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Designing a VR Game for Empathy in Indian Nurses

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ABSTRACT
The purpose of this article is to investigate and examine potential approaches for improving empathy among Indian nurses. Empathy is a fundamental ability for nurses to comprehend, assess, and support their patients in a more productive and holistic manner. Virtual reality game simulation has been shown to have an effect on humans, influencing their behavior and emotional characteristics. The significance of VR game has been shown through a case study. Being able to create empathy through VR game simulation can shift the overall experience of the Patient-Nurse relationship to be more compassionate and helpful. To tackle this topic, a design thinking technique was applied.

Keywords - Design Thinking, Empathy, Indian nurses, Game, Virtual reality.

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I. INTRODUCTION

In a clinical setting where the nurses, doctors and healthcare professionals interact with the patients and their families the virtue of Empathy plays a major role in the entire ecosystem. Empathy creates better understanding and motivation throughout this ecosystem. Identification with the patient's suffering, internal drive to empathize, comprehension of the patient's perspective, and the capacity to relay understanding of these feelings and views back to the patient are all components of empathy. Patients may not be able to articulate the idea of empathy, but they can tell whether they have been treated with empathy. [1] There is a strong link between empathy and positive healthcare outcomes such as patient satisfaction, treatment adherence, and a low rate of mistakes and problems. Nurses with low empathy are more likely to experience emotional weariness and professional discontent, as well as an increase in healthcare disagreements. Empathic abilities are essential in nursing care to comprehend patients' feelings and experiences, and nurses can enhance patients' circumstances through their "relational capacity." Despite the fact that empathic abilities are required for good nursing care, studies have shown that nurses have poor or intermediate empathic skills, and patients suffer as a result. Nursing students exhibit equally low levels of empathy, which might diminish as their studies proceed. The majority of authors have emphasized the importance of empathic abilities in patient care for the development of nursing students. As a result, finding effective approaches to equip nursing students with empathic abilities is critical.

II. NURSING IN INDIA- AN OVERVIEW

India is in need of 4.3 million more nurses by 2024 to meet WHO norms. With 1.7 nurses per 1,000 people, India falls short of the WHO-recommended rate of 4 nurses per 1,000 people, they said, adding that the country will require 4.3 million more nurses by 2024 to fulfill WHO standards. According to the Indian Nursing Council, the top causes for the annual migration of nurses leaving the nation are bad working conditions and low pay (INC). The optimal Nurse Patient Ratio recommended by the Government of India and the Indian Nursing Council (INC) has not been implemented, and as a result, one nurse is looking after 20 to 30 patients, putting patient well-being at risk, making doctors' jobs difficult and frustrating, and undermining India's healthcare system's credibility.

As nursing professionals' tasks and problems have grown throughout time, a key hindrance to their growth and development has been their lack of engagement in decision-making and policy formulation. There is a leadership problem in India's nursing cadres that must be addressed promptly. Non-nursing professionals who lack actual, day-to-day expertise in the field are woefully unqualified to make judgments on behalf of practicing nurses.

The history of nursing in India dates to about 1500 B.C.Atharvaveda (a sacred text of Hindus) contains the earliest accounts describing the practice of healthcare. In 700 B.C., "halls of healing" were founded, and Benares (a city on the bank of the River Ganges) was the center of medical education. The Ayurvedic (the science of life) surgeon Sushruta (6th century B.C.) and the physician Charaka (300 B.C.) were famous in the ancient world through their teachings in Samhita (a collection of texts) about asepsis and techniques of cesarean section, plastic surgery, and eye and brain surgeries. [2]

In all health care situations, cultural understanding and interpersonal communication are fundamental pillars for care. Interpersonal communication includes empathic understanding, unconditional positive regard, warmth, and genuineness. It creates a relationship where both communicators are equally participating. Cultural understanding and interpersonal communication create the groundwork for nursing goals, education, and compliance, and are essential to safe, high-quality nursing care. [3]

One research in India found that 87.6 percent of nurses were stressed, with 2.1 percent reporting severe stress. [4] Another survey showed that 92 percent of nurses were stressed, with 52 percent experiencing severe stress. [5]

Nursing has been characterized as a job with a high degree of stress. Job stress has a negative influence not just on nurses' health but also on their ability to meet job obligations. Poor doctor attitude, posting in busy departments (emergency/ICU), inadequate salary, too much work, time pressure, and demanding employment with little time for relaxation and meals are the primary occupational stresses for nurses. Stress impairs attention, focus, decision-making, and judgment abilities. Occupational stress is also associated with lower quality of care due to a loss of sympathy for patients and an increase in the occurrence of blunders and practice errors.

