

Contrastive Analysis of Point of View Effects in Culture-dependent Social Cognition

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Doctoral Dissertation

Contrastive Analysis of Point of View Effects
in Culture-dependent Social Cognition

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TO WHOM IT MAY CONCERN

We hereby certify that this is a typical copy of the original **Doctoral Thesis** written by Miss **Sutasinee Thovuttikul** in the fulfillment of the requirements of **PhD Degree** from the Graduate School of Informatics, Kyoto University, Kyoto, Japan.

Abstract

Social cognition plays a key role in communication. This study investigates how social cognition is influenced by cultural background and perception, point of view (POV) in particular, by conducting contrastive experiments using a virtual environment.

We introduced a simulated crowd as a computational framework that specifies an artificial environment and as well as an agent behaving according to a parameterized norm. The experiment used a large flat screen for the learner to observe the scene produced by the simulated crowd system, and a depth sensor for the system to capture the posture and behaviors of the learner. We employed a Wizard of Oz system to control the avatar and introduced agents that can produce basic crowd behaviors. This allows the user to see the simulated world from the first-person POV (the view from their avatar's eye position just as in the real world) or from the third-person POV (seeing from a remote position their avatar's body and all agents during interaction). We employed Hofstede's cultural dimensions as a parametric model of culture. Our simulation of waiting and shopping behaviors contrasted the behaviors in Japanese and Thai cultures.

The main research question of this study addressed how different POVs affect perception while learning different cultural communication. We first investigated how the two different POVs—first- and third-person POVs—affect perceptions in waiting situations. At this stage, we attempted to find the perceptual differences from observation and interaction via different POVs. We asked the Japanese participants to observe and interact in a waiting situation and then analyzed their consideration of waiting factors to observe the differences in perception between first- and third-person POVs. We found that the third-person POV participants prefer fairness in waiting, while the first-person POV participants consider the situation based on their feelings and interactions with the service-persons.

In the second step of our research, we studied how different POVs affect the perceptions of Japanese and Thai participants while waiting. We conducted experiments with Thai participants to find the differences in perception and interpretation from the different POVs. We asked them to engage in the same

activities as the Japanese participants to reveal the different perceptions and interpretations caused by their cultural background. From two experiments, we found that Japanese participants prefer speed when selecting a ticket counter, while Thai participants were more interested in experiencing the interaction with the service-person and their feelings about these interactions.

Finally, to clarify the different effects of observing the social situation via different POVs, we investigated whether the POVs yielded different effects in cross-cultural learning depending on the cultural aspect. We conducted an experiment with Japanese participants in first- and third-person POVs. We asked both POV groups to experience Thai-style shopping at a virtual night flea market. We used the key differences from Hofstede's cultural dimensions to design the activities of Thai shopping behaviors and a questionnaire. We used participants' answers to verify the different perceptions and interpretations of the different POVs on shopping activities. We found that the participants from the third-person POV can recognize the extracted keywords from the collectivism (COL) aspect better than the participant from the first-person POV. However, we have not found a significant difference between the two groups' ability to perceive the extracted keywords of the feminine (FEM) and uncertainty avoidance (UAI) aspects of Thai culture from the Thai shopping scenario in this experiment. The factor analysis result indicates that participants from different POVs groups consider different culture-related keywords in differing ways: The first-person POV group separately considered the keywords related to IDV and other aspects, while the third-person POV group considered the keywords related to IDV and UAI together.

These findings suggest that the third-person POV allows participants to recognize holistic aspects like fairness, while the first-person POV highlights interpersonal aspects of culture, contrasting participants' behavior in Japanese and Thai cultures. The more elaborate analysis showed that the participants could recognize the keywords related to the COL, FEM, and UAI aspects of Thai culture in both first- and third-person POV. We found a significant difference only in the COL aspect, showing that the participants in the third-person POV group can recognize the extracted keywords of the COL aspect better than in first-person POV.

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Chapter 1: Introduction

1.1 CROSS-CULTURE COMMUNICATION

The world seems smaller than in the past, and new technology provides powerful tools, methodologies, and systems for us to connect people around the world faster and more easily than ever before. Even with these advancements, communication with people from a different culture might be difficult when experienced for the first time, and different cultural behaviors during communication can still cause misunderstandings (Dresser 2011).

Greeting behavior, for example, differs across cultures and can cause confusion in cross-cultural communication. Different cultures may greet with touching, while other countries use non-touching greetings. When traveling abroad for the first time, people from a culture with a touching greeting style may make a mistake by touching the body of people from a culture with a non-touching greeting style. On the other hand, those with similar cultural norms, such as people in Asian countries who have more similar traditions (Thovuttikul & Nishida 2011) or people from Europe and America who share similar traditions, will more easily recognize the cultural values and imitate the greeting behavior of the targeted culture.

Like greeting behaviors, waiting behaviors also vary widely across cultures. Waiting in different cultural places can be complex because learners must recognize many factors, such as a shopkeeper's behavior, other customers' behavior, space used, and environmental setting. Waiting behaviors may occur with only one person waiting in front of the counter or with a group of people waiting. In group waiting situations, both one-to-one behaviors (micro) and group interaction behaviors (macro) must be observed and interpreted make meaning of the situation. People engaging with a different culture might have difficulty learning both micro and macro behavior at the same time in a real-world situation.

Communication is defined as “the exchange of information between a sender and a receiver and the inference (perception) of meaning between the individuals involved” (James & Anthony 1997). People use both verbal and nonverbal behaviors for communication. While speech and language convey the main facts and data for

communication, body language and sound tones represent another part of emotion and feeling in the communication (Pease & Pease 2008). Nonverbal communication is ambiguous, however, and therefore often causes misunderstandings.

Perception and interpretation are important inference processes for both the sender's and receiver's understanding. To encode and decode messages, both sender and receiver must understand the communication pattern (Mullins 2011). One or both participants using different protocols because of different backgrounds and experiences may lead to a misunderstanding, and the communication intent may then fail.

Hofstede et al. (2010) emphasized awareness, knowledge, and skill in realizing an intercultural communication learning assistant system. Awareness enables learners to notice different or strange signals in an environment and recognize the differences in their own cultural background. A communicator obtains knowledge by establishing the meaning of a behavior in the new culture and updating this mental information. A communicator gains skill through practice, by being aware and updating knowledge. The learner will gain the skill of awareness and the knowledge to understand situations and behaviors in a new cultural place.

1.2 MOTIVATION: A CROSS-CULTURE COMMUNICATION LEARNING ASSISTANT SYSTEM

The long-term goal of this research is to develop a cross-culture communication learning assistant system that can help learners understand different culture conversations and understand how to communicate therein. Such a system should allow them to recognize the key behavior, learn the core idea, and understand the cultural values as the essential element of a situation that can then be adapted to another situation. The cross-culture communication learning assistant system, therefore, should help the learner gain social cognition in cross-culture communication.

Shepherd, John & Striphas (2005) introduced the communication learning styles, which are both practice-based and theoretically based. In the practice-based style, a learner comes to understand cultural differences and to avoid cultural misunderstanding during communication in a particular situation. People who learn from case studies can often easily understand the situation and behavior from

concrete examples, but they might not be able to apply their knowledge to other situations when the physical settings are slightly changed. The practice-based style is an “on-the-ground” approach to navigating new communication situations in real-time.

The theoretically based style involves reading theories of cultural difference. One of the most famous theories is Hofstede’s cultural dimensions (Hofstede et al. 2010), which emerged from experimental interviews with people in more than 40 countries. All answers were categorized according to thinking, belief, and behavior. Hofstede defined six dimensions of national culture based on an aspect of each culture relative to other cultures. The dimensions were: 1) Power Distance, 2) Individualism versus Collectivism, 3) Masculinity versus Femininity, 4) Uncertainty Avoidance, 5) Long-term versus Short-term Orientation, and 6) Indulgence versus Restraint. Hofstede uses these dimensions to describe a culture from many angles. Although people who understand the theory may collect a core idea or cultural value, they may not understand how to apply this value to a real-world situation.

Both practice-based and theoretically based learning styles are important for learners to confirm their cultural understanding so that they can practice communicating with others in real-world situations. This research employed a combination of both learning styles. We found useful examples from the real world and analyzed cultural differences based on Hofstede’s cultural dimensions, with a goal of helping learners understand how to interact in real-world situations and how to apply their knowledge to other situations.

1.3 SIMULATED CROWD FRAMEWORK

Crowded places are suitable for practicing communication learning because uncommon behaviors would be difficult to detect if studying or interacting with only a few people. In less-crowded situations, we cannot predict or assume whether certain behaviors are acceptable. In contrast, in a crowd, most people will behave the same way or at least less self-consciously, allowing easier observation of which behaviors are normal and acceptable. We can observe many examples of communication and interaction in crowds where complex activities occur. However, we cannot understand the messages from only verbal behaviors; all aspects of behavior

including voice, gestures, and direction of the moment are important nonverbal signals.

Learning the communication styles from real-world situations is very challenging and requires some experience. Real-world situations are impossible to replicate exactly, and in any given interactions, there is a chance one could make a serious mistake. Increased practice, then, is often better than precept, and a good way to practice cultural communication is to walk in a crowd, paying attention to culture-specific behavior by which people cooperate or negotiate to achieve communication goals. In this experiment, we took the simulated culture approach (Hofstede et al. 2010), building an artificial world where agents and avatars behave according to the cultural setting. The simulated crowd is a tool to allow people to practice communication behaviors. It can be characterized as one possible instantiation of synthetic culture (Thovuttikul et al. 2011), which specifies an artificial environment and agents behaving according to a parameterized norm.

In simulated crowd, we set a large flat screen and depth sensor (a Microsoft Kinect device) in front of the learner. This setup allowed the learner to observe the situation from the screen while the Kinect sensors captured the posture and movement of the learner's body as the learner interacted with the agent in the system. In order to represent interaction from the experiment, we applied the Wizard of Oz (WOZ) system to control the avatars (Lala, Thovuttikul & Nishida 2011). A cultural expert controlled the service-person avatar based on predefined rules. The service-person avatar could thus naturally respond to the participant in real-time according to the WOZ system. We then introduced agents that produced basic crowd behavior, designing the cultural interaction to match the basic interaction behavior of a crowd. The agent could walk around, stop, and stand, depending on their purpose in the scenario. The user could see the simulated crowd either from the first-person POV (the view from their avatar's eye position just as in the real world) or from the third-person POV (seeing their avatar's body and all agents during interaction from a remote position).

We focused on cultural learning in a traveling situation. Supporting reasoning for activities is relevant to traveling activities in different cultural places. The learner can apply the knowledge learned from our system in real-life interactions, employing appropriate shopping, waiting, and queuing behaviors in cross-cultural situations.

1.4 RESEARCH QUESTIONS AND EXPERIMENT CONTRIBUTION

The goal of this dissertation was to discover people's different perceptions after learning and taking part in social communication from different points of view (POVs). The main research question was "Do different POVs affect perception while learning different cultural communication?" Pursuing this question, we investigated the differences in how Japanese and Thai participants understand fairness in waiting behaviors, as fairness is important for understanding communication problems caused by different cultural backgrounds. Fairness should be preferred in negotiation behavior, but ideas about fairness in waiting might be different because of subjective viewpoints (observer or participant), social rules that depend on culture-related factors, different patterns of thinking, and styles of physical action and interaction.

We chose Japanese and Thai cultures when designing a system and conducting experiments in this dissertation because the two cultures have some similar and some different characteristics. According to Hofstede's cultural dimensions, Japanese and Thai cultures have a similar score on the power distance dimension (Japanese PDI = 54, Thai PDI = 64). They have different scores in the individualism versus collectivism dimension (Japanese IDV = 46, Thai IDV = 20) and uncertainty avoidance dimension (Japanese UAI = 92, Thai UAI = 64) cultures. In contrast, they have very different scores for the masculine versus feminine dimension (Japanese MAS = 95, Thai MAS = 34). Given these scores, we reasoned that Japanese people could easily understand the somewhat different culture of Thailand.

Both Japanese and Thai people have a relatively similar score in the UAI dimension. This suggests that most group members respect the rules for avoiding an altercation while waiting or shopping. However, people in each culture may have a different way to interpret UAI as regards physical behavior. For example, Japanese people make a line to define clearly the sequence of who comes first, while Thai people may show their faces to the shopkeeper to show they are coming.

In this study, we focused on both waiting and shopping behaviors. Waiting behavior is a representative activity in a human crowd, chosen because of its general "first come, first served" rule. However, in some places, waiting behavior is still based on a local culture's social rules. The idea of waiting is related to the idea of fairness (Maister 1984; Rafaeli, Barron & Haber 2002). Although fairness is a simple term, to consider its meaning, many factors are required, including culture.

Intercultural tourism is superficial (Hofstede et al. 2010) because travelers experience other cultures/countries for a short time. Hofstede et al. (2010) stated that the intercultural communication learning process comprises three phases: awareness, knowledge, and skill as described in Section 1.1. We aimed to increase awareness of cultural differences of the travelers in waiting situation.

We focused the shopping behavior in Thai culture as cultural learning behavior for Japanese participants, as many behavioral characteristics and cultural values are different between the two cultures. For example, the Thai shopping style includes random waiting positions versus the more formal, queue style of the Japanese, line-waiting position. The random waiting position represents the more relaxing and social activities of the Collectivism (COL) cultural dimension.

We focused on contrasting different points of view to provide different information about the situation to the participants. The differences were in our system design. Participants viewed the interaction through their avatar's eyes in the first-person POV, while those seeing the third-person POV witnessed the entire interaction from a remote position. To design the core system, we introduced a simulated crowd as a framework for developing a virtual cultural communication simulation system. We designed the behaviors of the agent and avatar in the simulated crowd based in real-world situations, namely waiting and shopping behavior in Japanese and Thai cultures, using Hofstede's theory (Hofstede et al. 2010) and assessments of each's cultural dimensions to shape the context and interactions.

In designing the experiments, we identified three of Hofstede's cultural dimensions to describe the different behaviors and interactions that may cause misunderstanding when learning cultural communication. We selected the case studies from real-world waiting and shopping situations. Hofstede et al.'s (2010) descriptions of beliefs, values, and behaviors provided both the cultural theory and case studies for applied in this experiment.

1.4.1 Investigating the effects of different POVs on perceptions

The first research question guiding this experiment asked, "Do different POVs affect perceptions in waiting situations?" The purpose of this part of the experiment

was to find the perceptual differences from observation and interaction via first- and third-person POVs.

In the first experiment, we defined and categorized a set of nonverbal behaviors that may cause difficulties in a cross-cultural conversation. We used the different points of view methodology to provide different perceptions to the learner while observing nonverbal behavior during an interaction. Different perceptions from different points of view help the learner understand the situation better than simply experiencing the learning system from one point of view. We asked the Japanese participants to observe and interact in a waiting situation, analyzing their consideration of waiting factors to find differences in perception between first- and third-person POVs. We found that the third-person POV participants preferred fairness in waiting, while the first-person POV participants consider the situation based on their feelings and interactions with the service-persons.

1.4.2 Comparing the effects of different cultural backgrounds

The second question guiding this research asked, “Do different POVs affect the different perceptions of Japanese and Thai participants while waiting?” In the second experiment, we verified the effects of the different backgrounds of Japanese and Thai participants on their behavior perception. We conducted two, similar experiments using first- and third-person POVs, one at Kyoto University, Japan, and another one at Chiang Mai University, Thailand. We conducted the experiments with Thai participants to find the differences in perception and interpretation from the different POVs, asking them to engage in the same activities as the Japanese participants to reveal the different perceptions and interpretations derived from their cultural background. From these two experiments, we found that Japanese participants prefer speed as their reason to select a counter, while Thai participants were more interested in the experience of the interaction and their feelings about it.

1.4.3 Employing Hofstede’s cultural dimension to elaborate the effects of POVs

The third question guiding this research asked, “Does the POV bring about different effects in cross-cultural learning depending on the cultural aspect?” In the third experiment, we applied the findings from the previous experiments. After we saw the effects of the different POVs and the participants’ different cultural backgrounds in the previous experiments, we designed the communication system

from the case studies and the different points of view method. We conducted this experiment with Japanese participants in first- and third-person POV groups. We asked both groups of participants to experience Thai-style shopping at a virtual night flea market. We then gave them a questionnaire based on Hofstede's cultural dimensions and analyzed their answers to verify the different perceptions and interpretations of the different POVs of the shopping activities. We found that the participants from both groups recognize the keywords related to the COL, FEM, and UAI aspects of Thai culture in both first- and third-person POV. We found a significant difference only in the COL aspect shown that the participant in the third-person POV group can recognize the extracted keyword of the COL aspect better than in first-person POV.

1.5 THE ORGANIZATION OF THIS DISSERTATION

This dissertation is divided into six chapters. This first chapter has explored the foundations of the study. Chapter 2 surveys previous research and studies related to the topics under consideration here, such as the effects of different POVs and developing “different culture” communication in a learning system. The research team discussed the benefits and disadvantages of using different POVs in virtual simulations, games, movies, and story-based scenarios to narrow the scope of research for this project.

Chapter 3 describes the details of the first experiment, which provided different perceptions from different POVs of the conversation among Japanese participants. We designed and incorporated the different POVs method—first- and third-person POVs—into our system. In the experiment, we asked each participant to attend the two different cultural waiting styles—line- and group-waiting—to verify the different effects of their perception after the observation and interaction via different POVs.

Chapter 4 describes the details of the second experiment for Thai participants. The experiment setting is similar to the experiment setting for Japanese participants in Chapter 3. We then analyzed the differences in experimental results between Japanese and Thai participants to find the effects of one's cultural background on perception in both first- and third-person POVs.

Chapter 5 explains how we used the findings from the previous two chapters, the first and second experiments, to design the cultural communication learning system. We asked Japanese participants to observe and interact in a simulated Thai night flea market. We designed a questionnaire, based on Hofstede's cultural dimensions, to measure their perceptions and to verify the different perceptions of the two different POV groups.

Chapter 6 gives conclusions and limitations of this study and discusses suggestions for future work based on all three experiments. I review the conclusion by the research question and hypothesis of each experiment and compares these with the results. I review revealed the study's limitations as well as illuminating new avenues for future research stemming from this work.

Chapter 2: Previous work

This chapter reviews the existing research related to the topics addressed in this dissertation. Our literature review includes introduction of cross-cultural communication, human crowd activities and verbal and nonverbal communication in cross-cultural contexts, different POVs studies, Hofstede's culture, and cultural learning systems.

2.1 INTRODUCTION AND BACKGROUND

People may enter into many cross-cultural or intercultural social situations, depending on their specific opportunities, positions in society, and their occupation (Hofstede et al. 2010). People understand each other's behavior not only based on global norms but also on their different cultural backgrounds. People have different ways of thinking, behaving, and interacting with each other based on culture. Understanding these different cultures is one solution to help those from different backgrounds interact together peacefully and effectively.

Chapter 1 described examples of possible mistakes and misunderstandings in cross-cultural communication situations such as greetings. Dresser (2011) discussed that one reason for cultural misunderstandings is different cultural backgrounds. In other words, in any given situation, all parties have their own views about who is right, when in fact, nobody is wrong, and nobody is right. Misunderstandings instead happen because each side perceived and interpreted an interaction based on their own cultural traditions. Cultural awareness is necessary for understanding the differences between cultures, and increasing cultural awareness begins with recognizing an individual's cultural style and comparing it with other cultural styles.

Study or practice in a highly educated country is often the best choice to improve people's skills, education, technological awareness, social abilities, and understanding of different cultures. International students, who come from a variety of cities, countries, and continents, have to study together in an environment with many languages, traditions, and styles of dress and with unfamiliar personalities and mindsets. People usually use language to communicate with each other, but different

ways of thinking or styles of interacting may affect one's understanding of the conversation. Because of these cultural differences, problems of communication (e.g., misunderstandings of languages, postures, and gestures during a conversation) between teacher and student or between students from different cultures may occur. Learning to understand other cultures may increase understanding and reduce miscommunication.

Modern innovations such as mobile phones, social networks, e-mail, and video calls bring people around the world together, but differences among cultures matter (Hofstede et al. 2010). People communicate with each other for many reasons, and business comprises a large portion of cross-cultural communication. People from different countries negotiate and discuss business contracts and goings-on. In building a relationship with business partners, they should be polite. However, different cultures have different definitions of “politeness,” different ways of treating a boss, a manager, a newcomer, etc. Posture, gestures, and speaking styles, all which vary across cultures, affect the way people represent themselves during communication. Understanding different cultures helps people understand how to communicate with each other and thus to create a beneficial business relationship. Cultural understanding becomes an important factor in the success of a business.

As stated in Chapter 1, communication is defined as “the exchange of information between a sender and a receiver and the inference (perception) of meaning between the individuals involved” (James & Anthony 1997). Mullins (2011) concluded, from this definition, that both the sender and receiver must understand the communication pattern to encode and decode the message. The inference processes of perception and interpretation are important for both the sender's and the receiver's understanding, for when one or both participants use different communicative protocols based on their different backgrounds and experiences, misunderstandings occur. The intent of the communicative act may then fail.

People use verbal and nonverbal behavior for communication. Nonverbal behaviors provide clues for understanding messages, even without say anything. Cultural background is an important aspect of nonverbal perception and interpretation, because people use their life experiences, values, and current state of mind and emotions to interpret a situation (James & Anthony 1997).

Cultural background affect perception and interpretation of a conversation in cross-cultural communication situations (Alan & Gary 2011). This section introduces the topic of cultural effects on verbal and nonverbal behavior through the example of different greeting behaviors and the attendant communication misunderstandings.

Perception consists of many components, including the perceiver, target (object), and setting (Mullins 2011), and perceptions will change if these components change. People look at others' behaviors, then judge based on their own experiences and biases (Bernstein & Nash 2007). For example, consider three hypothetical people: George is an observer (perceiver) who looks at two others, John (target) and Jane (object) who are greeting (situation) one another. John raises a hand for a handshake and tries to move closer, whereas Jane, who is unfamiliar with handshake culture, becomes very uncomfortable about the personal space violation and steps backward (Earley & Peterson 2004). In this example, George can identify with either John, who tried to shake hands, or with Jane, who tried to step backward, depending on George's own culture and experiences. One can easily understand, from an academic perspective, the different physical behaviors, comprehending the cultural barriers might be difficult to understand in real time by these two people in a greeting situation. Consider the situation from the observers' perspective once more. George can observe many situational factors, such as nonverbal behavior, personal space, and timing of movement, which offers enough information to fully consider the situation.

Learning communication techniques for different cultures can help strangers to avoid misunderstandings when living in a place with an unfamiliar culture. A culture is a complex form of knowledge (Hofstede et al. 2010). Some indicators of culture are visible (e.g., language, food, art, posture, and behavior), while some are less apparent (e.g., beliefs, values, communication styles, handling of emotion, and use of physical space) (Earley & Peterson 2004; Wilce & Wilce 2017; Samovar et al. 2016). Learning by imitating behavior is a simple learning process and is useful in particular situations; however, if some factors in a given situation change the interaction, the behavior or learning solution must change accordingly. In this case, if a learner understands a basic concept in another culture that is not initially apparent, we believe that the learner will adapt this concept to a new situation. Learning by imitating behavior from an example or case study is a simple and easy-to-practice

learning process. The process is very effective for understanding real-world situations and useful in particular situations. In this case, the key is that a learner should understand a basic concept from another culture that is not apparent from imitation. After practicing by imitating and interacting, we believe that the learner will understand a given communication or behavioral concept from another culture and adapt this concept to a new situation.

2.2 HUMAN CROWD, WAITING, GREETING, AND SHOPPING BEHAVIOR

The tourist who comes from a different culture might not understand the complicated situations, but they should learn appropriate behavior to avoid misunderstandings and miscommunication. The travel and tourism industry are currently expanding and becoming a major part of the economy of many countries. Both tourists and people in host countries should learn to understand different cultures to communicate smoothly and make the tourists' trips enjoyable for everyone.

The focus of the research in this dissertation is communication among a group of people/a human crowd, because we can easily identify similar behaviors within a large number of people. Certain unique behaviors may be difficult to observe in a small group of people because too few people represent too many different behaviors. In contrast, in the case of a crowd, many people behave in the same manner. Thus, it is easier to observe a general pattern and identify unique behaviors of a crowd. With crowd activities, space usage is one important dimension in cultural communication differences. Hall & Hall (1959; 1989) discussed territoriality and personal space—a simple concept that cannot be seen as a physical boundary. There is an invisible “bubble” around each person that's size depends on a number of factors: relationships to nearby people, emotion, activities, and culture. For example, people allow friends or family to occupy space much closer to their body than they allow for others who are strangers. Culture is a particularly important factor in controlling personal space and is therefore valuable to investigate for its influence on people's social interactions.

Greeting behavior

The first type of communication when people meet each other is a greeting. People from different cultures may make a mistake the first time they travel abroad. For example, most Asian countries, such as Japan, Thailand, and India, have a greeting based on individual posture, such as Japanese bowing, Thai Wai, and Indian Namaste. By contrast, in America and most European countries, greetings involve more body contact, such as handshakes, hugging, and kissing. A mistake might happen, for example, when Asian girls travel to America or Europe and meet new friends who greet by shaking hands with the opposite sex and who hug or kiss new friends of the same sex. An Asian girl might feel ashamed when an American boy asks to shake hands or to hug in public, because Asian cultures like China, Vietnam, and Thailand are very strict about bodily touching, especially across sexes and in public (Dresser 2011). Even when greeting someone of the same sex, an Asian girl may feel uncomfortable hugging or kissing on the cheek an American girl, because in her Asian culture, such thing is inappropriate in public spaces.

Greeting gestures also relate to Hofstede's first cultural dimension, or the power distance. In a small power distance culture, people have the same gesture for greeting everyone, but in a large power distance culture, less powerful people should use respectful gestures to more powerful people. In this section, we describe the greeting gesture example in a large power distance culture. If we consider the different level of greeting postures, we can compare the Japanese bow and the Thai Wai, each a similar concept of respect represented by the degree of body posture, bow level, and the position of the palms. The level of respect is represented by different levels of obeisance in Japanese culture, and different positions of the hands against the face in Thai culture. We found that these greetings share a general style of respect and body posture. This finding shows that Japanese and Thai cultures have the same value of respect toward people such as parents, teachers, family members, elderly people, friends, and younger people. If the learner has a cultural background that is similar to that of the new culture (e.g., a Japanese visitor to Thailand), it is easy for them to understand ideas such as respect, as they can adapt and apply their knowledge accordingly when greeting individuals. For example, Japanese and Thai people have similar ideas about greeting people from a different group. In school, greeting posture and gesture are more polite with the teacher and more informal with

friends. So, it is easy for Thai people to understand Japanese situations and adapt their new knowledge for communication in Japanese culture.

