficient | .312** |
| | | Sig. (2-tailed) | .002 |
| | | N | 95 |
| | SPR_54/SPR_D05 [SQ0054]. Do you think you will trust the information that the R gives you? | Correlation Coefficient | .515** |
| | | Sig. (2-tailed) | .000 |
| | | N | 94 |
| | SPR_04/SPR_D01[SQ004] Do you think the R always gives correct information? | Correlation Coefficient | 1.000 |
| | | Sig. (2-tailed) | . |
| | | N | 95 |
| | SPR_07/SPR_D01 [SQD007]. Do you think you trust the R to perform its task well? | Correlation Coefficient | .146 |
| | | Sig. (2-tailed) | .158 |
| | | N | 95 |

## Correlations

| | | | SPR_07/SPR_D01[SQD007]. Do you think you trust the R to perform its task well? |
|---|---|---|---|
| Spearman's rho | Age | Correlation Coefficient | .048 |
| | | Sig. (2-tailed) | .640 |
| | | N | 96 |
| | SPR_54/SPR_D05 [SQ0054]. Do you think you will trust the information that the R gives you? | Correlation Coefficient | .279** |
| | | Sig. (2-tailed) | .006 |
| | | N | 95 |
| | SPR_04/SPR_D01[SQ004] Do you think the R always gives correct information? | Correlation Coefficient | .146 |
| | | Sig. (2-tailed) | .158 |
| | | N | 95 |
| | SPR_07/SPR_D01 [SQD007]. Do you think you trust the R to perform its task well? | Correlation Coefficient | 1.000 |
| | | Sig. (2-tailed) | . |
| | | N | 96 |

**. Correlation is significant at the 0.01 level (2-tailed).

# Overview of Generative AI Tools Used

- Resoomer (free online version): This tool was instrumental in efficiently reviewing and summarizing various articles before reading them completely.
- Kapwing (free online version): An excellent AI-powered video editor that I used for editing videos and adding subtitles to them.
- Descript (free online version):: A very useful AI application for transcribing interviews, though the transcriptions require human review and correction.
- ChatGPT-4: A versatile AI tool that I used for learning about various topics.

# List of Figures

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