There is a significant association between the department of posting and the level of stress. The majority of the nurses posted in the emergency/ICU department are stressed out. It was found that staff nurses posted in the medicine, surgery, pediatrics, and obs/gynecology departments are less stressed as compared with those posted in the emergency/ICU department. In another study, a statistically significant association was seen between nurses' occupational stress and their area of work or specialty. Nurses working in intensive care units ranked insufficient regular breaks, work shifts, too much work, and staff shortage as the main sources of distress.[3] Nurses in medical, surgical care units and operation theaters ranked workload, time

pressure, staff shortage, and lack of management and co-workers' support more stressful.[6]

III. VR GAMES- AN APPROACH TOWARDS EMPATHY

Video games are interactive electronic games that are designed primarily to entertain players. Video games allow players to interact with virtual settings, either 2D or 3D, under precise rules and circumstances that change from game to game. Games may generate a range of changes in participants, such as aggressive, negative, or cooperative behavior, as well as positive attention. There is a connection between video games and player behavior. Emotions, reflexes, actions, motives, requirements, thinking style, and response to internal and external circumstances are all influenced by video games. The influence of video games on player behavior and emotions cannot be overstated. [7]

Virtual reality is a computer-generated 3-D simulation that provides the user with a wide variety of sensory input, allowing them to interact with items in a virtual world and feel as if they are physically present. Virtual reality may be utilized to assist nursing students in developing skills in virtual hospital environments. Virtual reality simulations improve students' focus, engagement, confidence, motivation, and creativity while also allowing them to apply theory and study at their own speed. It also allows them to practice whenever and as frequently they want in safe and realistic situations without concern of making errors and injuring patients. Because the study is an applied style, students who participate in VR simulations are more likely to become comfortable, confident, and effective in real clinical situations. Nursing students who possess these abilities can offer safe care, appropriately dispense drugs, and detect changes in their patients. Finally, students who engage in virtual reality simulations can provide patient safety in real-world clinics.[8] As a result, these VR simulations eventually aid in the development of interpersonal (people) skills, communication skills, listening skills, time management skills, and empathy in nurses.

IV. EMPATHY THROUGH A DESIGN THINKING APPROACH

Empathy is a multifaceted phenomenon that is characterized as the ability "to perceive the client's private world as though it were your own, yet without ever losing the 'as if' characteristic." Between 1992 and 2000, a concept analysis of empathy in the nursing literature indicated five conceptualizations of empathy as: a human attribute; a professional condition; a communication process; caring; and a particular relationship. These conceptualizations represent both the innate and learned features of empathy, as well as the essential parts of empathy (moral, affective, cognitive, and behavioral components), which are summarized by [9]. The capacity to give empathy varies from person to person since some individuals are more empathetic by nature than others; nonetheless, learned empathy may be taught as a skill and improved with practice and experience.

There has been an increasing focus in the role of empathy in patient care over the last few decades. Empathy is seen as a necessary component of every caring interaction, but it is especially important in providing great nursing care. Its importance in a therapeutic connection has been underlined, in which healthcare practitioners comprehend patients' sentiments as if they were the patients themselves. However, research has revealed that healthcare personnel frequently neglect patients' direct and indirect emotional responses, missing opportunities to convey empathy. This may reflect the intrinsic challenge of evaluating what may be regarded as a subjective, multifaceted, and even ethereal component of caring, and brings the rigor of techniques used to measure it into doubt. [9]

V. METHOD - A DESIGN THINKING BASED APPROACH

The aim of this study is to introduce a Virtual reality based game to put forward Empathy in Indian Nurses. For the same, a Design Thinking based approach has been followed to fulfill the purpose. What is the Design Thinking process? Design thinking is based on the designer's ability to examine 1. human needs and new visions of living well, 2. existing material and technological resources, and 3. the constraints and potential of a project or business all at the same time. The combination of these three variables necessitates the designer's capacity to be analytical and emphatic at the same time, rational and emotive, systematic and intuitive, guided by plans and limitations, yet spontaneous. [10]