Learning to understand another cultural behavior should start with a comparison to one's own cultural background. Greeting gestures in Thailand and Japan use different hand position but are similar in the idea of multi-level bending of the body. When they arrive in Japan, Thai people should learn the Japanese style greeting, and vice versa. Each can learn by mimicking the body posture and trying to use that posture to greet people in real situations. While practicing, visitors have to recognize the right posture level to use in each situation and for each person they meet. After practicing, they will acquire the cultural values of the country they are visiting.

Waiting behavior

Waiting usually operates on a general rule, "first come, first served" and some local cultures. Fairness in waiting behavior can contain many cultural, personality, situational, and role-of-attention factors. Parameters such as waiting position and face direction are considered differently when learned via first- and third-person POVs. The details of the design and the activities are in Chapter 3.

Tourist waiting behavior is an excellent case study on culture-related activity. The main idea of waiting is related to the idea of fairness (Maister 1984; Rafaeli, Barron & Haber 2002). Although fairness is a simple term, its meaning is deepened by many factors, including culture. Even though intercultural tourism is superficial, and their visit time is limited, visitors should learn appropriate behavior to avoid mistakes while in other cultures/countries. In order to start the intercultural learning process, Hofstede's cultural dimensions stated that the intercultural communication learning process comprises three phases: awareness, knowledge, and skill. Awareness enables learners to notice different or strange signals in an environment and recognize the differences in their own cultural background. Knowledge is obtained by establishing the meaning of the behavior in the new culture and updating their own knowledge. By practicing being aware and updating knowledge, they will gain the skill of awareness and the knowledge to understand the situation and behavior in the new cultural place.

Shopping behavior

In addition to greeting and waiting behaviors, culture also affects communication in shopping situations. For example, culture dictates the manner of the shopkeeper while selling, the style for negotiating a discount, privileges for members or special people, and waiting behavior. We selected the shopping behavior in Thai culture as a subject of investigation, as the Thai shopping style includes random waiting positions and the popularity of negotiating for discounts in informal shopping places. Because Thai culture is Feminine on Hofstede's criteria, shopkeepers are generally flexible and like to maintain a good relationship with favored customers by giving them discounts, and the random waiting positions induce relaxed social interactions indicative of the collectivism of Thai culture. We examined how Japanese participants behave at a shop in Thai culture, especially based on waiting and negotiation. The details of the design and the activities are in Chapter 5.

2.3 DIFFERENT POINT OF VIEW (POV)

First- and third-person POVs provide different perspectives to the learner and are a proposed solution to increase awareness of cultural differences, for awareness is an important step in learning culture (Hofstede et al. 2010).

Degens et al. (2015) conducted a study on different POVs by conducting an experiment involving a story-telling-based scenario, and they proposed a cultural learning experiment with two groups, experienced and inexperienced participants. One scenario for the experienced group told a story about the main character using "you." Participants in this scenario were immersed in the first person. In contrast, researchers told the inexperienced group the story using "he" to immerse the participants in the third person. This study showed that the participants perceived story characters differently depending on the pronoun and the perspective. Their questionnaire results showed that the participants in the experienced group tended to emulate behaviors to understand them (that is, they modeled their behavior on the characters to gain understanding). The inexperienced group, conversely, tended to examine the logic of the situation. From this study, we see that being "inside" or "outside" the conversation can give clues for cultural interpretation.

Denisova & Cairns (2015) engaged in more concrete, game simulation research. They mentioned that the first-person view is more immersive than the third-person view during role-play gaming. While the first-person POV provides the benefit of realism during play, navigating social scenarios tends to work better in the third person. Black (2017) also suggested that the first-person POV provides a participative or embodied experience, giving game players a realistic experience. Alternatively, the third-person POV gives information about the learner's body position, body direction, and behavior or interaction with the environment, including the virtual objects or other agents. Black created an extended experience by producing a third-person POV as another layer of player embodiment. This technique provided a sense of where the people were and how they could interact in their virtual world. To extend this idea from gaming to our cultural simulation, we categorized the advantages of using first- and third-person views by investigating the different information and knowledge achievements from different POVs.

Prior studies used these traditional POVs in their learning systems. However, our research follows the perception and communication theory described in the Introduction. The situational information and the perceiver's background also influenced the perception and interpretation processes. We therefore address both the first- and third-person POVs and their effects on perception and interpretation during observation and interaction in the conversation.

This research uses the core idea of different POV methodology from a previous study, "Synthetic Evidential Study project (SES project)" (Nishida et al. 2015a; 2015b; Ookaki et al. 2015). The SES project presented the benefits of different perceptions from different POVs. We used this essential finding to observe the cultural situation to help learners recognize the different cultures from different POVs.

Synthetic Evidential Study project: SES

Synthetic evidential studies (SES) developed systems that explore different first- and third-person POVs and discussed human perceptions from different POVs (Nishida et al. 2015a; 2015b; Ookaki et al. 2015). These systems allow researchers to carefully examine how and why people participate in a situation. In SES, researchers conducted a workshop to see the different effects of different POVs. First, the participants acted out and discussed the story in a scenario. At this stage, all

participants witnessed the situation and saw the activities in the scenario via only their own role. Second, they asked the participant to observe a simulation of another POV. They permitted the participant to observe the scene from another participant's first-person POV. The results from the workshop showed that, after the participants witnessed the first-person POV of other participants, they gained a deeper understanding of the part played by each role in the scenario. However, the participants better understood the rationale and timing of the interactions from witnessing the third-person POV. We used the benefits of these different POVs to help learners explore cultural communication and interaction from more than one direction.

Human perceptions from experience in the virtual world

In the experimental design process, we considered many behaviors as possible candidates for the targeted activity in the experiment. We chose the waiting behavior because of its fairness-related general rule that still has some local cultural variances (Maister 1984; Leon 1969). A new-comer has to consider many relevant factors when learning a culture's waiting behavior, including facts-based (general rule) and emotion-based (local culture/social rule) factors. We used this concept to find the different perceptions and interpretations in waiting behavior.

2.4 HOFSTEDE'S CULTURAL DIMENSIONS

The cultural dimension framework developed by Hofstede et al. (2010) categorizes the thinking, beliefs, and behaviors of more than 40 countries. Six dimensions of national culture emerged, describing each culture relative to other cultures.

Dimension 1: Power distance. People in high power distance cultures believe the power in society is distributed unequally and accept inequalities among people. People in low power distance cultures strive to equalize the distribution of power to everyone in society. Malaysia is a high PDI country, while the United Kingdom is a low PDI country

Dimension 2: Individualism versus collectivism. A collectivistic culture thinks in terms of "in-group" or "out-group." In an individualistic culture, people expect to take care of only themselves. A society's position is reflected in whether

people's self-image is defined in terms of "I" or "we." China is a highly collectivist culture, and the United States is highly individualist.

Dimension 3: Masculinity versus femininity or achievement-oriented versus cooperation-oriented. In high masculinity cultures, people prefer achievement, competition, and success with rewards. In high femininity cultures, people prefer cooperation, modesty, and taking care of the weak and one's quality of life. Japan is a highly masculine culture, while Chile is highly feminine.

Dimension 4: Uncertainty avoidance. Weak uncertainty avoidance cultures believe, "what is different is curious." In contrast, strong uncertainty avoidance cultures tend to think, "what is different is dangerous." Russia has very high uncertainty avoidance, while India has weak uncertainty avoidance.

Dimension 5: Long-term versus short-term orientation. Long-term orientation cultures are driven by future-orientation (perseverance and thrift), while short-term orientation cultures are driven by past and present-orientation (respect for tradition). Japan has a long-term orientation, and by contrast, Ghana has short-term orientation.

Dimension 6: indulgence versus restraint. Indulgence cultures have societies that are based on basic and natural human drives and believe that people should enjoy life and have fun. Restraint cultures are based on needs and regulations and they believe people should strictly follow social norms. Mozambique scores high in this area, while Italy scores rather low.

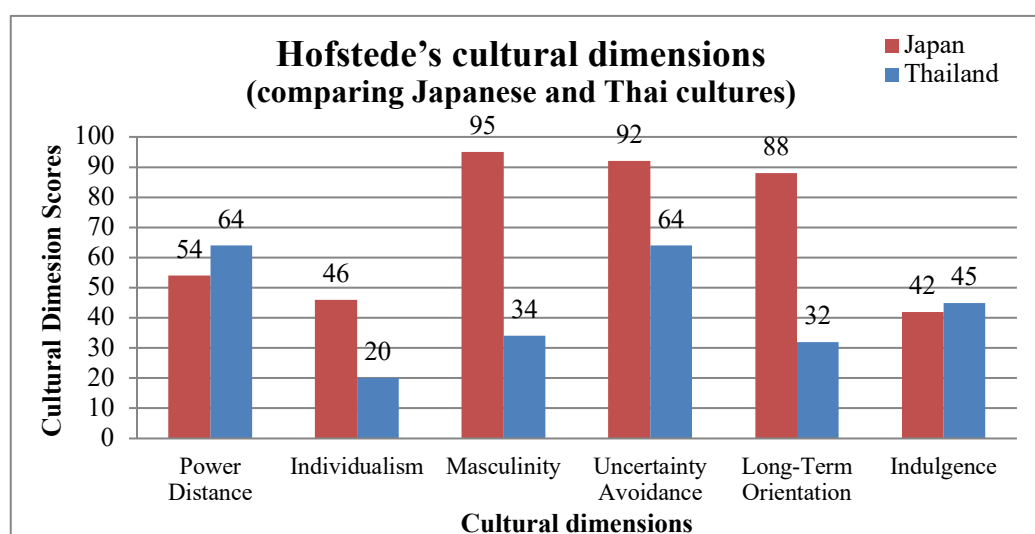


Figure 2.1: Hofstede's cultural dimensions (comparing Japanese and Thai cultures)
(Hofstede et al. 2010)

Hofstede's cultural dimensions were established from responses to the IBM Attitude Survey (Hofstede 2001). This questionnaire asked about the expectations of and satisfaction with working life; the import and satisfaction of goal and work efficiency; working status; career security; salary; and welfare for employees and families; physical working environment; and relationships with co-workers and managers. We cannot find any category or cultural dimension in the questionnaire, so we cannot match the questions and the cultural dimensions directly. We can, however, find the keywords in the questionnaire, such as: challenging; personal sense; cooperative person; freedom; relationship; personal and family; private life; individual; group; rule; and friendly atmosphere. The questionnaire asked about what was desirable and desired, or how people think the world ought to be versus what people want for themselves. These expectation and satisfaction answers were collected and compared between the different national culture, and then *culture* and *value* were defined. The shared value of each culture (dimension) was calculated from the different norms between the desirable and desired. Hofstede et al. (2001) defined the dimensions of cultures based on the common basic problems worldwide (Inkeles & Levinson 1954).

"Culture" describes a collective phenomenon because it is at least partly shared among people who live(d) within the same social environment. Hofstede et al. (2010) described culture as mental programming, the collected pattern of thinking, feeling, and potential acting which a person learns through a lifetime. National culture specifically describes the culture of people in the same country. However, "national culture" might be not suitable to describe all characteristics of all people in a country, because one cannot assume that a country has only a single society. Nevertheless, the nation has at least shared the history of its societies and is a strong integrating force, using the dominant language, representing the national team in sporting competitions, and supporting a national army, products, and services. To account for differences, results in studies using national classifications should be categorized in terms such as "typically Japanese" or "typically Thai" behavior. Another expediency of using national cultural categories culture is ease of data collection at this level than at the level of organic, homogeneous societies. Perhaps the strongest reason to collect data at the national level is that one purpose of this research is enhancing the relationship between different national cultures.

Hofstede et al. (2010) defined values as a key construct to describe mental software. Values represent characteristics of the group. Values are feeling with arrows to them; plus, or minus pole, such as these following things: evil versus good, dirty or clean, dangerous or safe. The same value can be activated in a variety of situations. Cultural dimension values define meaning in practical situations in terms of *key differences* (Hofstede 1994). Key differences, then, explain phenomena particular to specific situations in a society. Hofstede et al. (2010) illustrated more concrete situations from the opposite direction in his report. In this project, we focused on developing a virtual interaction simulation that can increase the learner's awareness of different cultures based on the three most relevant of Hofstede's cultural dimensions to our work through the use of different POVs methodologies.

Dimension 2: Individualism vs. collectivism (IDV). This dimension represents the differences between people. As defined above, collectivism-based cultures feel and identify others as being a part of the in-group or out-group, whereas members of individualism-based cultures believe that there is no group and that everyone is unique. Table 2.1 describes the key differences between collectivism and individualism societies. Japan's score on this dimension is 46; Thailand's is 20.

Table 2.1: The key differences between collectivism and individualism societies (Hofstede et al. 2010)

Collectivism	Individualism
People are born into extended families or other in-groups that continue protecting them in exchange for loyalty.	Everyone grows up to look after him- or herself and his or her immediate (nuclear) family only.
Children learn to think in terms of "we."	Children learn to think in terms of "I."
Value standards differ for in-groups and out-groups; exclusionism.	The same value standards are supposed to apply to everyone; universalism.
Harmony should always be maintained and direct confrontations avoided.	Speaking one's mind is a characteristic of an honest person.
Friendships are predetermined.	Friendships are voluntary and should be fostered.
Resources should be shared with relatives.	Individual ownership of resources, even for children.
Adult children live with parents.	Adult children leave the parental home.
High-context communication prevails.	Low-context communication prevails.
Frequent socialization in public places.	"My home is my castle."
Trespasses lead to shame and loss of face for self and group.	Trespasses lead to guilt and loss of self-respect.
Brides should be young, industrious, and chaste; bridegrooms should be older.	Criteria for marriage partners are not predetermined.
Female friends are the most powerful influence on girls' beauty ideals.	The most powerful influence on girls' beauty ideals is boys in general.

Mascarenhas et al. (2013) and Degens et al. (2015) applied the key differences between collectivism and individualism societies (particularly in- and out-group) to design an experiment and questionnaire. They created the scenario of traveler, or the stranger who travels to different cultural places, and set the individual society, namely the boundary of in- and out-group. Their experiment hypothesized that people in the collectivist society would not be comfortable providing directions to a hotel when asked by a stranger, where in contrast, people in individualistic society will answer the question in a friendly manner and may invite the stranger to join them in an activity or a meal.

Dimension 3: Masculinity vs. femininity or achievement-oriented vs. cooperation oriented (MAS). This dimension describes how gender influences roles in a given culture. In high-femininity cultures, both genders are assumed to be cooperation-oriented. Table 2.2 describes the key differences between feminine and masculine societies. Japan scores a 95, making it a highly masculine culture; Thailand's score of 34 places it on the feminine end of the scale.

The key differences of masculinity versus femininity dimension (i.e., performance versus welfare and conflict versus compromise) were used to design cultural training experiments (Degens et al. 2014). In this scenario, the professor in masculine culture (with performance and conflicts keywords) agreed to extend the deadline of a project when students reasoned that they would perform better on the assignment if granted an extension but did not agree to extend deadlines for personal reasons like the family events. On the other hand, the professor from the feminine culture (with welfare and compromise keywords) agreed to extend deadlines for both reasons because both are important to the students. Swierczek & Onishi (2003) discussed a conflict between a Japanese manager and a Thai subordinate. They explained the specific working situation using the key differences in Hofstede's cultural dimensions, using the MAS and UAI cultural dimensions to describe the conflict between Japanese and Thai cultures. Japanese and Thai people differ widely on MAS and therefore have different concepts of work. In a masculine culture (Japan), one "people live in order work," whereas in feminine culture, one "people work in order to live." These different keywords yield different interpretations of free time, enjoyment, and comfort, and these differences can lead to conflict.

Table 2.2: The key differences between masculine and feminine societies (Hofstede et al. 2010)

Feminine	Masculine
Welfare society ideal; help for the needy.	Performance society ideal; support for the strong
Permissive society.	Corrective society;
Immigrants should integrate.	Immigrants should assimilate.
Government should aid poor countries	Poor countries should help themselves.
The environment should be preserved; small is beautiful.	The economy should continue growing; big is beautiful.
International conflicts should be resolved by negotiation and compromise.	International conflicts should be resolved by a show of strength/fighting.
More voters place themselves left of center.	More voters place themselves in the political center.
Politics are based on coalitions with polite political manners.	The political game is adversarial with frequent mudslinging.
Many women are in elected political positions.	Few women are in elected political positions.
Tender religions.	Tough religions.
In Christianity, more secularization; stress on loving one's neighbor	In Christianity, less secularization; stress on believing in God.
Dominant religions give equal roles to both sexes.	Dominant religions stress the male prerogative.
Religions are positive or neutral about sexual pleasure.	Religions approve of sex for procreation rather than recreation.
Both men and women should be modest.	Men should be assertive, ambitious, and tough. Women should be modest.
Management as ménage; intuitive and based in consensus.	Management as manège; decisive and aggressive.
Relationships and quality of life are important.	Challenges, earnings, recognition, and advancement are important.
Resolution of conflicts by compromise and negotiation.	Resolution of conflicts by letting the strongest win. Rewards are based on equity.
People work in order to live.	People live in order to work.
Competitive agriculture and service industries.	Competitive manufacturing and bulk chemistry.

Dimension 4: Uncertainty avoidance (UAI). This dimension is associated with base levels of stress and anxiety in society. People in high uncertainty-avoidance cultures are anxious in unknown or unpredicted situations. In contrast, people are more relaxed in low uncertainty-avoidance cultures Table 2.3 describes the key differences between weak and strong uncertainty-avoidance societies. Japan has an enormous UAI score of 92, while Thailand has a lower, but still high, score of 64.

Table 2.3: The key differences between weak and strong uncertainty-avoidance societies (Hofstede et al. 2010)

Weak uncertainty-avoidance	Strong uncertainty-avoidance
More changes of employer and shorter service.	Fewer changes of employer and longer service; more difficult work-life balance.
There should be no more rules than strictly necessary.	There is an emotional need for rules even if they will not work.
Work hard only when needed.	There is an emotional need to be busy and an inner urge to work hard.
Time is a framework for orientation.	Time is money.
Tolerance for ambiguity and chaos.	Need for precision and formalization.
Belief in generalists and common sense.	Belief in experts and technical solutions.
Top managers are concerned with strategy.	Top managers are concerned with daily operations.
More new trademarks.	Fewer new trademarks.
Focus on decision process.	Focus on decision content.
Intrapreneurs are relatively free from rules.	Intrapreneurs are constrained by existing rules.
There are fewer self-employed people.	There are more self-employed people.
Better at invention, worse at implementation.	Worse at invention, better at implementation.
Motivated by achievement and esteem or belonging (competitive).	Motivated by security and esteem or belonging (agreement).
Risky investments.	Conservative investments.

Swierczek & Onishi (2003) also discussed and applied the weak and strong UAI societies in the conflict description of the UAI dimension. In this scenario, the Japanese manager preferred to apply the company rule strictly and felt uncomfortable with frequent decision changes, while the Thai employee felt their Japanese manager was too serious in making decisions based strictly on the rule. The Thai employee believed the decision could be adjusted as needed, responding to changes in the work environment.

We have considered these previous works and found the key differences at the heart of many situations. The situations can be changed but the core idea of the key differences remains the same. We thus conclude that we can apply these key differences to create scenarios based on the key differences between Japanese and Thai cultures, as measured by Hofstede's cultural differences.

We used Dimensions 2 and 3 (IDV and MAS) to design the waiting behavior of Japanese and Thai culture in our simulation. People from Japanese and Thai cultures interpret waiting differently: Thai culture is collectivist and feminine (IDV = 20, MAS = 34). Thai people are, generally, relaxed and unhurried and enjoy waiting time because waiting is a social activity. On the other hand, Japanese culture is

individualist and masculine (IDV = 46, MAS = 95). Japanese people are, generally, more competitive and emphasize an equal right more than Thai people. Waiting, for the Japanese, becomes an instrument to achieve their goal. Chapters 3 and 4 detail these cultural differences in waiting situations.

We used Dimensions 2, 3, and 4 to describe the characteristics of a Thai shopping style. Thai culture is collectivist, feminine, and has medium uncertainty-avoidance (IDV = 20, MAS = 34, UAI = 64). Waiting in a random position reflects the medium uncertainty-avoidance of this social activity in Thai culture. Discount and flexible orders also represent privilege in this feminine culture. More details of this study are in Chapter 5.

2.5 CULTURAL LEARNING SYSTEMS

In the last decade, virtual simulation has become popular in many fields (e.g. entertainment, gaming, education, learning systems, business, tourism, and medical treatment/therapy). In the case of learning systems, virtual simulation provides a lesson in realistic situations. The realism is beneficial to the learning system with experiences that carry heavy social or moral importance, such as medical practice (surgical or dental), aeronautical or aerodrome controller training, nursing or first aid training, sport, performance, and communication learning. In other words, realistic simulation is vital training in fields where mistakes have major consequences.

Currently, computer simulation offers a suitable solution for helping people learn to overcome communication difficulties in different cultures, since this is a complicated process of awareness, knowledge, and skill (Hofstede et al. 2010). We cannot set up a real human crowd to practice communication, but we can simulate agents and an environment as a learning system to train people before they travel to different cultural places.

The study of cultural communication has gained popularity over the last decade, and many researchers have developed virtual simulation systems to represent different cultural behaviors and communication styles among learners. Their systems have provided learners with an understanding of different cultural behaviors via complex models of a virtual agent's behavior (Degens et al. 2014; Endrass et al. 2011; Hall et al. 2015; Kistler et al. 2012; Mascarenhas et al. 2013); conversation scenarios (Endrass et al. 2011; Hall et al. 2015; Kistler et al. 2012; Mascarenhas et

al. 2013); or powerful interactive tools or devices (Kistler et al. 2012; Mascarenhas et al. 2013). Users generally observe conversations from a third-person POV as in the real world. They are then asked to interact with an agent from a first-person POV to practice cultural exercises. The learners observe the situation from a third-person POV, just as they are looking at other behaviors as examples (Degens et al. 2014; Kistler et al. 2012; Hall et al. 2015). They are then asked to interact with the agent via the first-person POV (Hall et al. 2015; Mascarenhas et al. 2013), just as in the real world. By these steps, the participant gains experience of cultural agent behavior in the third-person POV, but they also interact through the first-person POV in one-to-one conversational interaction. They are thus able to acquire cultural lessons in observation and interaction via different types of POV. According to the precepts of cultural learning, understanding cultural differences can be difficult, so learners may not be able to recognize or understand fully the cultural knowledge from this simulation process. The difficulty of this process is that the participant has to adapt the knowledge from the third-person POV observation section to alter their behavior in the first-person POV testing section.

Chapter 3: Investigating the Different Effects of First- and Third-person POVs on Communication

In this chapter we ask, “Do the different POVs lead to different perceptions in the waiting situation?” We attempt to find the perceptual differences from observation and interaction via different POVs: first- and third-person POVs. We asked Japanese participants to observe and interact in the waiting situation. We analyzed the participants’ consideration of waiting factors to find different perceptions between first- and third-person POVs and found that third-person POV participants preferred fairness while waiting, while the first-person POV participants considered the situation based on their feelings and interaction with the service-persons.

3.1 MOTIVATION

We installed a system to allow learners to investigate a scene from two different perspectives: first- and third-person POVs. The participants who observed from afar (third-person) tended to see events and sequences more clearly because they were outside the conversation. In contrast, the participants who were standing near the target (first-person POV) were involved the conversation and could clearly see and hear the details of the conversation.

We emphasized the awareness process concerning cultural differences and conducted experiments that provided us with a solution that increased awareness of cultural differences. The two different POVs—first- and third-person—constituted one solution for helping participants realize and recognize different values in the cultures in this study.

Observing cultural activities in a crowd is a challenge because not only the person in front of the participants but also the environment surrounding the participants can influence situational decisions. A simple activity for crowd simulation is queue waiting, which invokes many opinions about and examples of fairness (Rafaeli, Barron & Haber 2002). Fairness is an important issue for peaceful communication. Many factors, including culture, affect ideas of fairness. People may

interpret the same situation differently, depending on their culture. Our research emphasized the parameters established by cultural influences on fairness in waiting behavior. Waiting behavior (Maister 1984) was examined in this experiment because of its complex cultural dimensions. The “queuing fairness” scenarios contained many cultural, personality, situational, and role-of-attention factors. Parameters such as waiting style, queue-jumping, speed of service, and rules were considered. Our study introduced first- and third-person POVs for participants to observe the queuing scenarios.

Perception is a critical factor for interpreting situations. We detected perceptual differences when participants changed POVs, and we evaluated the results to determine the most suitable POV for accommodating our communication learning assistance system. The research question was: “Do different POVs affect the different perceptions of participants while waiting?” We investigated the different perceptions, interpretations, and reactions of participants who participated the waiting situations from different POVs (first- and third-person). We developed two hypotheses based on the targeted behavior—waiting activity—to observe the effect of different POVs.

Hypothesis 1: First-person POV participants will prefer familiar waiting styles because they worry about unfamiliar behaviors.

Hypothesis 2: Third-person POV participants will prefer fair services because they understand the facts and rules of the situation.

3.2 PERCEPTION DESIGN FOR VIRTUAL COMMUNICATION SYSTEM

We describe herein the methods used to examine the effects of different POVs on participants’ learning. Perception plays an important role in the communication process; thus, we continually emphasized concrete factors of perception and methodology for this experiment.

3.2.1 Perception for Communication in Waiting Behavior in Crowds

We sought the concrete effects of communication perspectives so we could improve the communication learning process based on a simulated crowd (Thovuttikul et al. 2011). Such simulations help people learn human nonverbal communication in a virtual space. Our technology captured the human body and presented avatar movements in a virtual environment for participants. We designed

an agent and an environment help learners interact. The agents' behaviors pertained to the communication lesson, and the participants learned different behaviors while interacting with the agents. Nonverbal behaviors (e.g., standing position, posture, head direction, hand gestures) are useful in communication. We leveraged such behaviors for our experiment and represented them using the agents' and participants' avatars.