One of the major goals is to induce empathy in Indian nurses through vr and design thinking process thrives on empathy. How is Design Thinking related to empathy? Design Thinking employs five iterative working modes: "Empathize" is concerned with understanding the nature of the problem as well as the consumers and their requirements. This phase's findings are then classified in a "Define" stage, which synthesizes the primary findings and serves as a "persona" (an ideal user) to confirm decisions later in the process. The other three modes are "Ideate," "Prototype," and "Test." These modes are concerned with creating ideas and expressing them in prototypes in order to test them with people who are similar to the persona. The significance of empathy in Design Thinking is reinforced not just by the process (recall the first step "Empathize"), but also through Design Thinking research.

The Design Thinking process thrives on empathy and it is one of the foundational characteristics of the process. The problem solving process that is based on empathy proves to be a vital tool to design a VR game for empathy in Indian nurses. India- the land where diversity is prevalent becomes a challenging ground to understand and study the behavior of the nurses and design something that is universal and accessible to all. The design thinking process includes following steps: Empathy - Define - Ideate - Prototype - Test.

The entire process starts with understanding and studying the user which in this case are Indian Nurses. We can approach and employ empathy in a design process in various ways. First, as a tool for designing, which necessitates the conversion of this emotional state into an attribute. Second, designers can employ empathy to gain understanding of consumers' demands and, in turn, guide the design process. [11] In addition to the process itself (remember the first step, "Empathize"), research on design thinking also emphasizes the importance of empathy. For instance, authors like Tim Brown describe empathy as the most fundamental and desired principle for businesses as to why Design Thinking should be implemented. Case studies on the application of Design Thinking and self-descriptions from organizations also indicate this. [12] Now to be able to understand Indian Nurses and analyze their emotional and behavioral aspects Empathy mapping is done.(Fig. IV.1) An empathy map is a collaborative graphic that is used to express what we know about a specific type of user. The user or persona is at the center of an empathy map, which is divided into four quadrants (Says, Thinks, Does, and Feels). Empathy maps, which are neither chronological or sequential, give a glimpse into who a person is as a whole.

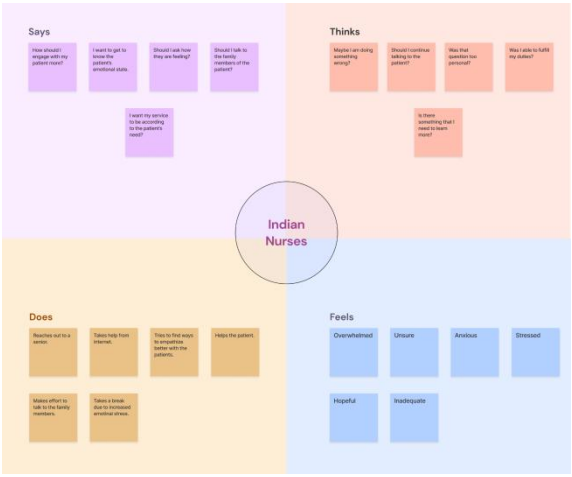


Fig.IV.1 Empathy map of Indian Nurses

It's time to compile the knowledge obtained during the Empathize phase. In order to define the key issues that have been discovered, the observations are now analyzed and synthesized. Problem statements are what these definitions are known as. A precise problem statement that directs the design process is provided in the define phase. Ideas and potential solutions will be based on this. The needs and requirements of the nurses are now prioritized in order to determine the greatest solution to the issue they are now dealing with, which is to develop strong patient empathy. A user persona of the nurses will help to understand their true pain and delight points and would help to better understand the nurses. (Fig. IV.2) This will help to clarify the statement.