Customer agents' waiting behavior. Two ticket counters, A and B, represented different waiting styles. The participants could simultaneously see both counters from the same distance. The participants could comprehend the different waiting styles of the customer agents from their positions, walking movements, and body directions.

Line-waiting Counter A. Customer agents queued up in a line, each behind the previous agent, following closely.

Group-waiting Counter B. Customer agents crowded the counter in random position.

Queue-jumping customer. One customer agent was friends with the service-person. He cut the line and directly addressed the service-person avatar. The participants were unable to respond to this behavior; they could only observe it.

Service-person avatar's fairness and integrity. The service-person avatar served all customer agents by the first come, first served (FCFS) rule in all cases. The service-person avatar identified the next customer via a hand-pointing motion and faces and attended solely to the customer. The service-person avatar notified and focused on the next customer when the service was complete. The service-person avatar chose from two responses when the queue-jumping customer arrived: accept or reject the queue jumper.

Defined rules for service-person and customer behavior. The interaction between the service-person avatar and the customer was programmed (see Figure 3.1). The service-person avatar provided participants and customer agents with tickets at the counter. The scenario consisted of the following four steps:

1. The service-person greeted the customer by saying "Hello".
2. The customer requested a ticket, then a ticket icon was shown.

3. The service-person acknowledged the order by saying “thanks” to the customer and preparing the ticket in approximately 5 seconds.
4. The service-person avatar passed the ticket to the customer, who takes the ticket in hand and departs, walking away from the counter.

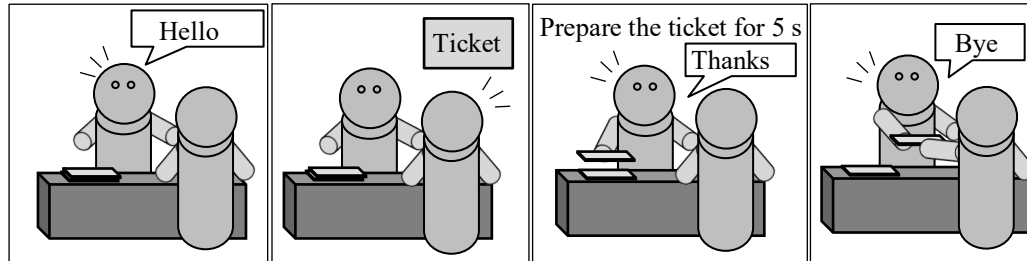


Figure 3.1. Storyboard of defined rule for service-person and customer behavior.

We designed the wait in front of the counter as the main activity. Conditions, such as fairness behavior (response of friend of service-person), service rule (first come, first served), and waiting style (line- and group- waiting), were the factors of fairness that participants observed. We show all possible cases in Table 3.1.

Table 3.1. Activities of Service-person and Customer in Five Experiment Sessions

Session 1		Session 2		Session 3		Session 4		Session 5	
Counter A	Counter B	Counter A	Counter B	Counter A	Counter B	Counter A	Counter B	Counter A	Counter B
Line waiting style	Random group waiting style	Line waiting style	Random group waiting style	Line waiting style	Random group waiting style	Line waiting style	Random group waiting style	Line waiting style	Random group waiting style
No queue-jumper customer		Queue-jumper customer go to counter where participant waits for ticket		Queue-jumper customer go to counter where participant waits for ticket		Queue-jumper customer go to counter where participant waits for ticket		Queue-jumper customer go to counter where participant waits for ticket	
Service-person do not provide any response to queue-jumper		Both Service-person reject ticket request from queue-jumper		Service-person accept ticket request from queue-jumper	Service-person reject ticket request from queue-jumper	Service-person reject ticket request from queue-jumper	Service-person accept ticket request from queue-jumper	Service-person accept ticket request from queue-jumper	

After observing, the participant chose an acceptable counter depending on their preference. We provided a practice session (Session 1) for training participants. We did not include the queue-jumper during this session. We added the queue-jumper in sessions 2–5. The service-person at Counter A and Counter B will either reject or

accept the queue-jumper based upon a shuffle to ensure balance. We give an example experiment consisting of five sessions for a participant in Table 3.2.

Table 3.2. Example of Experiment Sessions and Service-Person’s Behavior

Session	Counter A Line-waiting	Counter B Group-waiting
1 (Practice)	Service-person: Fair (No jumper arrives at counter)	Service-person: Fair (No jumper arrives at counter)
2	Service-person: Fair (Rejects jumper’s order)	Service-person: Fair (Rejects jumper’s order)
3	Service-person: Unfair (Accepts jumper’s order)	Service-person: Fair (Rejects jumper’s order)
4	Service-person: Fair (Rejects jumper’s order)	Service-person: Unfair (Accepts jumper’s order)
5	Service-person: Unfair (Accepts jumper’s order)	Service-person: Unfair (Accept jumper’s order)

3.2.2 Different Perceptions from Different Points of View

We separated participants into two groups to observe their different reactions and perceptions of agent interaction. We applied factors like those in the aforementioned Degens et al. (2015), which used scenarios with “you” or “he” that led participants to inherit the appropriate POV. In that experiment, participants only read scenarios, which did not allow much control. In our experiment, the participants saw an example with “my action” and “his action” and personally responded to the agents in our simulation system. Our experiment also supported that aspect of the SES framework (Nishida et al. 2015a; 2015b; Ookaki et al. 2015). The SES framework examined how people understand different perceptions, feelings, and rationales from the first- and third-person POVs (the two participant groups). Figure 3.2 shows the camera settings.

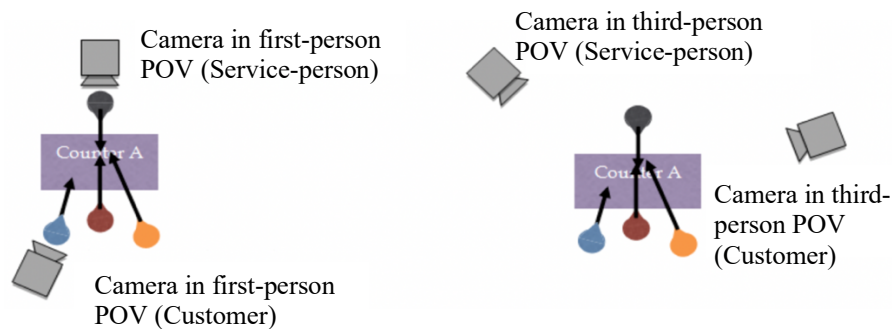


Figure 3.2. Different camera positions for observation and avatar control (left: first-person view; right: third-person view)

We showed the same simulation from different POVs using different camera positions. We installed the first-person POV camera near the eye-level of the customer avatar, tracked the avatar, and changed it based on its viewing position. The third-person POV camera was static, positioned close to the counter, and captured all customer agents, including the participants' and service-persons' avatars.

We must understand how learners observe the interactions and communications in the simulation system to evaluate their interpretations. The behavioral reactions and the inner state of the participants are very important and are necessary for analyzing the perceptions of different POVs to test our hypotheses. We designed and implemented the virtual environment as a tool to investigate the participants' perceptions and interpretations when they were interacting in our system.

We selected the waiting behavior as an example of group of conversation in the human crowd because people know and are familiar with the general waiting and the FCFS rule. Often, waiting also includes a local social rule that may affect the waiting styles depending on cultural differences. The difference is easily mimicked, but learners may not understand the hidden reasons because they judge the situation from their own cultural backgrounds and experiences.

Our targeted at this first stage was communication from different POVs methodology so that in this experiment, we could verify its diverse effects on perceptions and interpretations of situations.

3.3 EXPERIMENT

3.3.1 Task

We asked participants to imagine attending an international theme park where people from different cultural backgrounds share public spaces. The park consisted of five locations: the parking area, the main gate, the castle amusement, the food center, and the souvenir shop. Each location had its own gate. All customers, including the participants, had already purchased a ticket for unlimited playing and eating in all areas. To pass through each gate, play the amusements, or get food and souvenirs, they first had to visit the staffed ticket service counter to receive a paper ticket. If a staff member wanted to obtain access to an area, that person had to wait at the counter along with the customers. The participants could wait at either of two

counters; Counters A and B served all customers and staff via the FCFS rule. The service-person avatar at each counter was a different person. The service behaviors at each location reflected different reactions to queue jumpers.

The virtual ticket counter (VTC). The VTC system was a shared virtual environment for the participants to observe all activities and interact with a customer agent, two service-person avatars, and a queue-jumper customer. We set up a shared virtual environment on two computers with sharing on a network for participants to converse, as shown in Figure 3.3. In the VTC, the participant used their terminal to participate in the shared virtual space. We designed a simple agent behavior model to control the agent's behavior: walking, collision avoidance, requesting and receiving a ticket, and waiting at the counter. We used Microsoft Kinect sensor Version 2 to capture participants' body movements and transfer them to control the avatars' movements and posture. It also captured the participants' walking posture for the avatars' walking movement and measured participants' rotation for left- and right-turning actions.

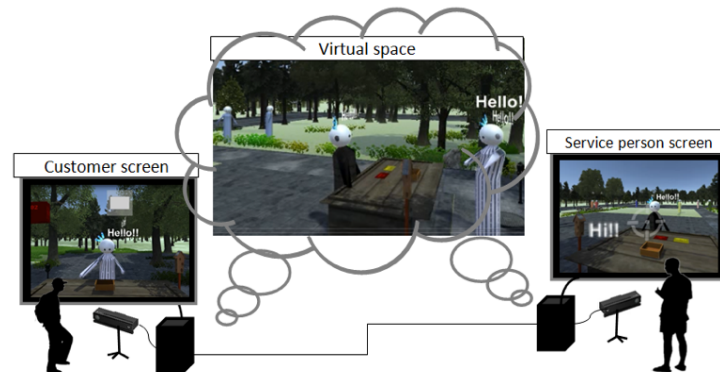


Figure 3.3. System setting and a screen shot of the system.

Participants. The participants were able to see space and objects in the virtual environment, including the ticket and the counter. In the VTC, the participants interacted with all customers and the service-person avatar by moving their bodies. We captured the participants' body movements, walking, turning left and right, and hand movements using Microsoft Kinect sensor, then transferred them to control the participants' avatars' body postures, body and face direction, and walking movement and direction. Figure 3.4 shows the details of the simulation model.

Customer agent and queue-jumper customer agent. We designed a simple behavior model to control the agents' behavior and movement: walking, collision avoidance, requesting and receiving a ticket, and waiting at the counter. The queue-

jumper customer's behavior model was similar to the customer agent's, but when the ticket counter was opened, the queue-jumper customer suddenly stopped close to a targeted ticket counter and immediately requested for the ticket after arriving at the counter. Figure 3.5 illustrates both the customer agent's behavior models.

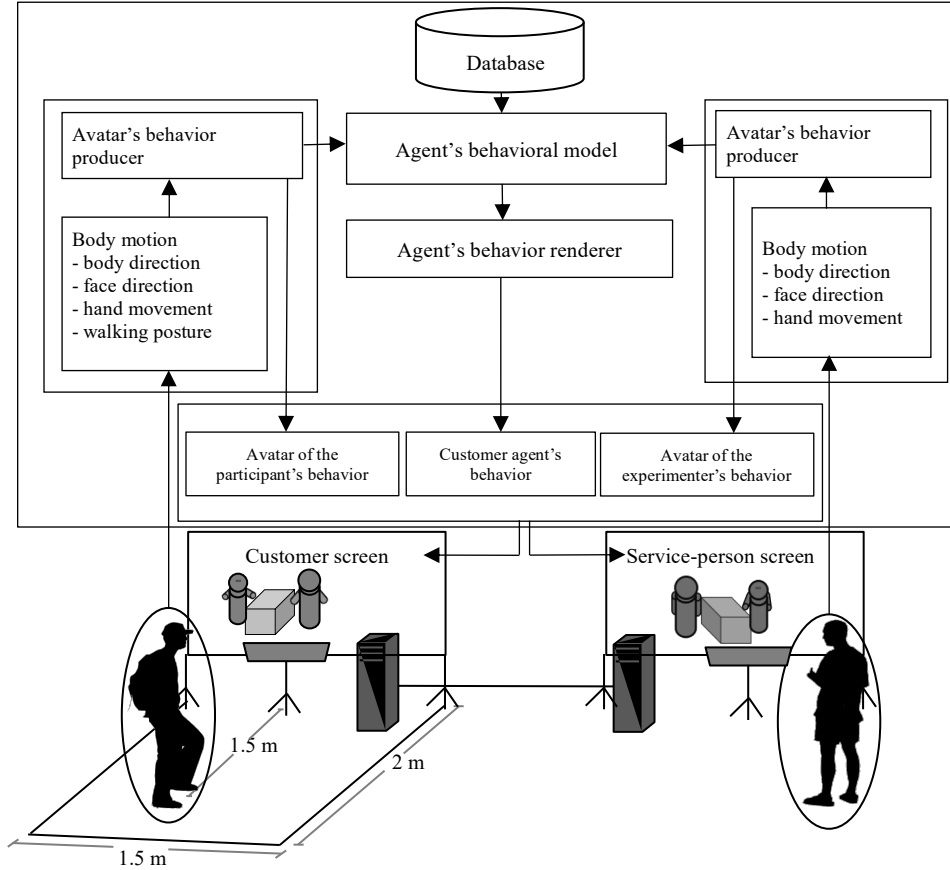


Figure 3.4. Environment setting and model of the simulation system

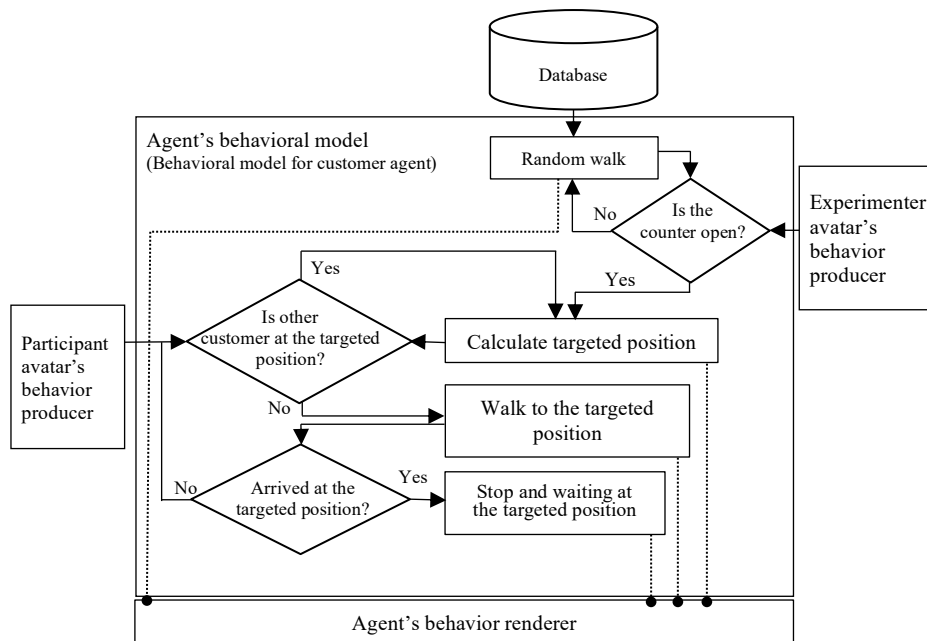


Figure 3.5. Agents' behavior model

Service-person. The WOZ system has also been used by experimenters, cultural communication experts, to control the service-person avatar. All behaviors and responses were based on the defined rules introduced in Section 3.2.1. Therefore, the service-person avatar could naturally respond to the participant because the experimenter could see a participant's avatar and make decisions in real time.

Activities. The service-person avatars stood at Counters A and B to serve tickets to the customer agents and participants. The customer agents walked directly to the targeted counter and stood in front of the counters to wait for tickets. They formed a line in front of Counter A and stood at a random position at Counter B. The participants had to walk to a counter and wait with the other customer agents to get a ticket.

3.3.2 Procedure

We asked the participants about activities and conversations between the customers and the service-persons in the experiment to find any differences in perception between the two groups. We started each session by asking learners to observe a video of the activities in the virtual space.

We introduced examples of typical behaviors to the participant for concrete activities in which they had to interact with the customer agents and the service-person. We presented a video about the simulated customer agents' activities (i.e., walking to the counter, waiting for the ticket in front of the counter, requesting the ticket, receiving the ticket from the service-person, and leaving the counter after activities at the counter were finished) to the participant. The videos also showed the queue-jumper customer's behavior and the service-persons' responses to the queue-jumper customer's request. We shot the video from the same environment of the virtual simulation used in our experiment.

The participants in the first-person POV group observed only the first-person view. Similarly, those in the third-person POV group observed only the third person view. The video illustrated an interaction at the counter, which lasted for 3 minutes for each waiting style. We then asked the participant to practice getting a ticket from both counters one at a time. After a participant had experienced the system from the observation and interaction practice phase with both service-persons at both counters, we asked the participant to go to either ticket counter three times to get tickets in the

interaction confirmation phase. This could be the same counter three times, or it could be any combination of the two counters. Each session consisted of three phases, as shown in Table 3.3.

During the interaction-confirmation phase, we asked participants to select the counter they wanted to visit and wait for a ticket three times. We call this the “counter selection result.” After each session, we asked the participants to annotate their reason for each their counter choice. We did not suggest or fix any rules or guidelines for this phase. We called this process produced the “reasoning result.”

The perceptions and the interpretations derived from the different POVs were the targeted factors in this experiment. The questionnaires collected the participants’ understanding of the situation, their counter-selection reasoning, and the inner state data from the participants. (To view the questionnaire for Experiment 1, see Appendix I.) In the questionnaire, we asked each participant to answer the following two questions:

1. What counter did you select in each session? Please answer for all three times of the counter visit. (We used this answer as the counter-selection result.)
2. What was the reason for each counter selection? Any reason is acceptable as the reasoning. (We used this answer as the reasoning result.)

Table 3.3. Participant Activity Phase of Each Session

Participant activity phase	Participant activity	Tools
1. Observe (the video) phase	Watch an interaction example	Video of the interaction between the service-person avatar and the customer agent at Counters A and B
2. Interaction practice phase	Try to control avatar to get a ticket (confirm knowledge from the observation phase)	VTC system (Figure 3.3): participants make their avatars walk to the counter and order tickets
3. Interaction confirmation phase	Control avatar to get three tickets at counters they choose	

3.3.3 Experiment Setting

In designing the experiment to measure participants' perceptions in the virtual world, we made the conversations simple and easy to understand because natural and simple communication is most easily understood. The VTC was a shared virtual environment built on the SES support environment. Each participant used a terminal to participate in the shared virtual space. We introduced the service-person avatar by an experimenter using WOZ (Lala, Thovuttikul & Nishida 2011).

We controlled the avatars of the participants and service-persons in the virtual simulation by the human body movement. We controlled the participants' avatars with their body movements, and the experimenter—a cultural communication expert—controlled the service-person's avatar. We used the Kinect sensor to capture the body movements. Figures 3.5 and 3.6 show the participants' walking postures from the first- and third-person POVs. We placed two groups of participants in two positions of observation and interaction.

We implemented the system to run on two personal computers connected by a client-server network system. Both computers ran the 64-bit operating system Microsoft Windows 7, with 4 GB RAM. We developed and ran the virtual simulation using Unity3D editor, Version 5 (Unity Technologies, 2017, 2018). The human body movement was an input from the system used to control the avatars' behavior. The customer agent was controlled by the agent's behavior model for walking, standing (waiting at the counter), requesting a ticket, receiving a ticket, and leaving the counter after getting the ticket.

Space and physical environment setting. The participants interacted with our system in front of a screen (Sharp PN-L702B, 70-inch diagonal size display (65 inches wide by 38.7 inches high). During the interaction, participants stood away from the screen at a distance between 1.5–2 meters, depending on their activities; when they walked forward, they were about 1.5 meters from the screen, and when they stepped backward, they were 1.8–2 meters away. Kinect Sensor Version 2 was placed in front of the participant's body close to the large screen.

Camera setting for first-person participants. Each first-person participant observed the scenario in the virtual space as an actor. We attached the camera at the head of the avatar (left side, Figure 3.2). When participants walked in the virtual

space, they saw the movement because the camera moved with the avatar (Figure 3.6).

Camera setting for the third-person participants. Third-person participants witnessed the scenario in the virtual space as observers (Figure 3.7). We used a fixed camera positioned near the counter (right side, Figure 3.2) to capture the participant's POV. The participants could control the avatar's movement just as the first-person participants could, but their viewpoint was fixed from a position near the counter.

3.3.4 Participants

We recruited 32 Japanese undergraduates' students (average age: 21.2, age range: 18–27, males: 16, females: 16, SD: 2.01) via ads posted from Kyoto University, Japan. Eight male and eight female participants joined the experiment in the first-person view setting, and eight males and eight females joined the experiment in the third-person view setting. Figure 3.6 shows the participants' walking postures in the first-person POV during the experiment. Figure 3.7 presents the walking postures for the third-person POV. The participants in Figure 3.6 assumed the first-person view, whereas the participants in Figure 3.7 were walking in the virtual space while controlling the avatar in the assumed third-person view.

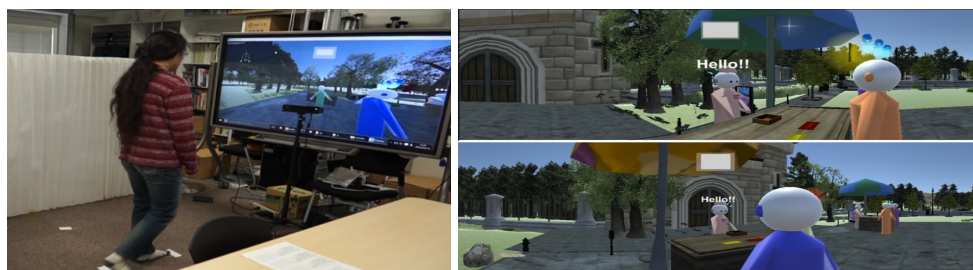


Figure 3.6. Example of different first-person POVs (left: participant during the experiment; top right: first-person POV in the group-waiting scenario; bottom right: first-person POV in the line-waiting scenario)



Figure 3.7. Example of different third-person POVs (left: participant during the experiment; top right: third-person POV in the group-waiting scenario; bottom right: third-person POV in the line-waiting scenario)

3.3.5 Experiment Results

We used the participants' counter selection and their reasoning of selection as the key experiment results. The participants had three opportunities to select counters and receive three tickets. They were able to freely select the same or a different counter during each session. The results of selecting Counter A or Counter B were totaled counted. We analyzed the reasoning results from the written answers in the questionnaire.

Counter selection results. We obtained all 48 counter selections from the 16 participants in each POV group. Each participant had three chances in each session ($n = \text{number of participants in group} \times 3 \text{ chances of selecting ticket} = 16 \times 3 = 48$). Table 3.4 shows the counter selection result. We found that when both counterpersons served tickets fairly (as in Session 1) and no queue-jumping customers were in the waiting activities, the first-person POV participants (58.3%, $n = 48$) waited in line at Counter A more often than the third-person POV participants did (47.9%, $n = 48$). In contrast, the third-person POV participants (52.1%, $n = 48$) selected group-waiting in random positions at Counter B more than the first-person POV participants did (41.7%, $n = 48$).

When a queue-jumper arrived at the counter, and at least one of the service-persons rejected the queue jumper, the first-person POV participants continued to select line-waiting at Counter A over Counter B during Session 2 (64.6%, $n = 48$), Session 3 (54.2%, $n = 48$), and Session 4 (56.2%, $n = 48$). Meanwhile, the third-person POV participants selected line-waiting at Counter A during Session 2 (58.3%, $n = 48$) when both service-persons were fair. They selected only fair service-person in Session 3 (64.6%, $n = 48$) and Session 4 (70.8%, $n = 48$). When both service-persons became unfair in Session 5, most of the first-person POV participants (56.2%, $n = 48$) and third-person POV participants (54.2%, $n = 48$) chose group-waiting at Counter B.

We applied the analysis of variance (ANOVA) to calculate our results and found no significant differences between first- and third-person POVs groups in all sessions. The counter selection result analysis from both groups (first- and third-person POV groups) did not have any relationship; thus, we continued to analyze the counter selection results and found that all participants randomly selected counters. For example, in three examples of the interaction confirmation session, one

participant selected counters A, B, and A, reasoning that he wanted to try to wait at Counter A, then try Counter B. After trying both counters, he finally selected Counter A because of the line. Another participant, who selected Counter A three times, gave the same reason: he preferred waiting in line at Counter A. We found that it was very important to look at the reasoning provided in the questionnaire. The counter-selection results could not confirm the participants' perceptions and interpretations because they did not always select the same counters for the same reasons. For example, both participants in the previous example selected the same counter for different reasons: they were really trying, or they really wanted to wait in line. Nevertheless, the reasoning results more clearly defined the participants' perceptions.

Table 3.4: Total Counter Selection Results for Each Session of First- and Third-person POVs

POV	Session 1		Session 2		Session 3		Session 4		Session 5	
	Counter A No jumper	Counter B No jumper	Counter A Reject jumper	Counter B Reject jumper	Counter A Accept jumper	Counter B Reject jumper	Counter A Reject jumper	Counter B Accept jumper	Counter A Accept jumper	Counter B Accept jumper
First-person POV (<i>n</i> = 48)	28 (58.3%) (1.750)	20 (41.7%) (1.250)	31 (64.6%) (1.937)	17 (35.4%) (1.063)	26 (54.2%) (1.625)	22 (45.8%) (1.375)	27 (56.2%) (1.687)	21 (43.75%) (1.313)	21 (43.75%) (1.313)	27 (56.2%) (1.687)
Third-person POV (<i>n</i> = 48)	23 (47.9%) (1.438)	25 (52.1%) (1.562)	28 (58.3%) (1.750)	20 (41.7%) (1.250)	17 (35.4%) (1.063)	31 (64.6%) (1.937)	34 (70.8%) (2.125)	14 (29.2%) (0.875)	22 (45.8%) (1.375)	26 (54.2%) (1.625)

Reasoning results. Owing to their free-counter selection, we asked the participants to select a counter three times and asked them to write a reason for each selection. We categorized this reasoning by grouping similar reasons: queue-jumping-customer/fairness; waiting style/waiting position; speed; interaction with service-person; and feeling. Table 3.5 shows the reasoning categories. We categorized the data based on the meaning of each word used to describe (Hofstede 2001) the participants' reasoning for their counter selections (Table 3.5) (Maister 1984; Rafaeli, Barron & Haber 2002). We counted the reasoning results without considering the counter selection results because we wanted to consider only the stimuli that the participant perceived from our system. One counter-selection reasoning may contain reasons from many categories. For example, a reasoning result might be "I liked the service-person's response to the customers." That counter-

selection reasoning result would count in two categories, “like” would place it in the feeling category, and “service-person’s response to the customer” would place it in the category of interaction between service-person and customer.

Table 3.5. Reasoning Categories

Reasoning Categories	Reason for Counter Selection
1. Fairness	Friend jumper customer, friend was rejected, friend was accepted, worried about jumper, jumper’s coming, non-jumper’s coming
2. Waiting style	Line-waiting, group-waiting, random position, waiting position, standing style, orderly line, free style to select the waiting position
3. Speed	Quicker service, slower service, shorter waiting time, longer waiting time, small number of waiting customers, same waiting time, get ticket faster, takes a long time
4. Interaction	Eye contract from service-person, jumper told to go to the end of the line, jumper’s request rejected, jumper’s request accepted, nice service-person, service-person’s reaction, bad service, fair service, good service-person
5. Feeling	Liked the service, boring to wait in line, wanted to observe both counters, feel bad with service-person

We obtained all 240 reasoning results from the 16 participants in each POV group. The participants selected a counter three times and wrote their reasoning once of each session. Then we counted all the reasoning results for the 5 categories ($n = \text{number of participants in group} \times \text{sessions} \times 3 \text{ choices} = 16 \times 5 \times 3 = 240$ reasoning results). We used all 240 reasoning results in the statistical analysis because all three choices of counter selection were important to verify the perception of the participants individually. First, to determine the probability of occurrence of each reasoning in the participant’s perceptions in both first- and third-person POV groups, we used the Fisher’s exact test to analyze the reasoning results—fairness, waiting position, speed, interaction, and feeling. We counted the reasoning results, and we showed these results in Tables 3.6 – 3.10.

Table 3.6. Fairness Reasoning Results in All 5 Sessions

POV	Considered Fairness	Did Not Consider Fairness
First-person POV	70	170
Third-person POV	103	137

Table 3.7. Waiting Position Reasoning Results in All 5 Sessions

POV	Considered Waiting Position	Did Not Consider Waiting Position
First-person POV	95	145
Third-person POV	87	153

Table 3.8: Speed Reasoning Results in All 5 Sessions

POV	Considered Speed	Did Not Consider Speed
First-person POV	67	173
Third-person POV	75	165

Table 3.9: Interaction Reasoning Result in All 5 Sessions

POV	Considered Interaction	Did Not Consider Interaction
First-person POV	49	191
Third-person POV	20	220

Table 3.10. Feeling Reasoning Results in All 5 Sessions

POV	Considered Feeling	Did Not Consider Feeling
First-person POV	39	201
Third-person POV	14	226

Significantly different results were found between the different POV groups in fairness, interaction, and feeling reasoning: (1) 103 out of 240 participants in the third-person POV group (42.92%) considered fairness reasoning ($p = 0.0012$) more often than 70 out of 240 participants in the first-person POV group (29.17%); (2) in contrast, 49 out of 240 participants in the first-person POV group (20.42%) considered interaction reasoning ($p = 0.0001$) more often than 20 out of 240 participants in the third-person POV group (8.33%); and (3) in feeling reasoning, 39 out of 240 participants in the first-person POV group (16.25%) considered feeling reasoning ($p = 0.0002$) more often than 83 out of 240 participants in the third-person POV group (5.83%).

As described in Section 3.2, we controlled for two factors (customer waiting style and service-person fairness) to determine the different perceptions across conditions. We defined the counterpersons' fairness and the waiting styles to categorize the results into two groups: same (fairness in Sessions 1, 2, and 5) and different (fairness in Sessions 3 and 4) conditions. In Sessions 1, 2, and 5, both counterpersons provided the same kind of service (they were both fair in Sessions 1 and 2 and unfair in Session 5). In Sessions 3 and 4, the service-persons at Counters A and B, respectively, were unfair.

The customer waiting styles at Counters A and B remained the same in all five sessions. The participants attended to both factors: service-person fairness and general waiting style. However, when one of the factors changed, some reasons became more common, and others became less common. We divided the data into the "same" (Sessions 1, 2, and 5) and "different" (Sessions 3 and 4) condition groups to analyze these two factors.

We show the reasoning results between the same and different conditions of the counterpersons' fairness in the box plot in Figure 3.8. For example, in the fairness reasoning group, if we totaled the number of participants who gave (or did not give)

this reason, then we can see a pattern in the results from the participants in each group.

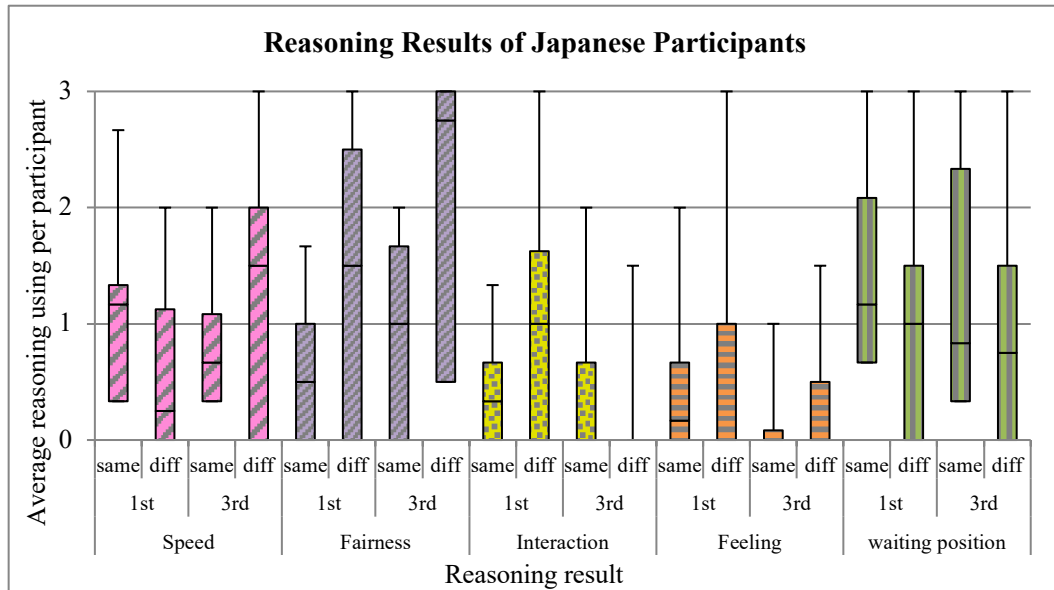


Figure 3.8. Reasoning results of Japanese participants.

We also used the ANOVA analysis to analyze the reasoning results and found the greatest effect with a significant difference between the two POV groups of participants was for the interaction reasoning result ($F(1, 30) = 6.101, p = 0.0194$) and the feeling reasoning result ($F(1, 30) = 3.319, p = 0.0785$). The results showed an interaction between the two POV groups on both the speed ($p = 0.0058$) and interaction ($p = 0.0021$) reasoning results. Other significant differences in effects were between the same and different fairness conditions, fairness ($F(1, 30) = 23.845, p < 0.001$), waiting position ($F(1, 30) = 6.567, p = 0.0157$) and the interaction ($F(1, 30) = 4.604, p = 0.0401$) reasoning result.

We used ANOVA analysis on the data to compare the results of the first- and third-person POV groups in more detail between the same and different conditions of the service-persons' fairness. We next analyzed the ANOVA results, with the means of the data plotted in Figures 3.9–3.13.

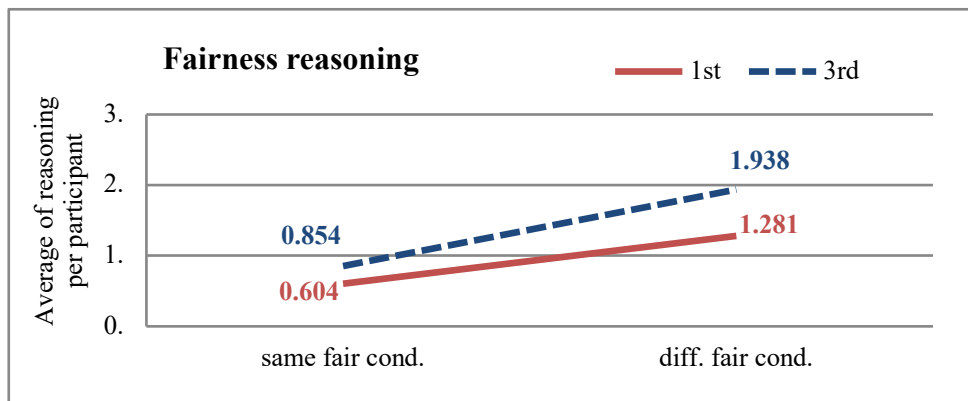


Figure 3.9. ANOVA of the fairness reasoning in the “same conditions” and the “different conditions”

In fairness reasoning, third-person POV participants gave “fairness” as their reason more frequently than first-person POV participants in both the same and the different conditions. Figure 3.9 shows that participants from both POV groups increasingly named “queue-jumping-customer/unfair service” or “fairness” as their counter selection reasoning for sessions in which service fairness differed.

Figure 3.10 shows that participants from both POV groups decreasingly named “waiting position” as their counter selection reasoning for sessions in which service fairness differed.

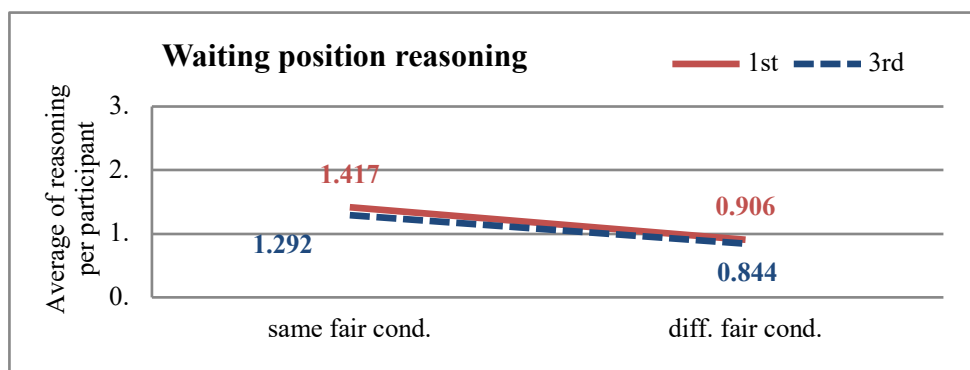


Figure 3.10. ANOVA of the waiting position reasoning in the “same conditions” and the “different conditions”

We found an ANOVA interaction effect in both the speed and the interaction reasoning categories. Figure 3.11 illustrates a speed reasoning result showing that first-person POV participants cited “speed” as a reason for their counter selections when both services were the same: both fair or unfair. In contrast, third-person POV participants gave their reasons for counter selection as “speed” more often when only one service-person was unfair.

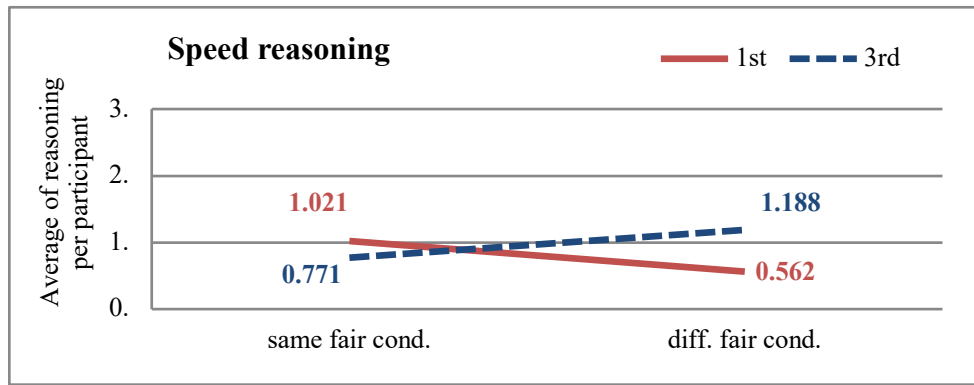


Figure 3.11. ANOVA of the speed reasoning in in the “same conditions” and the “different conditions”

The interaction reasoning results appear in Figure 3.12. We found a significant difference in the effect of POV: the same–different fairness effect and an interaction effect. We can see in the graph of the interaction between the two groups of participants, the first-person POV participants increasingly paid attention to how the service-person interacted with them when one of the counterpersons was unfair, whereas the third-person POV participants decreased their attention to the interaction with the service-person.

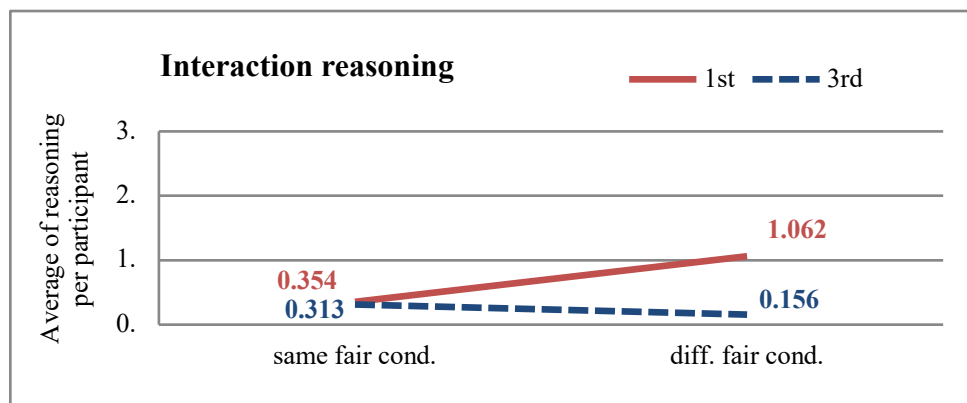


Figure 3.12. ANOVA of the interaction reasoning in the “same conditions” and the “different conditions”

We found a different effect for the feeling reasoning in the questionnaire. Figure 3.13 shows that participants in both groups increasingly used emotions to make choices when the service-person showed various fairness levels. The participants in the first-person POV group cited feelings significantly more often than the participants in the third-person POV group in all cases.

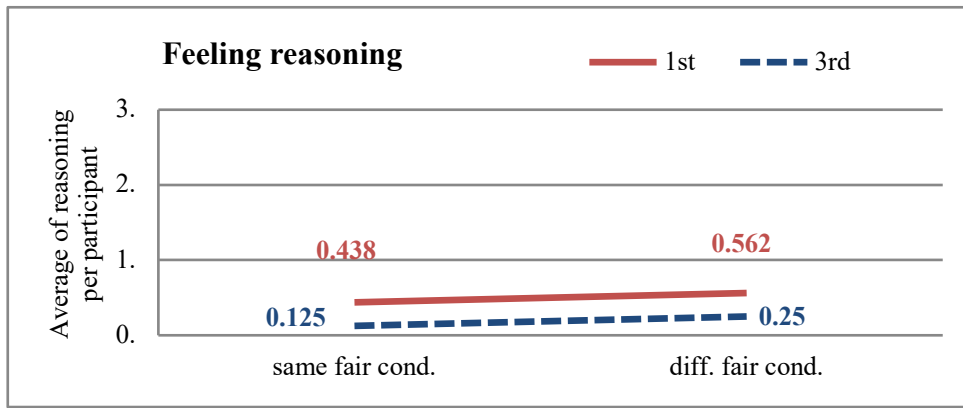


Figure 3.13. ANOVA of the feeling reasoning in the “same conditions” and the “different conditions”

3.4 DISCUSSION

We conducted an experiment to find the perceptual differences in culture-related waiting behavior from different points of view in both observation and interaction settings. These results provided evidence that it is not only the agents’ behavior, as target objects of the conversation, that is the main cause of perception differences. Different settings (e.g., different POVs) affecting the participants are also significant causes of perceptual differences.

We found significant effects between the different POVs groups in fairness ($p = 0.0012$), interaction ($p = 0.0001$), and feeling reasoning ($p = 0.0002$) from the reasoning result of all five sessions. These results showed that the different POVs lead to different perceptions. Therefore, we needed to examine the reasoning results in more detail to identify the basis for the different perceptions of two separate factors: waiting style and service-person’s fairness.

Comparing the same- and different-fairness condition sessions (same-fairness condition were Sessions 1, 2, and 5 and the different-fairness condition was compared in Sessions 3 and 4); all participants paid less attention to the waiting style (Figure 3.10) while increasing the amount of attention to queue jumpers and service fairness (Figure 3.9). We also found significant differences in the counter selection reasons related to speed (Figure 3.11) and interactions with the service-person (Figure 3.12). The third-person POV participants cited speed more frequently as the reason for their choices and ignored their interactions with the service-person, whereas the first-person POV participants were interested in interactions and not speed when the service-person was unfair. The first-person POV participants used

their feelings more to make decisions compared to the third-person POV participants. These findings allowed us to answer and verify our earlier hypotheses.

Hypothesis 1: First-person POV participants will prefer familiar waiting styles because they worry about unfamiliar behaviors.

We expected that the Japanese participants who participated in the experiment in the first-person view would always select line-waiting because Japanese culture is highly accustomed to this. The counter selection results showed that the number of first-person POV participants who selected waiting in a line was higher during sessions 1–4 (Table 3.4). Unfortunately, we could not find any significant difference in the waiting position reasoning between the two participant groups.

Moreover, the perception of the first-person POV group was a subjective view, and its participants stated that they preferred good interactions and feeling reasoning more frequently than the third-person POV participants. Figures 3.12 and 3.13 show the results.

Hypothesis 2: Third-person POV participants will prefer fair services because they understand the facts and rules of the situation.

As we expected, the third-person POV participants seemed to understand fairness in waiting more clearly than the first-person POV participants. The most of third-person POV participants selected the fair service-person in Sessions 3 and 4, while the first-person POV participants selected fair service-person in Session 4 but the unfair service-person in Session 3. According to the counter selection reasoning, compared to the first-person POV participants in both fairness condition cases, the third-person POV participants preferred the fairer service-person more than the first-person POV participants (Table 3.6). The third-person POV participants (42.92%) cited fairness reasoning as support of their counter selection ($p = 0.0012$) more often than the participants in the first-person POV group (29.17%).

In addition, we found that the counter selection results between first- and third-person POV groups were different for Session 3, when the service-person at Counter A (line-waiting counter) accepted the request of and served a ticket to the queue-jumping customer (the service-person's friend), while the service-person at Counter B (group-waiting) rejected the queue-jumping customer's request and sent him to the end of the line. The participants in the first-person POV group more often

selected line-waiting and the unfair service-person at Counter A (54.2%) than the fair service at Counter B. In contrast, the participants in the third-person POV group were more likely to get their tickets from the fair service-person with group-waiting at Counter B (64.6%) than the first-person POV group. A *t*-test analysis of the Counter A (line-waiting) selection results from Session 3 showed significant differences between the first-person POV group ($M = 1.125$, $SD = 1.088$) and the third-person POV group ($M = 0.563$, $SD = 0.727$) conditions; $t(30) = 1.719$, $p = 0.047$.

From the reasoning results, we found that the first-person POV participants focused on the perception and interpretation of the details of their interactions, whereas the third-person POV participants understood the overview and could better extract messages from conversations. In learning cultural understanding, not only is the first-person POV important for understanding feelings and detailed nonverbal behaviors in conversation, but the third-person POV also plays a crucial role in understanding the content of multichannel communications (e.g., nonverbal behavior, standing position, and walking direction) and complex culture-related situations.

In addition, we considered the nonverbal behavior of the participants during interactions with the service-person in our system as a representation of the perceptions and interpretations of the communication in the virtual simulation. The participants from the different POVs used different nonverbal behaviors during their interactions with the service-person. In the case of the timing of requesting a ticket, the participants finally arrived at the point where it was their turn to order tickets. Accordingly, 100% ($n = 16$) of the participants in the first-person POV group directed their face and body toward the service-person while requesting the ticket and looked at the service-person's face direction to follow the service-person's gaze direction. When the service-person faced the participants, they immediately started requesting a ticket. However, 56.25% ($n = 16$) of the participants from the third-person POV group did not pay attention to their body and face direction or that of the counterperson but observed other customers around them to recognize when it was their turn to request tickets.

Hall (1989) suggested that cultures are used as a filter for communication and that one function of culture is to provide a high screen between individuals and the outside world. In its many forms, culture designates what we pay attention to and

what we ignore (Hall 1989). Therefore, the next step of our research was to find more perceptual differences across cultural backgrounds. Given what we learned about culture from our readings (e.g., Hofstede 1979; Hall 1989; James & Anthony 1997; Hofstede et al. 2010; Alan & Gary 2011; Dresser 2011; Mascarenhas et al. 2013; Degens et al. 2015), and given the findings of this chapter, we knew we had to apply all factors influencing the learners' perceptions to design the model to establish the relationship between perception and cultural background and an agent communication model for interactions with crowd simulation (Kullu, Güdükbay & Manocha 2018).

Chapter 4: Effects of Cultural Background on Perceptions of Conversations

In this chapter we discuss the answer to the question, “Does POV affect waiting participants’ perceptions differently for Japanese and Thai people?” The previous experiment tested Japanese subjects. Our next step was to replicate that experiment with Thai subject to find out if there were different perceptions and interpretations from the different POVs with non-Japanese participants. We asked our Thai participants to take part in the same activities as the Japanese participants had so that we could compare the data and, in doing so, reveal whether there were different perceptions and interpretations influenced by their respective cultural backgrounds. After completing the two experiments, we found that the Japanese participant preferred speed as their reason for selecting a counter, while Thai participants were more concerned with the experience of the interaction and the feelings behind their choices.

4.1 INTRODUCTION

In this experiment, we used the same scenario of different waiting styles that we described in Chapter 3 for the experiment with the Japanese subjects to conduct a new experiment with Thai participants. We analyzed the participants’ reactions during their interactions to measure whether and in what ways their different cultural backgrounds affected their perceptions and interpretations of our scenario. We applied the different-POV method for learning different forms of cultural communication for two reasons: (1) to replicate the previous experiment for results comparison; and (2) most importantly, because our research told us that using different POVs would help the participants interpret the cultural situation more deeply than using only one POV. For example, observation from a third-person POV results in more information being available, such as 360-degree views of position, movement, distance, and environment. Participants are able to acquire more information to use in their reasoning and decision-making. When participants are able to interpret a variety of reasons or factors in a cultural situation, they can learn about different forms of cultural communication more clearly.

Therefore, we first hypothesized that first- and third-person POVs would yield different perceptions based on the participants' cultural backgrounds. In this study, we explored the different benefits of cultural learning with different POVs. We identified the cultural factors that influence perception in different cultural communications learning processes and developed a virtual simulation system that allows agents to present examples of nonverbal communication, such as hand gestures, standing distance, and body direction. Participant could then learn those behaviors and practice their reactions with our agents and avatars in our system.

Mascarenhas et al. (2013) and Degens et al. (2015) applied collectivism and individualism cultural dimensions by using key differences, an in-groups and out-groups, to design scenarios and a questionnaire. They created the scenario of a traveler, a stranger visiting a different cultural place, and set the individual society, namely the boundary between an in-group and an out-group. In their design, the people in the collectivism society will not comfortable answer the stranger's questions the hotel's location. In contrast, the people in the individualism society will be friendly and happily answer the question, and they may even invite the stranger to join them in the bar. Swierczek & Onishi (2003) discussed the cultural dimension of Japanese and Thai conflict between Japanese managers and Thai subordinates. They explained the specific working situations with the key differences in Hofstede's (2010) cultural dimensions, using the masculine and feminine cultural dimension and the uncertainty-avoidance cultural dimensions to describe the conflict between the Japanese and Thai cultures. In so-called masculine cultures, the work concept tends to be that we "live in order to work," whereas in feminine cultures, the emphasis of is that we "work in order to live." Japan has been called a "masculine" culture; Thailand has been called a "feminine" culture.

As in the earlier experiment, we used waiting behavior as the cultural communication activity to analyze cultural influence. We selected two dimensions that we considered relevant to waiting behavior to design the scenario and questionnaire.

4.1.1 Dimension 2: Individualism vs. Collectivism

In the individualist culture, waiting is instrumental. Universalistic logic says that everyone has equal rights when waiting. In contrast, in the collectivist culture,

waiting behavior is a social activity. Groups are formed based on relationships, such as family, friends, or other salient social functions.

4.1.2 Dimension 3: Masculinity vs. Femininity

In masculine cultures, even communication is competition. In contrast, in feminine cultures, there is not much force or urgency. Thus, while waiting, people relax and enjoy the time.

We used these two cultural dimensions to describe the characteristics of the waiting style in Japan and Thailand. We applied the idea of individualism vs. collectivism from Mascarenhas et al. (2013) and Degens et al. (2015) to waiting styles: waiting in groups and waiting individually in line. We applied the masculinity vs. femininity differences between the Japanese and Thai cultures from Swierczek & Onishi (2003) to design the service fairness styles of the service-person and the waiting style, with strict rules vs. flexibility. As stated in Chapter 3, Thai people usually do not form lines when waiting in informal situations, whereas Japanese people tend to form lines in virtually any situation where they have to wait for service.

We designed our experiment based on a real-world situation and related it to the cultural dimensions of Hofstede (1979; Hofstede et al. 2010). We designed two waiting styles—the group-waiting style (waiting in random positions) and the line-waiting style. People from Japanese and Thai cultures interpret waiting differently. The Thai culture is collectivist and feminine (IDV = 20, MAS = 34); Thai people are relaxed, unhurried, and enjoy waiting time because waiting is a social activity. Thus, a group-waiting style is suitable to represent the waiting style in Thai culture because people can talk socially, having group discussions about consumer goods, prices, news, and weather. Thai people may frequently walk close to the counter, as shown in Figure 4.1. In contrast, Japanese culture is individualist and masculine (IDV = 46, MAS = 95); the people are competitive and employ an equal-rights mentality. Thus, they tend to have concrete rules for waiting situations, such as lines or some other orderly system. Therefore, we designed our line-waiting to represent the waiting style of Japanese culture. Most Japanese people walk to the end of the line, as shown in Figure 4.1.