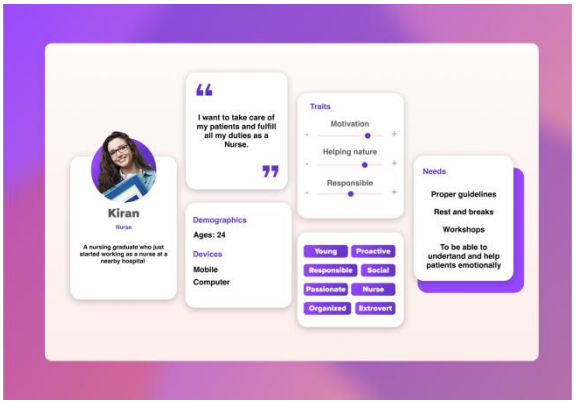


Fig. IV. 2. Persona of Indian Nurse

The process of creating, refining, and presenting ideas is known as "design ideation," where "idea" is viewed as a fundamental thought component that can be either visible, concrete, or abstract. As a result, it plays a crucial role in the design process in both theory and practice. [13] Currently, several suggestions for increasing empathy among Indian nurses are being reviewed and drafted in order to provide the finest answers. To gain their viewpoint on how to come up with ideas, the authors and nurses participated in a brainstorming session. A brainstorming map that displays potential approaches and routes has been developed to assist nurses in developing empathy.(Fig. IV.3)

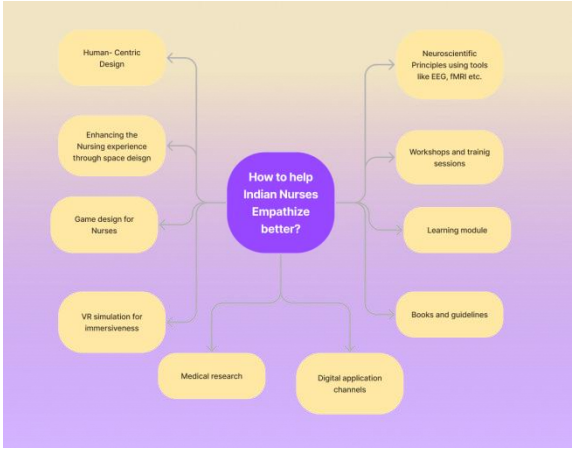
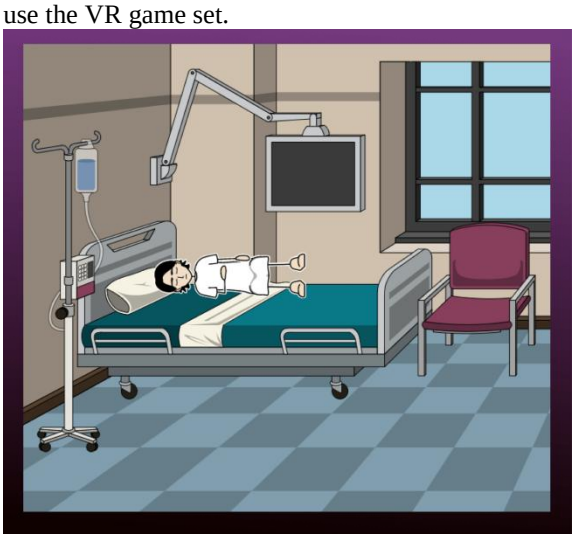


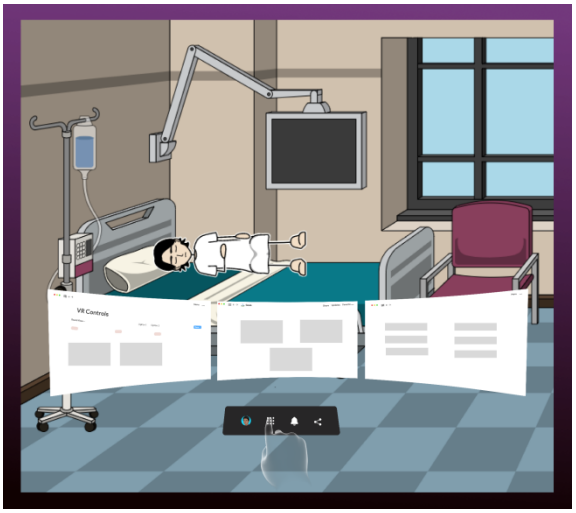
Fig. IV..3. Brainstorming session with the Nurses and the authors