Another factor is the response of the service-person to queue-jumping-customers; the service-person may accept or reject the ticket request from a queue-

jumper-customer, who is his friend. Accepting the request represents unfairness, as it is a recognition of privilege based the friend relationship that is related to collectivism and the feminine culture. In contrast, rejecting the queue-jumper-customer's request represents fairness, as it is an acknowledgement of equal rights that is related to individualism and the masculine culture.

In terms of communication, perception is a cognitive process by which people come to interpret and understand other people, events, and objects (Jandt 2017). People perceive the world differently, and we can understand the different behaviors of other people by learning how their perception operates. Learning perceptual processes helps us understand the meaning of behavior and improve communication.

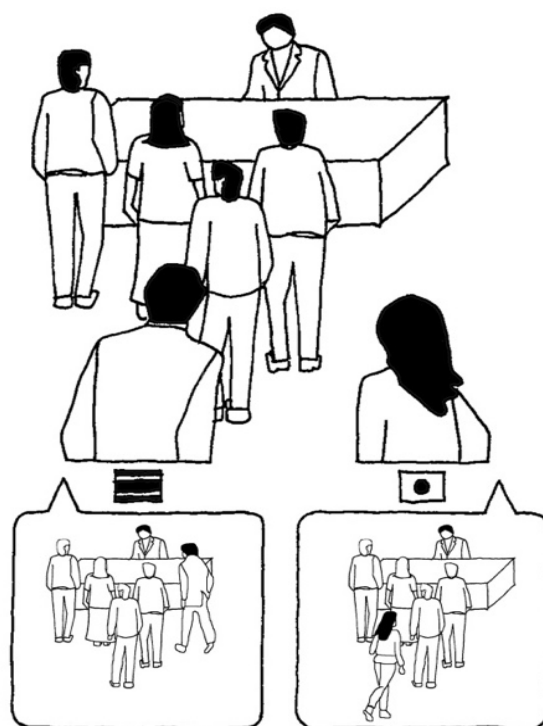


Figure 4.1. Thai and Japanese people select the different waiting positions.

In general, if learners see that the properties of choices are obviously different, they will easily select the better choice by the sense of sight. In contrast, if the main properties of these choices are similar, then they more carefully consider the features based on their own priorities. Thus, our second hypothesis was that culture would influence how people make a choice or simply ignore a situation. To describe this hypothesis, we designed two different waiting styles and two different fairness responses to the queue-jumper-customer as choices. This experiment showed the

learners both choices and then asked them to select the acceptable waiting style and queue-jumper-customer responses.

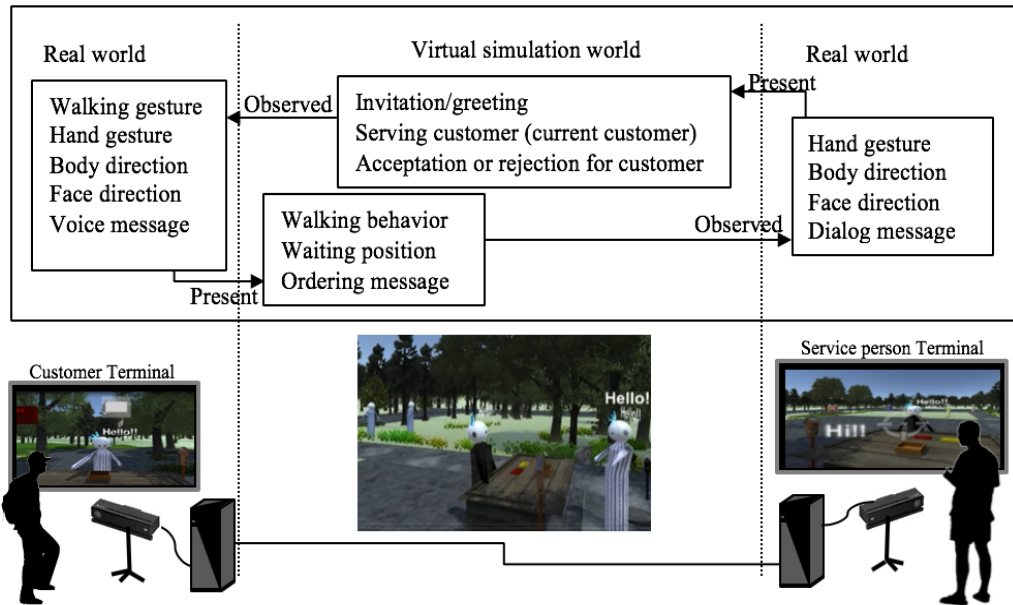


Figure 4.2. System setting and a screenshot of the system

4.2 EXPERIMENT

To contrast the waiting behaviors of people in the Thai culture, we conducted an additional experiment with almost the same conditions as the earlier experiment with Japanese participants, with the new experiment taking place in Chiang Mai, Thailand. We found that when Thai participants waited in a simulated crowd, some allowed queue-jumpers to get tickets because they were friends of the service-person, and/or only one queue-jumper was accepted, and/or staff (queue-jumper was a service-person) and might be late to work. This suggested that Thai culture characteristics (high feminine and collectivism culture) affected the perception and interpretation of Thai participants during waiting. The rest of this chapter repeats the description of the task setting from the previous chapter for clarity and describes unavoidable differences wherever necessary.

4.2.1 Task

We simulated the virtual world where participants had to wait to buy a ticket at a counter. We modeled the agents' behavior to present two different waiting styles depending based on culture: line-waiting and group-waiting.

We represented the communication behavior by the agents' and experimenters' avatars. We used the same set of behaviors show to the two groups of participants to compare the different perceptions of both participant groups.

Customer agents' waiting behavior. Two counters, A and B, represented distinctive styles of waiting. The participants saw both counters at the same time and from the same distance. The participants could understand the waiting style from the positions and the walking movements.

Line-waiting Counter A (individualism). In the line-waiting style, the customer agent (participant) stops in front of Counter A behind the last agent line and approaches the counter following the line.

Group-waiting Counter B (collectivism). In the group-waiting style, the customer agent (participant) stops in front of Counter B, as close as possible to the counter.

Queue-jumping customer. We introduced a customer agent, a friend of the service-person, who jumps in front of the counter directly, faces the service-person, and places an order, as shown in Figure 4.3.

Service-person's fairness and integrity. Service-persons served all customer agents by the "first come, first served" rule in all sessions. When the queue-jumping customer arrived at the counter, the service-person had two kinds of responses: accept (feminine) or reject (masculine) the request.

Defined rules for service-person and customer behavior. The interaction between the counterperson avatar and customers was programmed. The service-person served each participant or customer agent a ticket at the counter in four steps:

1. The service-person greeted the customer and asked for the customer's order, saying "Hello".
2. The customer placed the order (ticket icon shown).
3. The service-person acknowledged the order, saying "thank you," makes hand motions involved in preparing a ticket for approximately 5 seconds, then holds the ticket out toward customer agent.
4. The customer takes the ticket and turns, walking away from the counter.

We asked participants to imagine that they were visiting an international theme park where people from many countries share public spaces. They have to go to a ticket service counter to get a ticket. Sometimes, staff members also go to the counter to get a ticket, and they have to wait like any other customer. Each session comprised three sections: observation, practice, and interaction. We started the observation section by asking learners to observe a video of the activities. Then we asked the participants to practice getting a ticket from both counters. After the observation and practice sections, we assumed that the participants had enough knowledge to be able to interact with either service-person. In the final section of each session, the interaction section, we asked the participants to go to any ticket counter they chose three times to get three tickets. Then, we asked the participants to fill in a questionnaire about their reasoning process in the choice counter selection to evaluate their interpretations and perceptions.

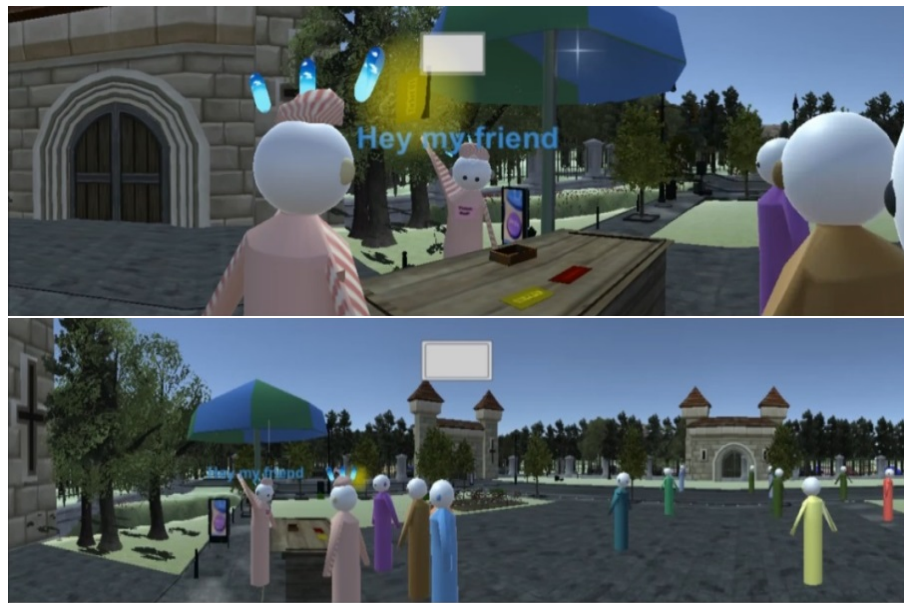


Figure 4.3. Queue-jumping customer from first-person POV (top) and third-person POV (bottom).

4.2.2 Experiment Setting

We conducted this second experiment at Chiang Mai University in Thailand to contrast the behavior of people from two different cultures. We used almost the same activity settings as those for the Japan experiment (see Chapter 3). Due to equipment limitations in Thailand, we used a projector to show the simulation instead of a large screen display. The lighting conditions differed slightly, but the participants in both places could clearly see the agent and the service-person in our simulation.

Activities setting. During the experiment, all participants saw all the customer agents and service-persons at both Counters A and B. The queue-jumper, a friend of the service-person, came to both ticket counters in Sessions 2, 3, 4, and 5.

Both service-persons served with the same level of fairness (both served fairly, or both served unfairly) in Sessions 2 and 5. In contrast, they offered different service in Sessions 3 and 4 (one of them fairly and the other unfairly). One participant joined five sessions. The experiment began with Session 1—basic communication. The other four sessions were in random order to remove the effect of order from each session.

Before each session, we asked participants to observe a video. Then, we asked participants to practice. Next, we asked participants to select a counter and wait for a ticket three separate times. Finally, at the end of each session, we asked the participants to state their reasons for making each choice.

Physical environment setting. The Japanese participants had interacted with our system in front of a screen (Sharp PN-L702B, 70-inch diagonal size display (65 inches wide by 38.7 inches high). During the interaction, participants stood away from the screen at a distance between 1.5–2 meters, depending on their activities; when they walked forward, they were about 1.5 meters from the screen, and when they stepped backward, they were 1.8–2 meters from the screen. The Thai participants interacted with our system in front of the projector reflection screen. The size of the screen and the standing distances from the screen were the same as for the Japanese participants.

4.2.3 Participants

We recruited 32 Japanese students (average age: 21.2, age range: 18–27, males: 16, females: 16, SD: 2.01) from Kyoto University, Japan, and 32 Thai students (average age: 22.2, age range: 19–30, males: 16, females: 16, SD: 2.94) from Chiang Mai University, Thailand. Eight male and eight female participants from each group joined the experiment in the first-person POV setting (Figure 4.4); the other eight male and eight female participants of each group joined the third-person POV group (Figure 4.5).



Figure 4.4. Example of different first-person POV waiting sessions: (left: Japanese participant during experiment; top middle: group-waiting scenario; bottom middle: line-waiting scenario; right: Thai participant).

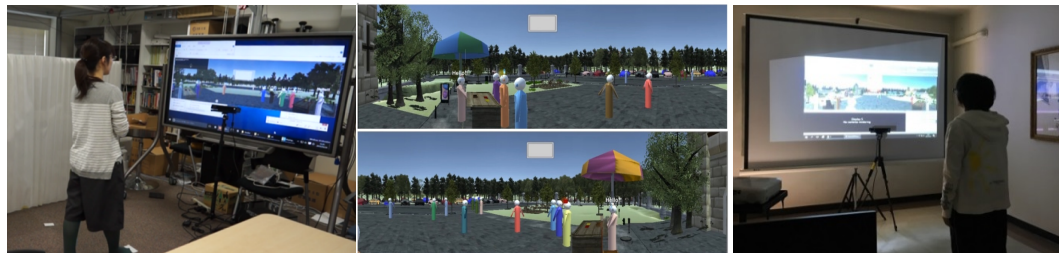


Figure 4.5. Example of different third-person POV waiting sessions (left: Japanese participant during experiment; top middle: group-waiting scenario; bottom middle: line-waiting scenario; right: Thai participant).

4.2.4 Experiment Results

The participants had three chances to select Counter A or B in the interaction section of each session. They could freely select the same counter three times or a different counter each time as the one they preferred to wait at for service. We used the participants' counter selections and reasons as the key experimental results. We called this selection the “counter selection result.” After they attended each session, we asked participants to write down their reasons for making each selection. We called this the “reasoning result.” (To view the questionnaire for Experiment 2, see Appendix I.)

Counter selection results. We obtained all 48 counter selections from the 16 participants in each POV group. Each participant had three chances in each session ($n = \text{number of participants in group} \times 3 \text{ chances of selecting ticket} = 16 \times 3 = 48$). The counter selection results are contrasted for the Japanese and Thai participants in Figures 4.6, 4.7, and 4.8.

We applied an analysis of variance (ANOVA) to the results to calculate the frequency of selection. There was no significant difference in counter selection

between the first- and third-person POVs in all sessions for either the Japanese or the Thai participants.

Further analysis of the counter selection results of each participant revealed that the participants randomly selected the counter. We found that the participants could not confirm their perceptions and interpretations because they were not always choosing the same counter for the same reason.

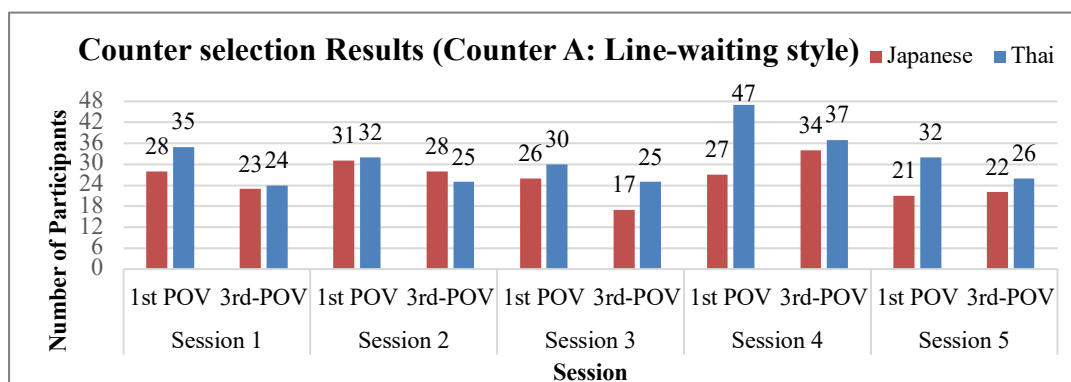


Figure 4.6. Counter selection Results (Counter A: Line-waiting style).

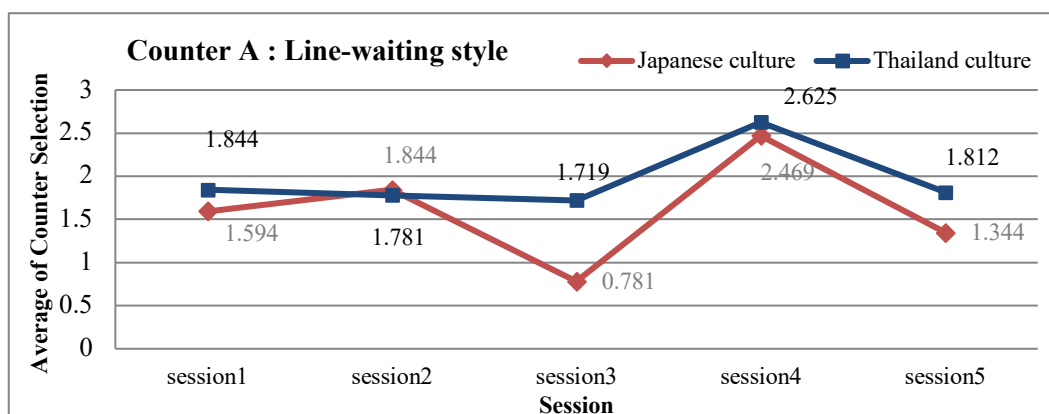


Figure 4.7. Average of Counter Selection results of Counter A: Line-waiting style: Japanese and Thai participant groups.

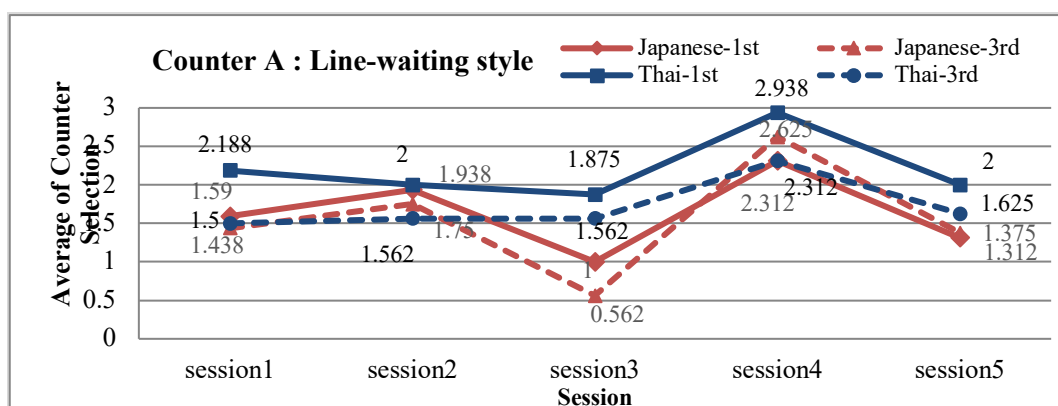


Figure 4.8: Average of Counter Selection result of Counter A: Line-waiting style: Japanese and Thai participants in first- and third-person POVs groups.

Reasoning results. We compared the cultural influence between the Japanese and Thai participant groups based on the different waiting styles and level-of-fairness conditions. After gathering all the reasons for counter selection, we categorized them using method of grouping by similar meaning (Celentano & Dubois, 2017). We evaluated the reasoning answers from the questionnaires without considering counter selection because we wanted to consider only the stimuli that the participants perceived from our system during counter selection in the experiment. We found that selection reasoning could be categorized same as was described in Chapter 3 (Table 3.5), into the same five categories: fairness, waiting style, speed, interaction, and feeling.

We obtained all 240 reasoning results from the 16 participants in each POV group. The participants selected a counter three times and wrote their reasons down after each session. We counted all the reasoning results for the 5 categories ($n = \text{number of participants in group} \times \text{sessions} \times 3 \text{ choices} = 16 \times 5 \times 3 = 240$ reasoning results). We used all 240 reasoning results in the statistical analysis because all three choices of counter selection were important to verify the perception of the participants individually. First, to determine the probability of occurrence of each reasoning in a participant's perception in both first- and third-person POV groups, we used the Fisher's exact test to analyze the reasoning results—waiting position, fairness, speed, interaction, and feeling. See Tables 4.1–4.5.

Table 4.1. Fairness Reasoning Results in All 5 Sessions

POV	Considered Waiting Position	Did Not Consider Waiting Position
First-person POV	122	118
Third-person POV	88	152

Table 4.2. Waiting Position Reasoning Results in All 5 Sessions

POV	Considered Waiting Position	Did Not Consider Waiting Position
First-person POV	96	144
Third-person POV	108	132

Table 4.3. Speed Reasoning Results in All 5 Sessions

POV	Considered Speed	Did Not Consider Speed
First-person POV	38	202
Third-person POV	32	208

Table 4.4. Interaction Reasoning Results in All 5 Sessions

POV	Considered Interaction	Did Not Consider Interaction
First-person POV	89	151
Third-person POV	57	183

Table 4.5. Feeling Reasoning Results in All 5 Sessions

POV	Considered Feeling	Did Not Consider Feeling
First-person POV	102	201
Third-person POV	83	157

Significantly different results were found between the different POV groups, with 122 out of 240 participants in the first-person POV group (50.83%) considering fairness their reasoning ($p = 0.0012$) more often than the 88 out of 240 participants in the third-person POV group (36.67%). Similarly, 89 out of 240 participants in the first-person POV group (37.08%) considered the interaction in their reasoning ($p = 0.001$) more often than the 57 out of 240 participants in the third-person POV group (23.75%). Another significant difference was found in feeling reasoning, with 102 out of 240 participants in the first-person POV group (42.5%) considering feeling in their reasoning ($p = 0.046$) more often than the 83 out of 240 participants in the third-person POV group (34.59%).

As mentioned earlier, we controlled for two factors in the experiment—customer waiting style and service-person fairness behavior—to observe the effects of cultural influence on communication. The agents always waited in line at Counter A and in a random position at Counter B. The service-person’s fairness behavior in each session differed. We grouped all five sessions into two categories: “same conditions” of fairness (both service-persons were fair or unfair in Sessions 1, 2, and 5) and “different conditions” of fairness (one service-person was fair and the other was unfair in Sessions 3 and 4).

The results of the Japanese and Thai participants’ reasoning are shown in the box plot in Figures 4.9 and 4.10, respectively. The graphs present the mean and standard deviation of each reasoning from both the first- and third-person POVs groups.

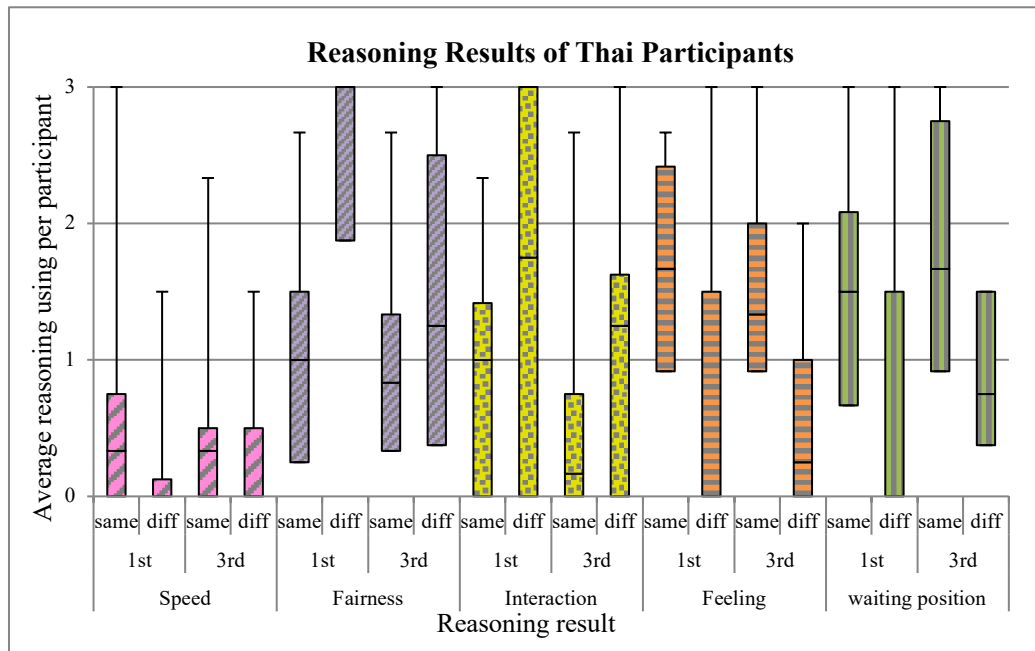


Figure 4.9. Reasoning results of Thai participants.

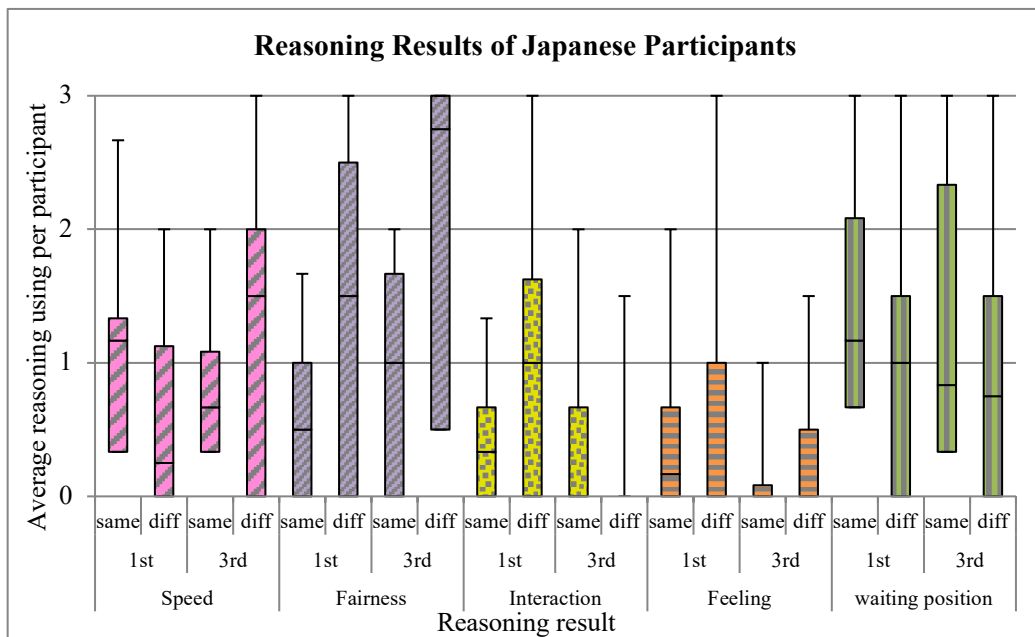


Figure 4.10. Reasoning results of Japanese participants.

We used ANOVA to analyze the reasoning results to determine the participants' perceptions while selecting a counter. We found significant differences with respect to "speed" reasoning when comparing the same condition sessions (Sessions 1, 2, and 5) with the different condition sessions (Sessions 3 and 4), ($F(1, 62) = 3.431, p = 0.0225$). This effect shows that the Japanese and Thai groups had significantly different rates of giving reasoning related to the speed of service or the waiting process. The Japanese participants were more likely to consider speed in

their reasoning than the Thai participants in all sessions. For further analysis, we plotted the ANOVA results of speed (Figure 4.11).