Finding the optimal answer for each situation is the objective. In order to test the ideas generated, various low-cost, scaled-down prototypes of the product (or specific aspects found inside the product) are developed. This might only require paper prototyping. Building experience-based prototypes is another key tenet of design thinking. The creation of prototypes is crucial to the innovation process. This principle runs counter to several established information management development methodologies. The majority of information system development techniques result in abstract models. These are frequently refined to lower abstraction layers through a step-by-step approach. Such models are not commonly understood by decision-makers. Design Thinking takes a different path. Prototypes that can be understood quickly and readily are created to enable the testing of novel concepts. [14]

Wireframes have been created for the clinical environment and VR game controls have been created in order to show what exactly is being proposed in this study.(Fig. IV.4,5,6) VR games are immersive and have a diegetic UI in order to create real-world experience for the users. This study is limited to the idea and to show that wireframes have been made of how the UI actually looks when nurses use the VR game set.



(Fig. IV.4) Shows the point of view of the nurse after entering the VR games



(Fig. IV.5) Shows how the controls look like when the nurse tries to engage in the VR game

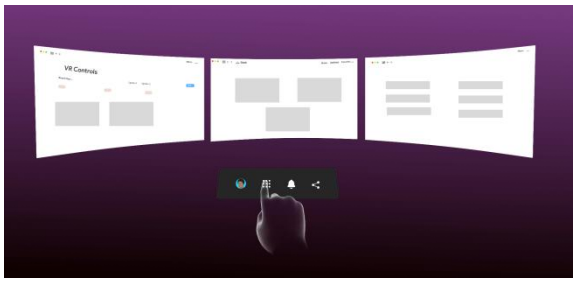


Fig. IV.6 Shows the VR game controls

VI. CASE STUDY: A SCENARIO WHERE A NURSE HAS TO DISCLOSE CANCER TO THE PATIENT AND THE FAMILY

A case study is done to better understand the problem area and identify prospective areas where empathy through VR games can be incorporated. A scenario is taken where a nurse has to disclose Cancer to the patient and the family. This itself is a very critical situation for the nurse to convey such drastic information. For this, the flow of the Nurse is analyzed and understood and the scope of VR games is proposed. (Fig. V.1)

The last step is where VR games can be used to help nurse practices and see how to break out this news to the family as well as the patients. Nurses can also be able to see how the patients and the family reacts to this news and frame questions and words accordingly. This can help the nurse to actually help to educate and make nurses capable of empathizing with situations like these as VR is an immersive experience for the nurses that helps to stimulate the emotional and behavioral changes in humans. In this case, the nurses can be exposed to such situations prior and through interactive quizzes and questionnaires evaluated further to improve upon this. Similarly, nurses can be shown these situations on VR and then their EEG data can be recorded to actually find out the brain activities which can eventually lead to educating the nurses as well as the further research to come up with better experience. In this case the interactive VR screen would be used for controls and guides for the nurses to help them navigate throughout the entire simulation.

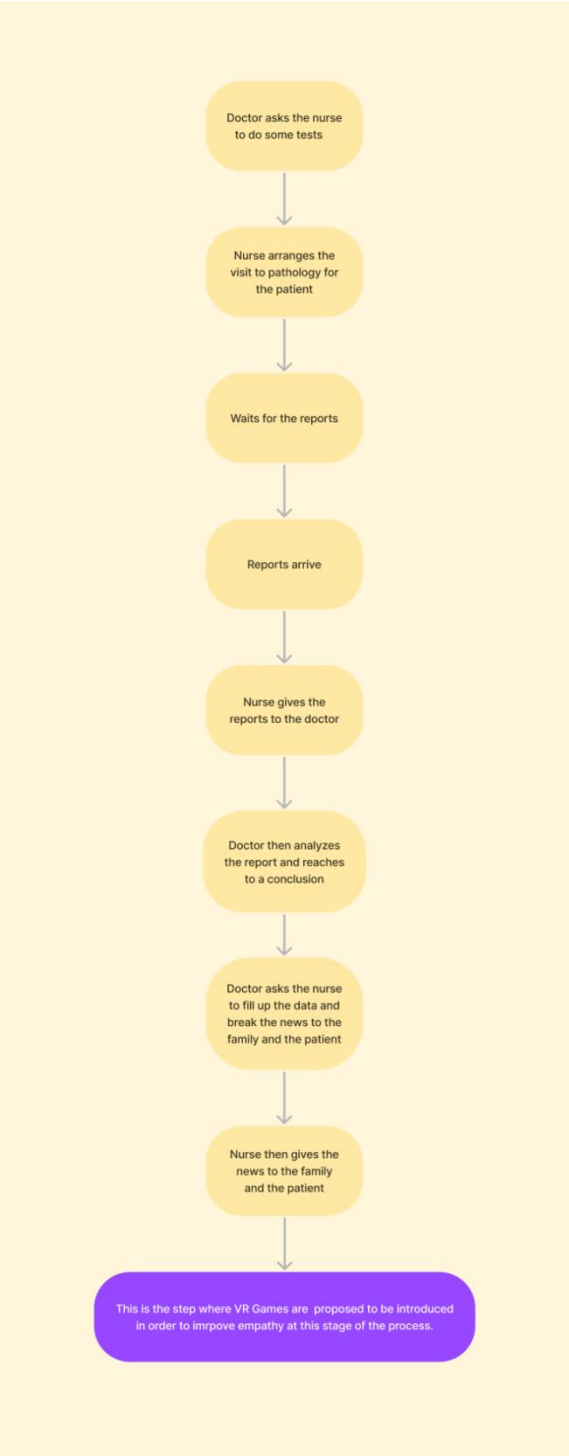


Fig. V.1 VR Scenario on Breaking Bad News

The best option after going through the ideation process is a VR game that may be utilized to increase empathy among Indian nurses. Ideas, flows, design, and development are essential to the game development process. In this study, we are primarily interested in the VR game's recommended design for empathy. The design part includes the concept and the flow, which are later expanded upon by the developers into a real-world game environment. The work flow of the nurses has also been noted after interacting with them and researching their objectives, needs, and motivations; this serves as the basis and guiding framework for the game's design.

Usability testing, often known as user testing, is a step in the design process that allows for real-user evaluation of the product or service and the development of user-centric products. Through this procedure, it is possible to investigate and examine how the target market interacts with the product. Further testing of prototypes of particular flows or features can be done by assigning tasks to a large number of users, collecting and analyzing the results, and then deciding which iterations are necessary to develop the product.

Testing the developed game would be conducted in a subsequent research study that would study the impact and result created by the game.

VII.RESULTS

The study explores the idea of VR games for Empathy in Indian nurses with a design based approach. The design thinking process guided the results of this study to reach a potential solution with a flow and architecture that Indian nurses get benefited with a more immersive experience to incorporate empathy into their day-to-day job. The deductive approach from the Design Thinking process with stages namely- Empathy, Define, Ideate, Prototype and Test supported the entire flow and study. The idea to use the Design Thinking

process based on Empathy will actually result in an enhanced gaming experience as well as Empathize better with the patients. The process started with dissecting and studying the problem with a rich literature survey on Indian nurses, Empathy, VR games, Design aspects and the nurses education. The knowledge gained through the review actually helped to set the foundation of our study. The wireframe for the VR game environment has been shown in the paper to better understand how actually the gaming experience is going to look like for the nurses.

The case study shown in this paper actually explores the significance of VR games in the nursing process and how actually the idea of VR games for empathy can be used effectively. The approach to empathy has to go through an empathetic process which the case study fulfills when the actual user case has been studied and examined to reach the conclusion.

VIII. CONCLUSION

The literature review showed the path to a design based approach to be chosen for the Indian nurses and explore the idea of Design Thinking. There were studies done on global research on empathy in the healthcare context, then moving on to start the process with interacting with the actual users of the study - The Indian nurses whose aspirations, motivations, needs, pain and joy points were noted through a brief interview with them, a questionnaire was prepared based on the literature review to suffice the interaction, then mapping these results via the empathy mapping, moving onto brainstorming sessions,creating personas, user flows, storyboards and then information architecture. Eventually the test of this study will follow and a separate study is planned in a follow up of this research to test the results.

The important and significant findings of the study include forming a strong mindset about the problems faced by Indian nurses and patients with a better clinical experience, the scope of VR gamings being immersive and fuel behavioral changes in human beings and how a real-time scenario helps the humans to understand and empathize better with the surroundings, the idea of using a design-fed process that takes into account the user behavior, needs and pain points into consideration and has a scope to ideate, brainstorm, prototype and test the final solution, the impact that VR games leave on the minds of nurses, the behavior shift to empathy and so on.

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