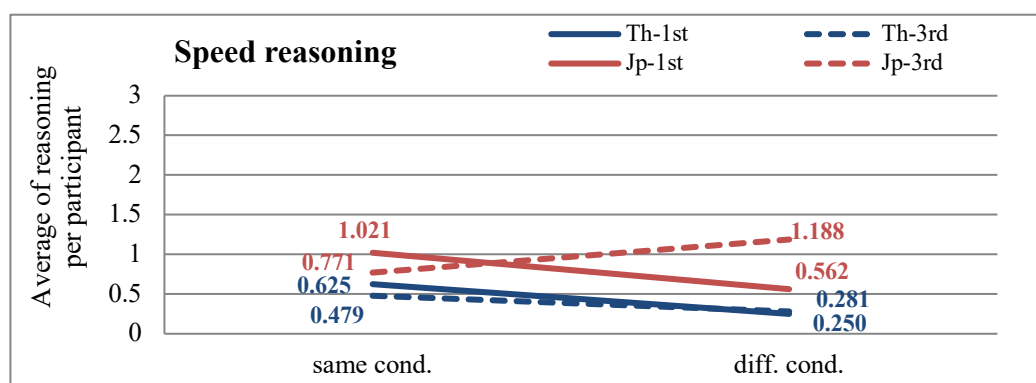


Figure 4.11. ANOVA of the speed reasoning in the “same conditions” and the “different conditions”

We also found significant differences in both the “interaction” reasoning ($F(1, 62) = 4.627$, $p = 0.0056$) and the “feeling” reasoning ($F(1, 62) = 8.137$, $p = 0.0001$). When we compared the participants from the Thai group and Japanese group, the participants in the Thai group described reasoning related to the counterparts’ interactions and their own feelings (sensibility) as supporting reasons when choosing their preferred counter for waiting more than the Japanese participants, as shows in Figures 4.12 and 4.13.

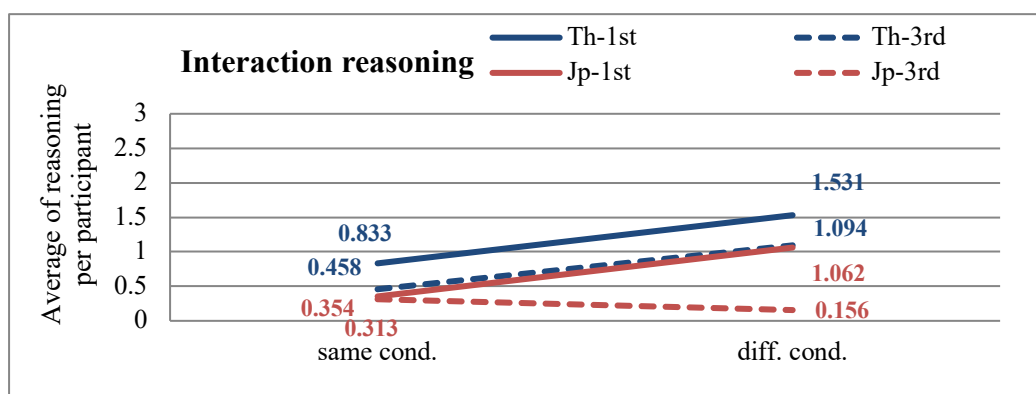


Figure 4.12. ANOVA of the interaction reasoning in the “same conditions” and the “different conditions”

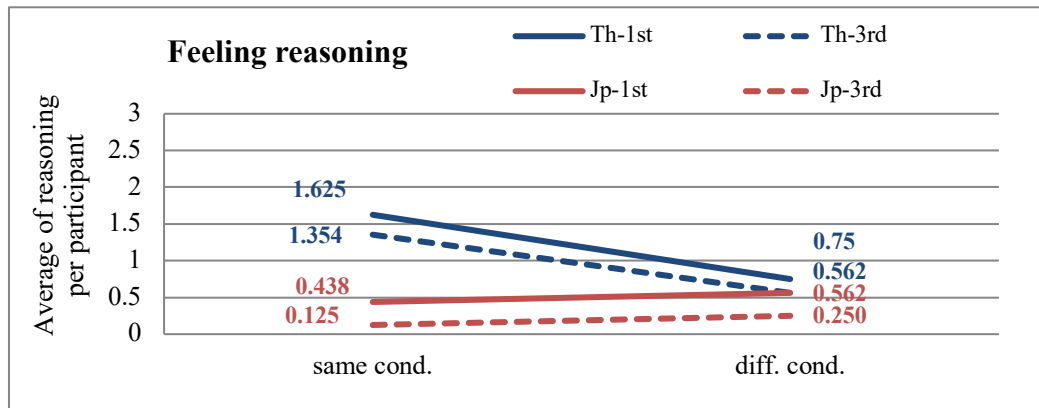


Figure 4.13. ANOVA of the feeling reasoning in the “same conditions” and the “different conditions”

In addition, the participants in the first- and third-person POV groups followed different reasoning patterns. We set the same service times and the same number of customers for both Counters A and B, with the same waiting time at both counters. When the unfair service-person (who accepted a ticket request from a queue-jumping friend) served tickets slower than the fair service-person (who rejected a ticket request from a queue-jumping friend), the participants in the third-person POV group gave speed as reason more often than the participants in the first-person POV group in both Japanese and Thai cultures, as shown in Figure 4.11.

In contrast, interaction and feeling depend on personal decision. The participants in the first-person POV from both Japanese and Thai cultures were more likely than those in the third-person POV to have considered the counterpersons’ behavior toward both the customers and the queue-jumping customer and to have considered their own feelings regarding the waiting style or fairness level of the service-person. The interaction reasoning results and feeling reasoning results are shown in Figures 4.12 and 4.13, respectively.

The participants from the different POV groups gave different reasons for deciding on their choice of interaction. When we compared the first- and third-person POVs from the same culture condition, we found that participants from the first-person POV group gave comments related to the interactions and feelings more often than participants from the third-person POV group, as shown in Figures 4.12 and 4.13, respectively.

We found that most participants in both groups gave a reason for their choice related to fairness in the different condition sessions (when one service-person at

Counter A or B performed unfair service while the other performed fair service), although we did not find any significant differences in “waiting position” and “fairness” reasoning, as shown in Figures 4.14 and 4.15, respectively. At the same time, when they focused on fairness in the different condition sessions, both groups of participants did not use waiting style or their waiting position to consider the situation.

We found that the participants in the first-person POV group ignored the fact and benefit of activities such as speed when one of the service-persons performed unfair service by accepting the queue-jumping customer’s request in the different condition sessions.

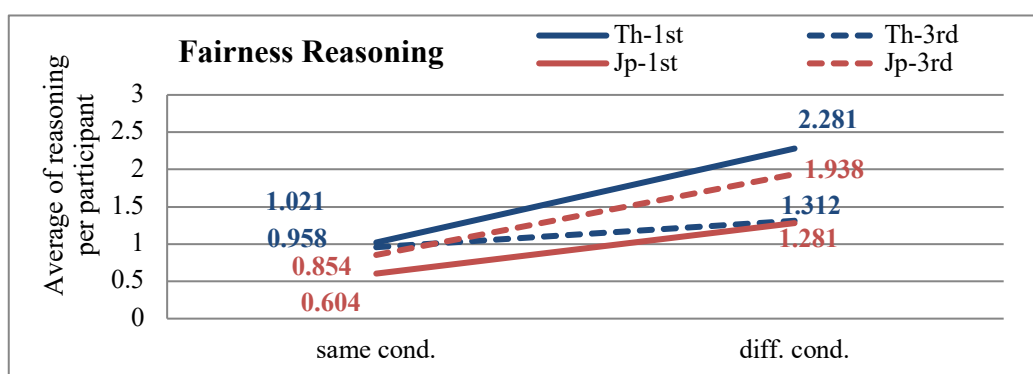


Figure 4.14. ANOVA of the fairness reasoning in the “same conditions” and the “different conditions”

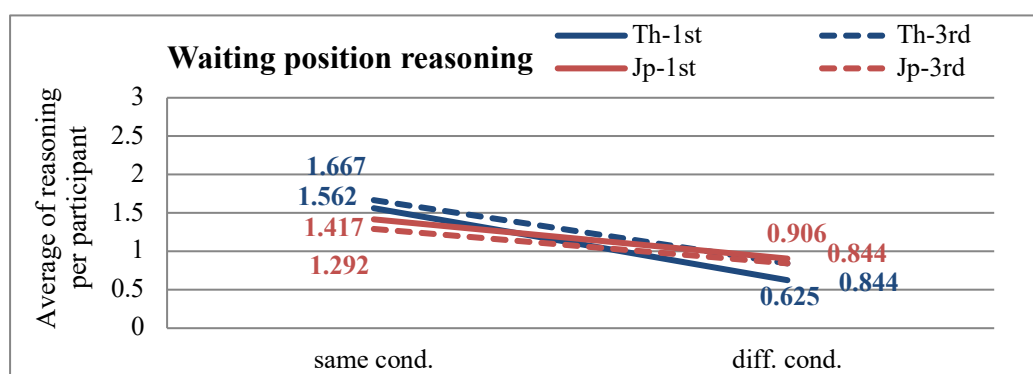


Figure 4.15: ANOVA of the waiting position reasoning in the “same condition” and the “different conditions”

4.3 DISCUSSION

In this chapter, we discussed the second experiment, which applied the findings from the experiment described in Chapter 3 to participants from two different cultures. Specifically, we examined different perceptions of fairness in participants from Japan and from Thailand using the different-POV method. We conducted the second experiment with Thai participants in at Chiang Mai University in Thailand. The experiment was nearly identical to the experiment we conducted with all-Japanese participants in Kyoto, Japan (see Chapter 3). We divided the participants into two groups—first- and third-person POVs—and both groups interacted with an agent in a virtual simulation from their perspective POVs. They observed and interacted with the customer agents and service-person avatars to get a ticket at the VTC system.

A novel contribution of this experiment was that we determined the effect of cultural background on perceptions of fairness levels in waiting behavior. While it would seem likely that most participants would prefer fair service, especially when waiting or queuing, benefits such as shorter waiting times and orderly service can also be preferred by customers, as we found in comparing the behaviors of Japanese and Thai participants. In the previous experiment with the Japanese participants, we have found the significant differences of the reasoning result between the different POVs groups in fairness ($p = 0.0012$), interaction ($p = 0.0001$), and feeling reasoning ($p = 0.0002$). In this experiment with Thai participants, we have found the significant differences of the reasoning results between the different POVs groups in fairness ($p = 0.0012$), interaction ($p = 0.001$), and feeling ($p = 0.046$). These results suggest that the Japanese and Thai participants are affected in a similar way by the change in POV. The different POVs provided learners with different amounts of information about the activities. As we found from the experiment with Japanese participants in the previous experiment, the first-person POV participants took particular notice of the interactions with service-persons and made decisions based on their feelings because the participants in the first-person POV interacts more closely with the simulation than participants in third-person POV; thus, their attention is focused more on gaining information from the system such as the counterpersons' behavior (e.g., treatment of the queue-jumping customer, gestures, body direction, and face direction during conversation, etc.).

We found that most Japanese participants worried about speed (84.38%, 27 of 32), which was more than the corresponding number of Thai participants (65.63%, 21 of 32). This suggested that the result was related to the cultural masculinity dimension (Japanese MAS score = 95), which involves competitiveness and the desire to protect individual rights. Among Thai participants, 2 out of 32 were accepting of the queue-jumper. They ignored the queue-jumper factor and continued to wait at their preferred counter because they thought that the queue-jumper might be in a hurry or have a critical reason for such rude behavior. In contrast, there were no Japanese participants who forgave the jumper or thought of the jumper's personal reasons for cutting the line. This result confirms that the Thai participants were more relaxed in general and did not stress when pressured. This might reflect the feminine dimension of Thai culture (Thai FEM score = 34).

We investigated waiting behavior to contrast Japanese and Thai cultures. Fairness in waiting would typically be preferred, in general, but our results showed that the Japanese and Thai participants accepted fairness at different levels. We used this finding to confirm our hypotheses, that first- and third-person POVs would yield different perceptions based on the participants' cultural backgrounds. Moreover, Japanese and Thai participants make a choice differently by different levels of fairness and reasoning.

To develop a learning system to help participants understand how other cultures communicate, we would have to carefully design the POV of the system to visualize the hidden reasons that may be concealed by cultural filters. For example, for Japanese participants to empathize with Thai culture in a waiting scenario would likely require the first-person POV because they would understand the feelings and the interaction more than in third-person POV. The interactions and feelings are important because most Thai participants focused on those during the ticket-acquisition scenario. In contrast, if we had to design a system to help Thai people learn the Japanese waiting style, we would use the third-person POV, which provides more factual information that would help Thai people to understand the overall situation and draw the focus away from relying on their own feelings.

Chapter 5: Analysis of POV Effects Using Hofstede's Cultural Dimensions

In this chapter, we will describe the third experiment in the study, in which we attempted to find how different POVs might bring about the different effects on observation of social situations. We conducted the third experiment with Japanese participants using the first- and third-person POVs. We asked both groups of participants to experience Thai-style shopping at a night flea market. We designed the questionnaire on the basis of Hofstede's cultural dimensions (Hofstede 1979; Hofstede et al. 2010) and used the combined answers between the different POVs to verify the different perceptions and interpretations of the shopping activities.

We conjectured that most of the participants recognized the collectivism aspect of Thai culture from the extracted keywords of the COL dimension when they were in the third-person POV more than when they were in the first-person POV.

5.1 INTRODUCTION

In this experiment we asked, "Does a difference in POV bring about different effects in cross-cultural learning due to the influence of cultural background?" We used Hofstede's cultural dimensions (Hofstede 1979; Hofstede et al. 2010) to elaborate on our findings in the previous chapter.

Mascarenhas et al. (2013) conducted experiments to develop a model for cultural behavior agents. They integrated only one cultural dimension, IDV, into their model. We aimed to identify not just one cultural factor that influences learners' interpretations in different cultural communication learning processes but to consider the combination of multiple cultural dimensions. To create a cultural learning lesson from more than one of the cultural dimensions, we needed to find the similarities and differences between the learners' cultural backgrounds and the new, targeted learning culture and design a suitable cultural lesson for the learners. In this experiment, we considered three of Hofstede's cultural dimensions to characterize different shopping scenarios between Japanese and Thai culture. We used these three dimensions to control the verbal and nonverbal behaviors for communication in our experiment.

5.1.1 Dimension 2: Individualism vs. Collectivism

In individualistic cultures, the universal logic is that everyone has equal rights in social activities. In collectivist cultures, groups are formed based on relationships, such as family, friends, or other salient social functions.

5.1.2 Dimension 3: Masculinity vs. Femininity

In masculine cultures, even communication is competition. In contrast, in feminine cultures, there is not much force or urgency. Thus, while waiting, people relax and enjoy the time.

5.1.3 Dimension 4: Uncertainty-Avoidance

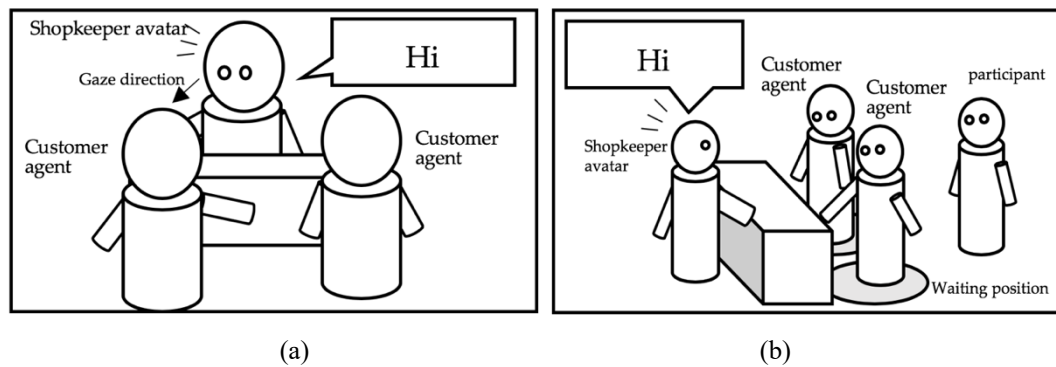
In cultures with high uncertainty avoidance, people are anxious and careful regarding the service process. In low uncertainty avoidance cultures, shopping is a social situation, and people relax during waiting or negotiation.

The two cultures are characterized by different cultural keyword values (Thailand: IDV = 20, MAS = 34, UAI = 64) and (Japan: IDV = 46, MAS = 92, UAI = 95). A random standing position represents a relaxed waiting style and social activities, and this reflects the low uncertainty-avoidance in Thai culture. A group of people waiting in front of a counter represents a group of people with the same purpose, reflecting a collectivism culture. A conversation (such as requesting a discount or negotiating) during ordering represents a feminine culture. The different types of waiting behavior in the two cultures are shown in Table 5.1.

We carefully designed the verbal and nonverbal behaviors in our simulation to reflect real-world situations. We consider both macrolevel behavior (waiting position, sequence of movements, and arrival time at the counter) and microlevel movements (gaze, face direction, body direction, hand movements) to determine the behavior of the customer agents and shopkeeper avatars. Figure 5.1 shows the POV of the participants while waiting behind other customers. The waiting behaviors with details of face-to-face interactions such as face direction (labeled “eye gaze”), body direction, and hand movement are more easily observable in the first-person view, as shown in Figure 5.1(a), while the waiting position, line, and group shape were more clearly observed from the third-person view as shown in Figure 5.1(b).

Table 5.1. Thai and Japanese Waiting Behavior Contrasted

Activities	Waiting behavior	
	Thai culture	Japanese culture
1. While moving and selecting waiting position	1. Move to directly free space close to the counter, as close as possible to the shopkeeper. 2. Wait in free space near the counter (group-waiting behavior).	1. Move to free space behind the last person in line. 2. Stand in line; move forward following line-waiting behavior.
2. While waiting	1. Find chance to interact with shopkeeper following shop rules and “first come, first served” or “first ready first served.” 2. Customer should remember other customers’ arrival timing to determine their own turn for ordering. 3. Special requests may be accepted, or privileges offered to special persons such as discounts or fast-track services for friends and well-known customers.	1. Waiting for their own chance is mostly following the “first come, first served” rule. 2. If there are special options or possible requests, everyone will know. There are no privileges for friends or well-known customer.

**Figure 5.1.** Participant POV during waiting behavior: (a) first-person POV; (b) third-person POV

5.2 EXPERIMENT

We designed the experiment to find any effects from first- and third-person POVs that influenced the cultural communication learning process. This experiment’s simulation of a cultural communication event for tourism was a shopping interaction at a virtual night market in Thailand. We designed the agents’ behavior models to represent Thai-style communication in a shopping situation. We used simple verbal and nonverbal behaviors for the conversations in this experiment. We divided the participants into first-person POV and third-person POV groups, and each participated in the same activities so we could capture and compare their understandings of cultural communication learning.

5.2.1 Task

We represented cultural communication with the verbal and nonverbal behaviors of the customer agents and the experimenters' shopkeeper avatars. We used simple verbal expressions for communication such as "hi," "thanks," "wait a moment," and "bye." We also used nonverbal behaviors such as the standing position, face direction, and hand gestures for communication between the customer agents and the shopkeepers.

Customer agents' waiting behavior. At the beginning of each task, the customer agent randomly walks to the counter when it opens. The agent stops in front of the counter, as close as possible to the shopkeeper, and asks for a ticket. After getting a ticket, the agent leaves the counter.

Shopkeepers' responses. After the counter opens, the shopkeepers serve tickets, food, or souvenirs to all the customer agents, using the "first come, first served" rule in all sessions.

Defined rules for shopkeeper and customer behavior. We designed the interactions between the shopkeepers and the customers based on a set of defined rules. The shopkeepers served participants or customer agents at the counter in four steps:

1. The shopkeeper greets the customer by saying "hello."
2. The customer asks for the order (ticket, food, or souvenir). Some customer agents may order many tickets, ask for a food discount, or request a specific color of souvenir.
3. The shopkeepers acknowledge the orders by saying "thanks," moves their hands to prepare the product (ticket, food, or souvenir), and about five seconds later they pass the product to the customer.
4. The customer takes the product, turns away from the counter, and walks away.

Scenario. We asked each participant to imagine that they were traveling to Thailand and that they were going to a night flea market to enjoy Thai food and buy a souvenir. They were supposed to walk to a counter and buy a ticket for food, order Thai food, or order a souvenir. While waiting at the counter, the customer agent

showed the participants an example of the Thai waiting style, including ordering food and a souvenir. The agent waited at a random position, as close as possible to the counter and the shopkeeper, and asked the shopkeeper for an order following the first come, first served rule. Other examples related to ordering many tickets, asking for a food discount, and requesting specific color souvenirs (Figure 5.2).

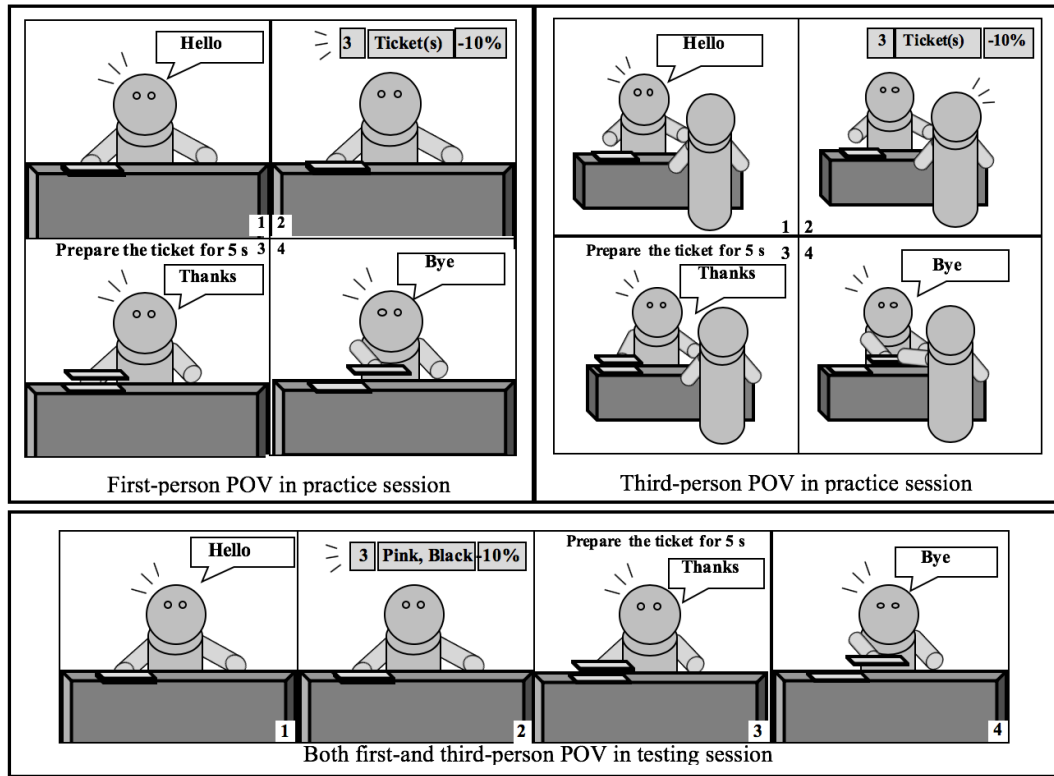


Figure 5.2: Storyboard of defined rules for shopkeeper and customer behaviors. (Thovuttikul, Ohmoto, & Nishida 2019b)

5.2.2 Experiment Setting

We designed both the virtual and the physical environments for the participants to observe customer agents and interact with the shopkeepers in both first- and third-person POVs. We used the camera settings described in Figure 5.3 for the different POVs in the simulation. These were similar to the settings in Figure 3.2, except that we installed the third-person-view camera on the left side of the avatar's body instead of at the counter so it could track the avatar's movements.

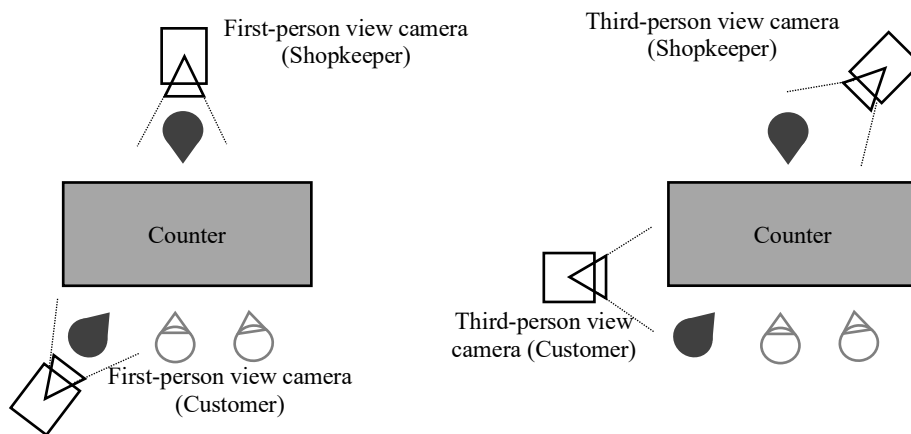


Figure 5.3: First-person POV cameras (left); third-person POV cameras (right) (Thovuttikul, Ohmoto & Nishida 2019b)

The participants learned about communication from the customer agents' behaviors and practiced interacting with the shopkeeper in a practice section. During the practice section, we expected that each participant would learn the situation from their respective POVs; the first-person POV group interacted using the first-person POV camera setting, and the third-person POV group did so using the third-person POV camera setting. After the practice section, we assumed that the participants had learned how to communicate with the shopkeeper. We asked all participants to control their avatars, using the knowledge and understanding gained from the practice section, to interact with the shopkeeper using the first-person POV (See Table 5.2).

Table 5.2. Participant Activity Sections

Section	Participants' Activity	
	First-person POV participants	Third-person POV participants
1. Practice section	Try to control the avatar to get three tickets and three meals (using first-person POV).	Try to control the avatar to get three tickets and three meals (using third-person POV).
2. Testing section	Control the avatar to get a souvenir and ticket at the counter (using the first-person POV).	

The participants interacted with our system in front of a screen (Sharp PN-L702B), 70-inch diagonal size display (65 inches wide by 38.7 inches high), as seen in Figure 5.4(a). During the interaction, participants stood away from the screen at a distance between approximately 1.5–2 meters, depending on their activities; when they walked forward, they were about 1.5 meters from the screen, and when they

stepped backward, they were about 1.8–2 meters away. Kinect Sensor Version 2 was placed in front of the participant's body close to the large screen.

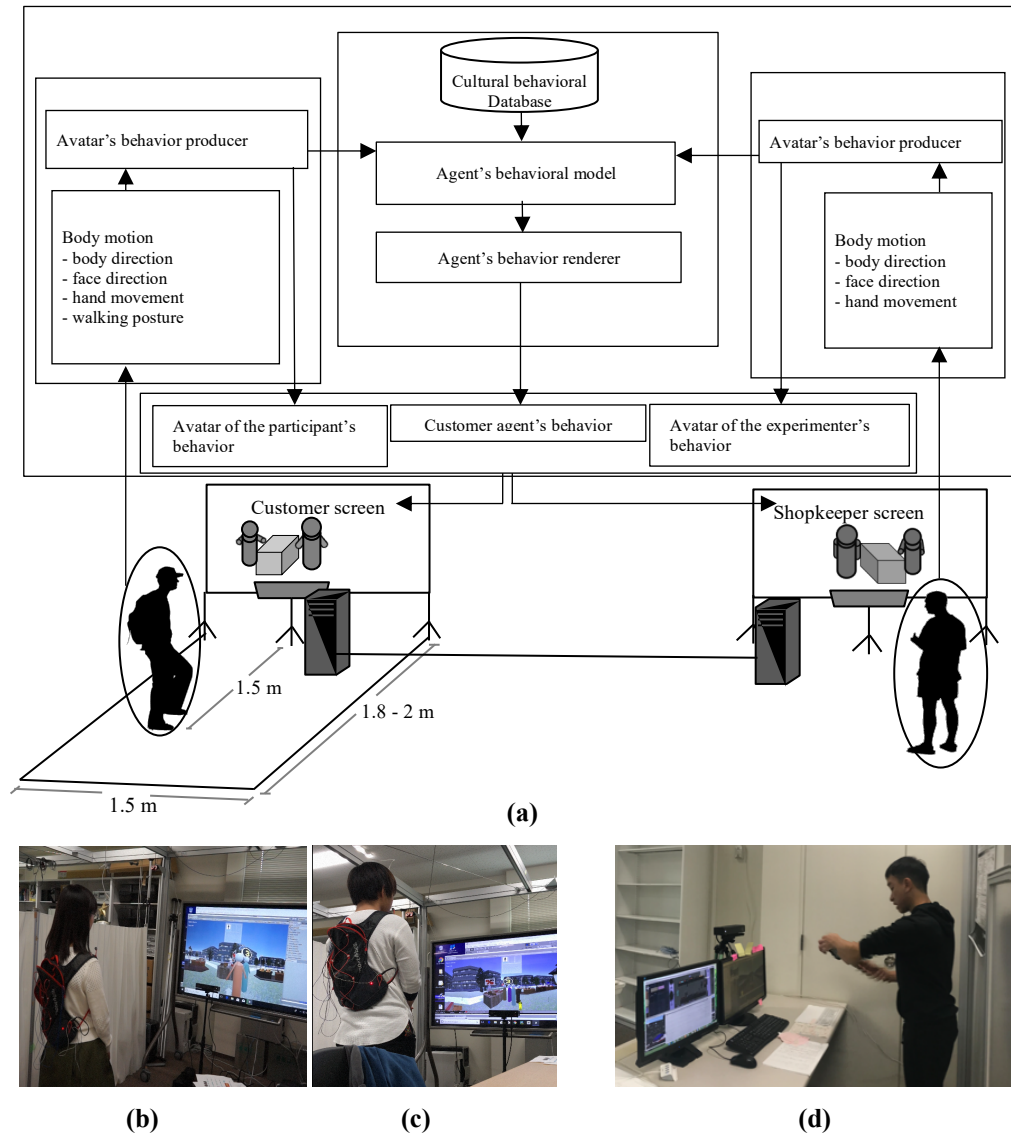


Figure 5.4: (a) Environment setting with Japanese participant during the experiment (b) a first-person POV participant; (c) a third-person POV participant; and (d) experimenter playing the role of shopkeeper.

5.2.3 Participants

We divided the participants into the two groups, first-person POV and third-person POV. We asked the participants in both groups to observe the customer agents' behavior and interact with the shopkeeper (Figure 5.4(d)) during a practice session. After they learned to communicate, all participants interacted with the shopkeeper in the testing section using the first-person POV.

We recruited 42 Japanese students (average age: 21.2, age range: 18–27, male: 21, female: 21, SD: 2.01) from Kyoto University, Japan. Ten male and eleven female participants joined the experiment in the first-person POV group (Figure 5.4(b)), and eleven male and ten female participants joined the experiment in the third-person POV group (Figure 5.4(c)).

5.2.4 Questionnaire Design

We designed a questionnaire based on Hofstede's cultural dimensions (1979; Hofstede et al. 2010) for measuring the participants' feelings and understanding of other cultures—in this case, Thai cultural activities at a night flea market—after they had communicated with shopkeeper avatars and customer agents in a simulation. The questionnaire asked about participants' experiences regarding the activities, behaviors, and communication in the simulation.

In previous works, Reisinger & Crofts (2010) and Ozdemir & Yolal (2017) used questionnaires to measure the behavior of tourists from different national cultures. Reisinger & Crofts (2010) created a questionnaire to gauge participants' agreement according to a five-point Likert-type scales with Hofstede's cultural dimensions' measurements. Ozdemir & Yolal (2017) used the visual analog scale (VAS) in the design of their questionnaires to find the differences in opposite behaviors; they used three categories—shopping, social activities, and simple interactions—to ask guided tour participants about their experiences of international tourist behaviors. To apply this method to our study, we modified this questionnaire to ask about the Japanese participants' perceptions and interpretations of Thai cultural behavior and interactions from two different directions—namely, opposites in Hofstede's cultural dimensions (e.g., individualism vs. collectivism).

Hofstede's cultural dimensions have been used and applied in many studies (e.g., Hofstede 1994; Hofstede 1998; Reisinger & Crofts 2010; Endrass et al. 2011; Kistler et al. 2012; Mascarenhas et al. 2013; Degens et al. 2014; Hall et al. 2015). Previous studies used the keywords of each dimension to interpret the meaning of behaviors and use this to create a scenario. For example, Swierczeka & Onishi (2003) discussed the keywords, such as rule, free time, enjoyment, and comfort, to describe the different culture-related work and career views in Japan and Thailand.

We found key differences between Japanese and Thai culture in such areas as adherence to rules, performance, compromise, flexibility, acceptance of change, and we used these to develop our waiting and shopping simulation. The scenario, communication activity in the experiment, and the questionnaire that we used for verifying participants' perceptions were based on the cultural dimensions of individualism vs. collectivism (IDV vs. COL), masculinity vs. femininity (MAS vs. FEM), and uncertainty-avoidance (UAI).

We interpreted the cultural values and key differences of each dimension as keywords. We selected the pairs of words (keywords and antonyms) for the questionnaire and designed the scenario and the activities of Thai-style shopping from the key differences. We selected the relevant key differences of each cultural dimension from Tables 2.1, 2.2, and 2.3 to design the shopping activities, and we used the nine keywords for the questionnaire shown in Table 5.3 (collectivism vs. individualism), Table 5.4 (feminine vs. masculine), and Table 5.5 (uncertainty-avoidance).

Table 5.3. Keywords for the Thai-style Shopping Simulation Questionnaire (Collectivism vs. Individualism)

Question	Collectivism		Individualism	
	Key Differences	Keywords for the Questionnaire	Key Differences	Keywords for the Questionnaire
1.	Value standards differ for in groups and out groups: <i>exclusionism</i> .	<i>Personal relationships:</i> People behave with and react to other people depending on their relationship.	Value standards apply equally to everyone: <i>universalism</i> .	<i>Equal rights:</i> People behave with and react to everyone in a similar way. Relationships with people are not connected to behavior and reactions.
2.	Trespasses lead to shame and loss of face for self and group.	<i>Loss of face, shame:</i> Feeling ashamed when other people know of their cheating behavior	Trespasses lead to guilt and loss of self-respect.	<i>Loss of self-respect:</i> Feeling ashamed when resorting to unfair means

Table 5.4. Keywords for the Thai-style Shopping Simulation Questionnaire (Feminine vs. Masculine)

Question	Feminine		Masculine	
	Key differences	Keywords for the Questionnaire	Key Differences	Keywords for the Questionnaire
3.	People work to live.	<i>Friendly, cheerful:</i> Friendly behavior; words of greeting, welcoming, gratitude	People live to work.	<i>Quiet:</i> Not friendly during work; mostly presenting only the working posture.
	Relationships and quality of life are important.		Challenge, earnings, recognition, and advancement are important.	
4.	Welfare society ideal; help for the needy.	<i>Good atmosphere of service:</i> mood surrounding counter was good and relaxing	Performance society ideal; support for the strong.	<i>Quality of service:</i> Service with high quality; fair to everyone
	Management as ménage: intuition and consensus.	<i>Intuitions:</i> Sales per shopkeepers' intuition without conscious reasoning	Management as manège: decisive and aggressive.	<i>Ethical:</i> Sale of products according to moral principles and fair practice.
6.	International conflicts should be resolved by negotiation and compromise.	<i>Compromises:</i> mutual agreement to be reached in many situations	International conflicts should be resolved by a show of strength.	<i>Assertive:</i> Strict obedience to rules; no room for atypical actions or requests
	Both men and women should be modest.		Men should be assertive, ambitious, and tough.	
	Resolution of conflicts by compromise and negotiation		Resolution of conflicts by letting the strongest win, but rewards are based on equity.	

We used the key differences from Hofstede's cultural dimensions (Tables 5.3, 5.4, and 5.5) to design the activities of the Thai shopping behaviors because those keywords had been used in previous works, as discussed above, to show the relevance between cultural dimensions and communication activities.

Shopkeepers performed their friendly greeting behaviors with the customers; the purpose of this was to make a good atmosphere of service. After taking a customer's order, the shopkeeper might offer a discount to a customer who bought more than one ticket or item. The shopkeeper would extend this offer to establish a friendly, positive relationship with the special customer (personal relationship). This activity represented the intuition of the shopkeepers when they flexibly selected special customers and offered them discounts, and the compromise to choose to accept or reject another customer's request for this special offer.

Table 5.5. Keywords for the Thai-style Shopping Simulation Questionnaire (Uncertainty Avoidance)

Question	Weak Uncertainty-avoidance		Strong Uncertainty-avoidance	
	Key differences	Keywords for the Questionnaire	Key Differences	Keywords for the Questionnaire
7.	More changes of employer, shorter service No more rules than strictly necessary.	<i>Flexible:</i> open to change, adjustable	Fewer changes of employer, longer service, more difficult work–life balance	<i>Intransigent:</i> strict obedience to rules
8.	Motivation by achievement and esteem or belonging (competitive)	<i>Competitive:</i> Familiar with a completion	Motivation by security and esteem or belonging (agreement)	<i>Agreement:</i> Wanting to make an agreement
9.	Risky investments	<i>Accepting of risk:</i> ignoring solutions for management of risks	Conservative investments	<i>Avoidance of risk:</i> Preparing a solution to avoid risk and failure

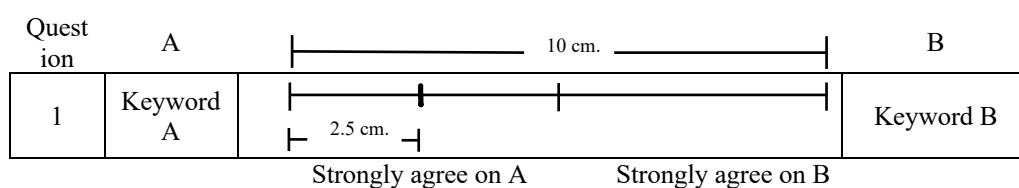
In Thai culture, people select a suitable random waiting position based on their intuitions to avoid loss of face. They have to accept the risk of a random position competitively and compromise to find a better position compared with other customers. In a random waiting position, customers have to decide on the right service order and timing (that is, they have to know when it is their turn, even when there is no visible system) to avoid a loss of face and shame. The customers have to use their intuition and should compromise in competition with other customers. In our simulation, we used flexible ordering, such as color choices and number of items. The order variety was intended to show that the Thai ordering style is flexible, adjustable, and negotiable.

The keywords of the questionnaire in the third experiment were designed following the key differences described above. We translated the keywords to Japanese for our Japanese participants, as shown in Table 5.6.

Table 5.6. Thai–Japanese Translation of Keyword for the Questionnaire

Cultural Dimension	Cultural dimension aspect and the keywords	Cultural dimension aspect and the keywords
Dimension 2	Collectivism culture: COL Personal relationship (関係重視), Loss of face, shame (集団尊重)	Individualism culture: IDV Equal Right (個別評価), Loss of self-respect (個人尊重)
Dimension 3	Femininity culture: FEM Friendly, cheerful (にぎやか), Good atmosphere of service (雰囲気重視), Intuitions (直感的), Compromise (融和的)	Masculine culture: MAS Quiet (平穩), Performance of service (利益重視), Ethical (倫理的), Assertive (対立的)
Dimension 4	Low uncertainty-avoidance: LUAI Changeable, flexible, adjustable (柔軟), Competitive (競争的), Accept risk (リスク許容)	High uncertainty-avoidance: HUI Intransigent (strict about rules) (厳密), Agreement (調和的), Avoid risk (リスク回避)

We used a visual analog scale in the questionnaire to measure the perception and interpretation difference between the two groups of the participant. We would like to measure attitudes of the participant between two poles of cultural dimension (Hofstede 1994)—IDV vs COL, MAS vs FEM, Low UAI vs High UAI. We asked them to specify their level of agreement between two keywords by indicating a position along a continuous line between two end-points. We measured the score of each question from the ten centimeters-bar as the score of each question. For example, we can measure the score of 25 from 100 for Question 1 in Figure 5.5.

**Figure 5.5.** Example of the visual analog scale (10 centimeters)

After the participants finished the simulation sessions, we asked them “Regarding the experiment activities in the scenario, please consider these two words (Keyword A and B) and assign a score making a vertical mark on the scale.” (See Figure 5.5 as an example; see Appendix II for the questionnaire used in this experiment.)

We used the pairs of words and their antonyms in the questionnaire to enquire about the participants’ feelings. The nine pairs of words used are listed in Table 5.7.

Table 5.7. Questionnaire Design Based on Hofstede’s Cultural Dimensions

Question	Cultural Dimension	Word and Antonym Pairs for the Questionnaire			Cultural Dimension
1	COL	Personal relationship 関係重視	vs.	Equal rights 個別評価	IDV
2	COL	Loss of face, shame 集団尊重	vs.	Loss of self-respect 個人尊重	IDV
3	FEM	Friendly, cheerful にぎやか	vs.	Quiet 平穩	MAS
4	FEM	Good service atmosphere 雰囲気重視	vs.	Performance of service 利益重視	MAS
5	FEM	Intuitions 直感的	vs.	Ethical 倫理的	MAS
6	FEM	Compromise 融和的	vs.	Assertive 対立的	MAS
7	Low UAI	Changeable, flexible, adjustable 柔軟	vs.	Intransigent (strict about rules) 厳密	High UAI
8	Low UAI	Competitive 競争的	vs.	Agreement 調和的	High UAI
9	Low UAI	Accepting of risk リスク許容	vs.	Avoid risk リスク回避	High UAI

5.2.5 Experiment Results

After the Japanese participants interacted with the Thai waiting and shopping simulation, we asked them to answer a questionnaire to measure their understanding of Thai culture.

Questionnaire results. All the Japanese participants from both groups, the first- and third-person POVs, observed the same activities but from the different points of view according to their group. We represented the activities—the Thai waiting and shopping style—using the various behaviors and interactions between the customer agents and the shopkeeper avatar.

After the participants attended both the practice and testing sections of the experiment, we asked them to choose a word and write make a mark on a 10-cm scale bar to indicate how close the word was to their feelings about during the experiment (see Figure 5.5). We measured the score from each scale bar (10 cm = 100 points/percent) in the questionnaire, and used the score results to analyze the perceptions, feelings, and understanding of the Japanese participants with respect to

Thai cultural communication in the night flea market scenario simulation. The results are shown in Figure 5.6.

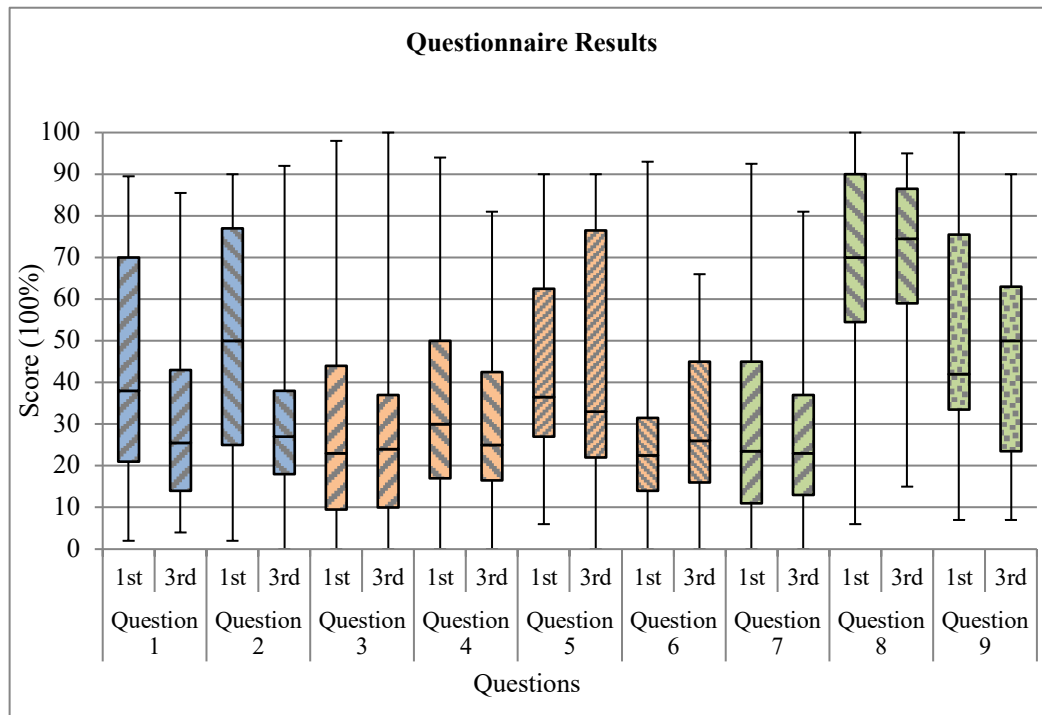


Figure 5.6: Experiment results: average score of each question.

We found a statistically significant difference (*t*-test) in the average score for the IDV dimension-related questions, Questions 1 and 2 from the survey ($t(40) = 2.02, p = 0.05$). The average scores for Question 1 from the participants in the first- and third-person POV groups were 45.52 and 32.62 respectively. The average scores for Question 2 from the participants in the first- and third-person POV groups were 49.88 and 33.86 respectively. The average scores for Questions 1 and 2 (representing the IDV dimension) of the participants in the first- and third-person POV groups were 47.70 and 33.24 respectively. There were no significant differences in the *t*-test results between the first- and third-person POV groups for Questions 3–6 (the MAS dimensions) and Questions 7–9 (the UAI dimensions). The average scores for the MAS dimension of the first- and third-person POV groups were 33.95 and 33.52 respectively. The average scores for Questions 7–9 for the first- and third-person POV groups were 50.22 and 47.90 respectively. A box plot of all the questionnaire results is shown in Figure 5.6.

We used factor analysis to categorize and evaluate the questionnaire results to identify patterns or trends in awareness and perception among the participants in

answering each question after they participated in the experiment. The factor analysis results are shown in Table 5.8. We used three- and four-factors in the factor analysis process. We found that four-factor analysis was suitable for this data set because the four factors represented each individual dimension as well as a combination of dimensions.

The factor analysis results indicated that the participants in both the first- and third-person POV groups answered the questionnaire strongly depending on the cultural dimension, as shown in Table 5.8. The IDV dimension (Questions 1 and 2) was represented by Factor 2 of the first-person POV group and Factor 1 of the third-person POV group. In addition, only the participants in the third-person POV group tended to answer Question 7 in the same direction. For the MAS dimension, Factor 3 of the first-person POV group and Factor 2 of the third-person POV group showed similar patterns in participants' answers to Question 5. For the UAI dimension, the participants from both first- and third-person POV groups showed the same tendency. For Question 9, Factor 4 of the first-person POV group and Factor 3 of the third-person POV group are shown to have answered in the same direction.

Table 5.8. Factor Analysis of Questionnaire Results of First- and Third-person POV Groups

Question	Cultural Dimension	First-person POV				Third-person POV			
		Factor 1	Factor 2	Factor 3	Factor 4	Factor 1	Factor 2	Factor 3	Factor 4
1	IDV/COL	0.361	0.713	0.148	-0.368	0.876	-	-	-
2	IDV/COL	0.117	0.834	-0.208	-0.197	0.650	0.100	-	-0.200
3	MAS/FEM	-0.167	-0.143	-	0.465	-	-	-	0.992
4	MAS/FEM	0.866	-	-0.217	-0.117	0.389	0.285	-0.162	-
5	MAS/FEM	-0.114	-0.306	0.935	-0.122	-	0.913	0.384	-
6	MAS/FEM	0.800	0.238	0.176	-	0.555	-0.405	-	0.146
7	UAI	0.164	0.118	0.554	0.169	0.758	-	-	-0.132
8	UAI	-0.804	-0.278	-0.211	0.258	-0.395	0.351	-0.272	0.336
9	UAI	-	-0.234	0.334	0.905	-	0.180	0.978	-

Item loading of > .600 or < -.600 appears in shaded boxes

Factor 1 of the first-person POV group represented the combination of observations for the MAS and UAI dimensions (Questions 4, 6, and 8). This factor was found only in the first-person POV group but did not match the third-person POV group. On the other hand, Factor 4 of the third-person POV group represented the MAS dimension (Question 3), which was not found in the first-person POV group.

5.3 DISCUSSION

We asked, “Does a difference in POV bring about different effects in cross-cultural learning due to the influence of cultural background?” We used Hofstede’s cultural dimensions to elaborate on the findings of the experiments described in Chapters 3 and 4. The results of the previous two experiments confirmed that different POVs increased different aspects of cultural awareness. Most of the first-person POV participants recognized situations based on their own feelings during interactions and their cultural background, whereas the third-person POV participants were better at recognizing situation based on the facts provided or on social rules.

We conducted this third experiment to confirm the cultural effects on understanding based on cultural communication learning through different POVs. We asked the Japanese participants to attend the Thai night flea market simulation. We divided the participants into two groups. In the practice session, we asked both groups to observe and interact while performing the same activities from their appropriate POV (first-person or third-person). The participants who learned using the first-person POV observed and interacted with the simulation from a narrow POV, whereas the participants who learned from the third-person POV could observe the entire environment and all the agents’ and the shopkeepers’ movements during the simulation. After both groups of participants had completed the practice section, all participants completed a testing section from a first-person POV.

As the main purpose of this research was to find the different effects on cross-cultural learning from learning through different POVs, we used the key differences from Hofstede’s cultural dimensions to design the activities of the Thai shopping scenario because these keywords have been used in previous works to show the relationship between cultural dimensions and communication activities. We found significant differences (*t*-test) in the result for Questions 1 and 2 for the first-person POV group of Japanese participants ($M = 47.70$, $SD = 25.23$) and the third-person POV group ($M = 33.24$, $SD = 20.80$); $t(40) = 2.02$, $p = 0.05$. We designed the scenario of Thai shopping behavior and the keywords in the questionnaire from Hofstede’s cultural dimension to gauge the perceptions and interpretation of the participants. Questions 1 and 2 are the keywords from the collectivism versus individualism dimensions. The average scores for Questions 1 and 2 in the first- and

third-person POV groups were 47.70 and 33.24 respectively. These results show the trend of both participants to recognize the keywords of the COL aspect more than the IDV aspect in our shopping scenario in Thai culture. So, I conclude that participants in the third-person POV group perceived the collectivist aspect of Thai culture in our shopping simulation (with the keywords—personal relationship, and loss of face, shame) better than the first-person POV group.

We continued to find other significant differences in the questions related to MAS and UAI cultural aspects. We found no significant differences in the extracted keywords from the MAS and UAI aspects. The average scores of the extracted keywords in Questions 3–6 (with the keywords—friendly, cheerful; good service atmosphere; intuition; and compromise) that related to the FEM aspects of the participants from the first- and third-person POV groups were 33.95 and 33.52 respectively. These results show the trend of both participants to recognize the keywords of the FEM aspect more than the MAS aspect in our shopping scenario in Thai culture. Moreover, the average scores for the keywords in Questions 7–9 (with the keywords—flexible, open to change, adjustable, competitive, and accepting of risk) that related to the UAI aspect of the participants from the first- and third-person POV groups were 50.22 and 47.90 respectively. These results show the trend of both participants to recognize the keywords of the UAI aspect at the middle level in our shopping scenario in Thai culture. Thus, these results indicated that the Japanese participants of two POV groups similarly recognize FEM and UAI cultural aspects (with the FEM keywords—friendly, cheerful; good service atmosphere; intuition; and compromise—and UAI keyword—flexible, open to change, adjustable, competitive, and accepting of risk) after engaging in our simulation.

We used factor analysis to investigate in more detail the results to better understand the differences in perception between the first- and third-person POV groups for each question in the questionnaire. We examined the relationship of each question and found that the participants in both first- and third-person POV groups answered the questionnaire strongly depend on the designed cultural dimension. The participants in first-person POV group separately considered the keywords of COL, FEM, and UAI cultures. We found that Factor 2 showed a strong correlation with Questions 1 (personal relationships) and Question 2 (loss of face, shame). The participants considered the FEM and UAI aspects from the keywords in Questions 5

(intuition) and 9 (accepting of risk) separately as Factors 3 and 4 respectively. Similarly, the participants in the third-person POV group separately considered the keywords of FEM and UAI. They considered the FEM and UAI aspects from the keywords in Questions 3 (friendly, cheerful), 5, and 9 separately as Factors 2, 3, and 4 respectively.

Both groups of participants considered Factor 1 as a combination of more than one cultural dimension. The participants in the first-person POV group considered the keywords of the FEM aspects in Questions 4 (good service atmosphere) and 6 (compromise) and the UAI aspect in Question 8 (competitive) together, while the participants in the third-person POV group considered the keywords of COL aspects in Questions 1 and 2 with the keywords of the FEM aspects in Question 7 (Flexible, open to change, adjustable) together. We found that the factor analysis result indicated that the participants from different POV groups considered the different culture-related keywords. This suggests that we had established different POVs can influence different perceptions and interpretations in cross-cultural learning.

We surmised that the participants could recognize the keywords related to the COL, FEM, and UAI aspects of Thai culture in both first- and third-person POV. We found a significant difference only in the COL aspect, showing that the participants in the third-person POV group can recognize the extracted keywords of the COL aspect better than in first-person POV in this current environment setting.

Chapter 6: Concluding Remarks

The goal of this dissertation was to discover people's different perceptions after learning and taking part in social communication from different points of view (POVs), specifically the first- and third-person POVs. The main research question was "Do different POVs affect people's perceptions while they are learning different cultural communication?" We investigated the differences in how Japanese and Thai participants understood fairness because fairness is important in understanding many of the communication problems that arise between people of different cultural backgrounds. Fairness should be preferred in negotiation behaviors, but ideas about what constitutes fairness in waiting might differ from one person to another because of subjective viewpoints (observer or participant), social rules that depend on culture-related factors, different patterns of thinking, or styles of physical action and interaction.

We introduced a simulated crowd in this research as a framework for developing a virtual cultural communication simulation system. We designed the behaviors of the agents and avatars in the simulated crowd based on real-world situations, namely waiting and shopping behaviors in Japanese and Thai cultures, drawing on cultural theory and Hofstede's cultural dimensions (Hofstede, 1979; Hofstede et al. 2010). We introduced the different POV methodology to provide divergent information to the participants. The first-person POV gives participants a view from their avatars' eye position just as in the real-world. The third-person POV allows participants to see a more comprehensive overview of their avatars and all the agents during an interaction from a bird's-eye view.

6.1 THE CONTRIBUTIONS OF THIS DISSERTATION

First, this experiment, as described in Chapter 3, explored perceptual differences in communication from first- and third-person POVs in simulated crowds. The research question was: "Do different POVs affect the different perceptions of participants while waiting?" We asked the participants in both groups to perform the same waiting activities, and we analyzed the differences of their perceptions and interpretations from their counter selections and the reasons for their

selections. The participants in the first- and third-person POVs paid attention differently while waiting in the virtual space. The participants in the first-person POV group tended to focus more on the interactions and their feelings while waited than the participants in the third-person POV did. The third-person POV participants attended more to the concept of the fairness of the service during waiting. Thus, we used our findings for provided further evidence to answer our reseach question that environmental variables, such as POV, can influence perceptions and interpretations of conversations. When designing a system for learning cultural communication or practicing social skills, we should consider POVs as a tool to clarify messages and help develop cultural behaviors.

Second, we conducted the second experiment with Thai participants, as described in Chapter 4, to compare those results with those from the first experiment with Japanese participants. The purpose was to determine whether the first and third-person POVs would yield different perceptions based on cultural background. We explored the different perceptions derived from the participants of the two cultures, considering first- and third-person POVs, and expected different perceptions and interpretations from the Japanese and Thai participants. In addition, we conducted an experiment with both Japanese and Thai participants to establish the effect of the cultural background on perceptions of fairness in waiting behavior using a simulated crowd. The participants in the first- and third-person POV groups from Japan and Thailand performed the same activities in the experiment—specifically, buying tickets from two counters with a choice between queue-waiting and group-waiting counters. Our results reaffirmed that culture has an influence on human behavior, but by analyzing their reasons for selecting a counter, we also showed that POV affects people’s situational interpretations and determined the effect of culture on waiting behavior at different levels of fairness.

What we found was that the Japanese participants were more focused on the speed and performance of waiting activities; they gave reasons related to wait time, the number of waiting customers, and the serving speed of the service-person. This result confirmed previous assertions that Japan is a masculine culture. In contrast, Thai participants were more willing to forgive queue-jumping customers (a friend of the service-person), as they reasoned that the queue-jumper might have an emergency or special circumstance that excused the rudeness. We concluded that the

collectivism dimension can refer to groups and relationships in Thai culture and that Thais forgive queue-jumping customers more readily their “feminine” culture values feelings and taking care of others.

Third, in our third experiment we developed a cultural communication learning system to help people learn and understand how to communicate with people from a different culture, comparing the cultural learning ability of the first- and third-person POVs learning processes. Many dimensions affect culture, so we hypothesized that learning from the first- and third-person POVs might yield different understandings based on cultural background. We asked the Japanese participants to wait and shop in a virtual Thai night flea market. To develop the system, we needed to create several components, such as an autonomous agent with a virtual body that seemed natural and used normal cultural communication behaviors, a clear scenario with lessons to describe the different and difficult aspects of the targeted culture, and a tool or device that presented an immersive or realistic virtual simulation. Many previous studies have focused on these components, as was discussed in Chapter 2; however, here we focused on another methodology that emphasized learners’ perceptions and interpretations—the different POV method. This methodology helps participants understand situation differently depending on their POV. The experiment results in pursuit of the answer to our question (see Chapter 5) “Does a difference in POV bring about different effects in cross-cultural learning due to the influence of cultural background?” showed that we were heading in the right direction. The participants in the first- and third-person POV groups answered the questionnaire, providing their scores. We selected the related cultural dimensions (Hofstede et al. 2010) of IDV, MAS, and UAI to discuss cultural communication, design the experiment activities, design the questionnaire, and evaluate the results of the questionnaire.

We have found that the result for the participants in the first- and third-person POVs groups have a statistically significant differences in the average score for the IDV dimension-related questions. We designed the scenario of Thai shopping behavior and the keywords in the questionnaire from Hofstede’s cultural dimension to gauge the perceptions and interpretation of the participants. The results show that the trend of both POV group of participants recognizes the keywords of the COL aspect more than the IDV aspect. Thus, we conclude that participants in the third-person POV group perceived the collectivist aspect of Thai culture in our shopping

simulation (with the keywords—personal relationship, and loss of face, shame) better than the first-person POV group. We continued to find other significant differences in the questions related to MAS and UAI cultural aspects. and found no significant differences in the extracted keywords from the MAS and UAI aspects. Thus, these results indicated that the Japanese participants of two groups similarly recognize FEM and UAI cultural aspects (with the FEM keywords—friendly, cheerful; good service atmosphere; intuition; and compromise—and UAI keyword—flexible, open to change, adjustable, competitive, and accepting of risk) after engaging in our simulation. The factor analysis results indicated that the participants from different POV group considered the different culture-related keywords differently: the first-person POV group considered the keywords related to the COL aspect separate from the other aspects, while the third-person POV group considered the keywords related to the COL aspect in combination with the UAI aspect.

Tourism is an activity that relates to cultural communication because different cultures often have different interpretations of the same behavior (Hofstede et al. 2010). Mascarenhas (2013) suggested using the cultural behavior model to integrate the IDV dimension with the agent. Overall, the literature shows that people in a collectivism (COL) culture may not invite strangers to join them in a bar when outsiders ask for directions to their hotel, but the real-world is different; there is not just one cultural dimension that influences activities or communication. It is difficult to establish whether such behaviors are caused by the COL dimension alone. Therefore, we designed and conducted our experiment for many activities in a scenario combining three dimensions that would be related to this type of situation. The participants in both POVs experienced the COL, FEM, and UAI dimension values of Thai culture, moreover the participants using the third-person POV recognized the COL dimension value better the first-person POV. Thus, this scenario was suitable for learning and understanding Thai cultural communication in the night flea market via both first- and third-person POVs.

6.2 LIMITATIONS

The present results had four limitations. First, the research was limited in that if the case study was changed, the scenario would need to be redesigned, depending on the case study's activities. The activities design and behavior design required discussion among cultural experts of the differences between Japanese and Thai

culture before we could develop the cultural agent's model. In this study we focused on communication in a simulated crowd because it is challenging to simulate cultural communication in a complex situation. Therefore, based on the experiment results, the participants from the first-person POV had a limited view of everything through macro-communication but learned more with close up or micro-communication. In contrast, the participants from the third-person POV gained an advantage in macro-communication and had disadvantages in micro-communication. To apply our findings to further research in other cultures, this condition would need to be considered and designed for other experiments or studies.

Second, the study was limited regarding devices that might affect participants' perceptions. The participant interacted with a large screen in the current version of the system. The agents performed actions on a flat screen, so the participants did not really feel that they were in a three-dimensional virtual reality. For the next version, we plan to develop a virtual reality platform to let the participants interact and communicate with the agent in a fully virtual world.

The third limitation was that the target group of participants in both countries was imitated. For this study, we only included an educated subgroup of the population as example of Japanese and Thai society. To start developing the basics of different cultural communications for our system, we would need to start the process with a broader group of people to determine whether they, too, could learn the differences, understand the technology of the simulation system, and adapt their experiences to the virtual simulation system and provide us with the reasoning underlying their behavior. In addition, we conducted the experiment with only two cultures, Japanese and Thai. Some limitations may have arisen from a bias of cultural background. In the future, we plan to extend our experiment to other cultures using the same methodology and experiment design to identify global settings of multicultural communication.

The fourth limitation concerns the third experiment that we conducted with Japanese participants. We selected keywords to represent each cultural aspect because the previous work used these keywords and the relevance of the keywords to the different styles of shopping behavior between Japanese and Thai cultures. We used these keywords in the questionnaire and found significant differences in the answers related to the COL aspect. This result suggests that while we designed and

conducted our experiment properly to find the effects of the cultural learning aspect between different POV, the keywords themselves may represent a limitation. The keywords may represent specific meanings to some participants and may not cover all meanings of a cultural dimension. We used only nine pairs of keywords, and this might not adequately cover the three cultural dimensions. There were still other cultural aspects related to other keywords that we did not explore or research for any difference in effect between the two POVs.

6.3 FUTURE RESEARCH

6.3.1 POV Model for Broader Classes of Nonverbal Behaviors

From the results of the different perceptions from two POVs in the experiment described in Chapter 3, we learned that the first- and third-person POVs can be applied to other research studies that require both subjective (from first-person POV) and objective (third-person POV) viewpoints to consider similar situations. We would like to investigate the POV effects in more general. Our proposed future research is shown in Table 6.1.

Table 6.1. The example of cultural conversation and communication

Viewpoint	Nonverbal Behavior	Cultural Communications/Interactions					
		Greeting behavior, small talk	Pedestrian behavior	Escape behavior	Crowd dynamic	Waiting behavior in crowd	Shopping behavior in crowd
Subjective-viewpoint (Micro-behavior)	Face direction	✓	△	△	✕	✓	✓
	Body direction	✓	△	✕	✕	✓	✓
	Hand movement	✓	✕	✕	✕	✓	✓
Objective-viewpoint (Macro-behavior)	Walking direction	✕	✓	✓	✓	✓	✓
	Walking movement, speed	✕	✓	✓	✓	✓	✓
	Standing position	△	✓	✓	✓	✓	✓

Behavior analysis: ✕ = not required, △ = depends on application, ✓ = required

6.3.2 Culture-related Decision-making Model

The culture-aware decision-making model in Figure 6.1 shows the cultural aspects of the human cognition found in this research. This model was design based on our results. We found that the participant reaction varies based on different POVs—first- and third-person—and their cultural experience—Japanese and Thai

cultures. For future experiments, we should design the experimental parameters in order to verify each component in detail. Such interpretability improves the understanding of the effect of different POVs in communication. This model can then be used for designing the behavior of a culture-aware agent as well as designing the scenario for the cross-cultural learning system.

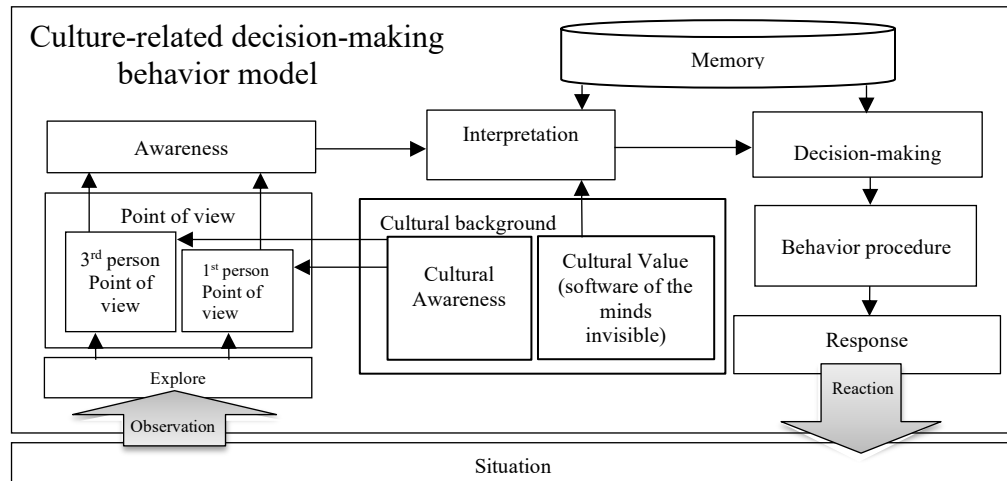


Figure 6.1. Culture-related decision-making behavior model.

After our third experiment, we were interested in finding other keywords that related to shopping activities in different cultures because the useful keywords would be appropriate cultural dimension representatives. It is easy to learn and understand the different cultures in interaction and communication simulation systems. Thus, another direction of our future work would be exploring the different effects of different POVs in other cultures to compare and shape our hypotheses and address our research questions. We would conduct this experiment with Thai participants engaging in a scenario of Japanese-style shopping and waiting so we could compare the results with the earlier experiment to find the different effects on cross-cultural learning depending to the learning from different POVs. In the near future, we plan to conduct an experiment with Thai participants and compare the results with the third experiment, because a comparison between cultures will help us better understand cultural differences, and that knowledge will improve our cultural model. We also plan to develop a more realistic simulation system using new technology (e.g., virtual reality) because we believe that a more realistic simulation will increase the benefits of the first-person POV.

6.3.3 Cross-culture communication training system

To apply the findings of this study in education domain, we can develop the cultural training system for the learner to understand the norms and acceptable behavior of a target culture. We can apply the keyword extraction process from the third experiment to model the cultural parameters of the target culture. We can use these cultural parameters to adjust the culture-related activities in a cross-cultural communication system. Examples include the design of a culture-related activity in a form of a story and simulating such situations to provide experiential cultural lessons. With such system, an expert can use the cultural parameters to adjust the difficulty of the situation, provide cultural hints, and allows for different POVs to help learners understand the target culture, not only through general conversation but more importantly through culture-specific interactions.

6.3.4 Culture-aware Agent and the application based on different POVs

The findings of such study can be applied to autonomous agents. We concluded that different POVs can bring different perceptions and interpretations to people, such finding should be useful to develop the autonomous agent. For example, when we embed different POVs into the autonomous agent's behavior model as shown in Figure 6.2, the agent will acquire different (and complementary) perceptions depending on different POVs. The system designer can design an on-demand switching mechanism between POVs to benefit from the information of one or both POVs' for the Reasoning Model. At this point, the agent's response will be based on the POV selection. This process enables the autonomous agent to react properly using different POVs.

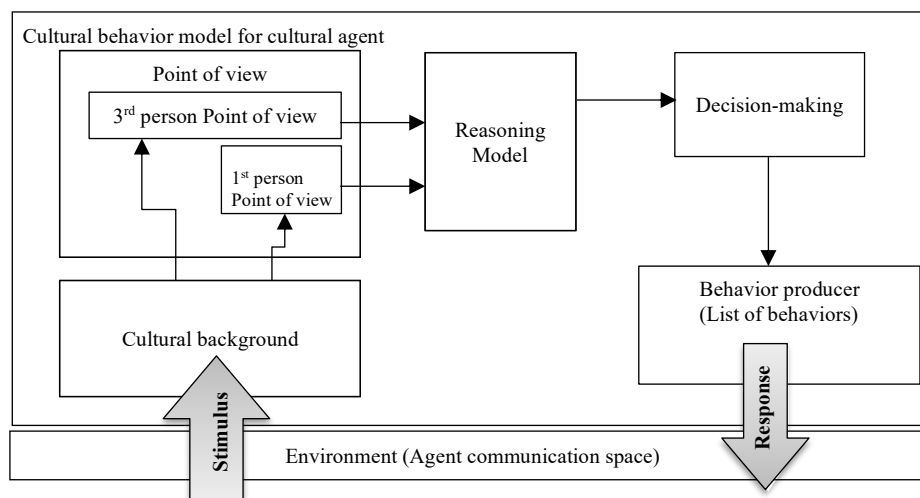


Figure 6.2. Cultural perception and interpretation model.

6.3.5 Cultural assistant agent empowered by different POVs

The findings of this research could also be used to design cultural assistant agent. This research shows that the first- and third-person POVs provide the participants with different information. First-person POV provides the information on the feeling and perception of reality, as in the real world. Third-person POV, on the other hand, provides information about the facts, rules and inherent properties of the situation. Moreover, our findings showed that the cultural background affects the reasoning underlying the decision-making process, as participants from different cultural background had different reasons for choosing the counter in our experiments.

To develop another system that covers a variety of situations in the future, it is important to select a suitable POV for assisting the users. The POV selection should be based on (i) purpose of the activity i.e. to focus on emotional aspects or to highlight the facts in the interaction, and (ii) the cultural background of the participants as we have found that people from two cultures—Japanese and Thai—perceived and understood the information from our simulation differently based on their cultural experience. We would have to carefully select a suitable POV for the participants based on their cultural backgrounds, because we know from our results that people from two different cultures interacted differently with our simulation and understood the information based on the POV and their own cultural background.

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Publications

I. First Author Papers

A. International Journal Papers

1. Sutasinee Thovuttikul, Yoshimasa Ohmoto, & Toyoaki Nishida. (2019). Learning communication from first- and third-person POVs: how perceptual differences influence the interpretation of conversations whilst waiting. *Multimedia Tools and Applications*, 1–25.
<https://doi.org/10.1007/s11042-019-7272-6>.
2. Sutasinee Thovuttikul, Yoshimasa Ohmoto, & Toyoaki Nishida. (2018). Comparison of influence of Thai and Japanese cultures on reasoning in social communication using simulated crowds. *Journal of Information and Telecommunication*, 3(1), 115–134.
<https://doi.org/10.1080/24751839.2018.1537557>
3. Sutasinee Thovuttikul, Yoshimasa Ohmoto, & Toyoaki Nishida. (2019). Investigating different understandings of cultural influences on waiting behavior from different. *Journal of Multimodal Technologies and Interaction*. (submitted April 30, 2019)

B. International Conference Papers

1. Sutasinee Thovuttikul & Toyoaki Nishida. (2011). Handling greeting gesture in simulated crowd. In *Proceedings of the IEEE International Conference on Granular Computing*, GrC 2011 (pp. 659–664)
<https://doi.org/10.1109/GRC.2011.6122675>.
2. Sutasinee Thovuttikul, Yoshimasa Ohmoto, Divesh Lala, Nils vab Kleef, Yoshimasa Ohmoto, & Toyoaki Nishida. (2012). Comparing people's preference on culture-dependent queuing behaviors in a simulated crowd. In *Proceedings of the 11th IEEE International Conference on Cognitive Informatics & Cognitive Computing*, ICCI* CC 2012 (pp. 153–162). IEEE Press. <https://doi.org/10.1109/ICCI-CC.2012.6311141>.

3. Sutasinee Thovuttikul, Yoshimasa Ohmoto, & Toyoaki Nishida. (2018). Fairness in culturally dependent waiting behavior: Cultural influences on social communication in simulated crowds. In *Asian Conference on Intelligent Information and Database Systems* (Vol. 10751, pp. 85–95). Vietnam: Springer. https://doi.org/10.1007/978-3-319-75417-8_8
4. Sutasinee Thovuttikul, Yoshimasa Ohmoto, & Toyoaki Nishida. (2018). Perception of fairness in culturally dependent behavior: comparison of social communication in simulated crowds between Thai and Japanese cultures. In *Recent Trends and Future Technology in Applied Intelligence*. (IEA/AIE2018). Montreal, Canada (pp. 489-495). https://doi.org/10.1007/978-3-319-92058-0_47.
5. Sutasinee Thovuttikul, Yoshimasa Ohmoto, & Toyoaki Nishida. (2019). The effect of first- and third-person POVs on different cultural communication: how Japanese people understand social conversation at Thai Night Flea Markets: Extended Abstracts (2019). *AAMAS 2019 International Conference on Autonomous Agents and Multiagent Systems*. Montreal, Canada.
6. Sutasinee Thovuttikul, Yoshimasa Ohmoto, & Toyoaki Nishida. (2019). Using first- and third-person POV to bridge cultural misunderstandings in learning system of different cultural communication in simulated crowd. *2019 IEEE 18th International Conference on Cognitive Informatics and Cognitive Computing (ICCI*CC2019)*, Milan, Italy. (accepted May 18, 2019)

C. International Workshop Paper

1. Sutasinee Thovuttikul, Divesh Lala, Hiroki Ohashi, Okada Shogo, Yoshimasa Ohmoto, & Toyoaki Nishida. (2011). Simulated crowd: Towards a synthetic culture for engaging a learner in culture-dependent nonverbal interaction. Workshop on eye gaze in intelligent human machine interaction, In *the 16th International Conference on Intelligent User Interfaces*, IUI 2011, California, USA, February 13, 2011.

II. Co-authored Papers

A. International Conference Papers

1. Divesh Lala, Sutasinee Thovuttikul, & Toyoaki Nishida. (2011). Towards a virtual environment for capturing behavior in cultural crowds. In *Conference on Digital Information Management* (pp. 310–315). Melbourne, Australia: IEEE Press.
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2. Toyoaki Nishida, Masakazu Abe, Takashi Ookaki, Divesh Lala, Sutasinee Thovuttikul, Hengjie Song, Yasser Mohammad, Christian Nitschke, Yoshimasa Ohmoto, Atsushi Nakazawa, Takaaki Shochi, Jean-Luc Rouas, Aurelie Bugeau, Fabien Lotte, Ming Zuheng, Geoffrey Letournel, Marine Guerry, & Dominique Fourer. (2015) Synthetic evidential study as augmented collective thought process: preliminary report. In Nguyen, N., Trawiński, B., & Kosala, R. (Eds.), *Intelligent information and database systems. ACIIDS 2015, Lecture Notes in Computer Science*, vol. 9011, (pp. 13–22). Springer, Cham. https://doi.org/10.1007/978-3-319-15702-3_2.
3. Toyoaki Nishida, Atsushi Nakazawa, Yoshimasa Ohmoto, Christian Nitschke, Mohammad Yasser, Sutasinee Thovuttikul, Divesh Lala, Masakazu Abe, & Takashi Ookaki. (2015) Synthetic evidential study as primordial soup of conversation. In Chu, W., Kikuchi, S., & Bhalla, S. (Eds.), *Databases in networked information systems. DNIS 2015, Lecture notes in computer science*, vol. 8999 (pp. 74–83). Springer, Cham. https://doi.org/10.1007/978-3-319-16313-0_6.

Appendix I

The questionnaire from the effect of different POVs on waiting behavior experiment is shown below. We used this questionnaire in the first experiment with Japanese participants and in the second experiment with Thai participants to find the effect of different POVs by analyzing the perceptions and interpretations depend on the counter selection and the reasoning.

Questionnaire: Satisfaction on Ticket counter system

This questionnaire is used to interview your opinion about how to buy the ticket for food at the ticket counter

Part 1: General Information. Please fill out this form

- Department(所属部局).....
- University (大学).....
- Age (年齢)..... years old (才)
- Nationality (国籍) ☐ Japanese (日本) ☐ Thai (タイ)
- Gender (性別) ☐ Male (男) ☐ Female (女)

The questionnaire

Part 2: Answer the question from your opinion.

	カウンターA(左)	カウンターB(右)
Session 1-5:		
1. What counter did you select in this session, Counter A or Counter B (please circle ○ at A or B) (カウンターA とカウンターBの どちらに行きましたか。○をつけてください。)	What was the reason for each counter selection? Any reason is acceptable as the reasoning? (どうして そのカウンターに行きましたか。理由はいくつでもいいです。)	
First round : Counter A ・ Counter B		
Second round : Counter A ・ Counter B		
Third round : Counter A ・ Counter B		

Appendix II

The questionnaire on the effect of different POVs on shopping in a Thai night flea market experiment is shown below. We used this questionnaire in the third experiment with Japanese participants to find the effect of different POVs by analyzing the perceptions and interpretations of keywords related to Hofstede's cultural dimensions. (Questions 10 and 11 are not the extracted keywords. We did not consider as the experiment result)

Questionnaire: Satisfaction on Ticket counters system

This questionnaire is used to interview your opinion about how to buy the ticket for food at the ticket counter

Part 1: General Information. Please fill out the form

- Department(所属部局).....
- University(大学).....
- Age (年齢)..... years old (才)
- Nationality (国籍) ☐ Japanese (日本) ☐ Thai (タイ)
- Gender (性別) ☐ Male (男) ☐ Female (女)

Part 2: Answer the question from your opinion. Please consider these two words (keyword A and B) and put the score by writing a vertical bar on the scale.

A		B	
Strongly agree on A		Strongly agree on B	
No.	A		B
1	Personal relationships (関係重視)		Equal rights (個別評価)
2	Loss of self-respect (個人尊重)		Loss of face, shame (集団尊重)
3	Friendly, cheerful (にぎやか)		Quiet (平穏)
4	Good service atmosphere (雰囲気重視)		Performance of service (利益重視)
5	Ethical (倫理的)		Intuitions (直感的)
6	Assertive (対立的)		Compromise(融和的)
7	Flexible, open to change, adjustable (柔軟)		Intransigent (strict about rules) (厳密)
8	Agreement (調和的)		Competitive (競争的)
9	Accepting of risk (リスク許容)		Avoid risk (リスク回避)
10	Funny (おもしろい)		Seriously(まじめに)
11	Exciting (悪用 開発する)		Boring (退屈な)