Walking a Mile in Simulated Shoes: Development of an Assessment of Perspective Taking

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ABSTRACT

Success in today's global environment is often contingent on one's ability to effectively navigate culturally complex situations. This ability, referred to as cross-cultural competence (3C), is actually a constellation of abilities that enables individuals to adapt to a wide range of interpersonal contexts. Despite the importance of 3C, adequate measurement of 3C is lacking and often overly reliant on self-evaluation, which can be inherently biased or unreliable. As a result, other methods by which 3C can be more validly assessed are being explored. This project focuses on one such method, namely, a game-based assessment of perspective taking. Perspective taking, a critical sub-facet of 3C, is a social-emotional skill that enables individuals to consider another's point of view. In cultural contexts, perspective taking is particularly important, as it not only facilitates awareness of how cultural norms influence behavior, but also allows for more accurate prediction of behavior in future situations. The simulation described here takes place on an alien planet and requires players to complete several quests in service of a larger game goal. Each of the quests require players to learn about the planet's culture and use what they've learned, along with their perspective taking skills, to achieve quest goals. Players' skill levels are inferred from the decisions they make and the amount of feedback they require to successfully complete each quest. The presentation will focus on the theoretical foundation for the game's development, as well as address the operationalization of the construct, game design, learning objectives, and scoring criteria.

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INTRODUCTION

Success in today's global environment is often contingent on one's ability to effectively navigate culturally complex situations. This ability, referred to as cross-cultural competence (3C), is actually a constellation of knowledge, skills, abilities, and other characteristics that enable individuals to adapt to and perform effectively in a wide range of intercultural contexts (Abbe, Gulick, & Herman, 2008; Thomas, et al., 2008). Despite the relevance of 3C to performance settings such as the military (Abbe et al., 2008; Caligiuri, Noe, Nolan, Ryan, & Drasgow, 2011), expatriate missions (Bhaskar-Shrinivas, Harrison, Shaffer, & Luk, 2005; Black, 1990), and even space travel (David, Rubino, Keeton, Miller, & Patterson, 2011), adequate measurement of 3C has been lacking and is often overly reliant on self-report (Gabrenya, Griffith, Moukarzel, Pomerance, & Reid, 2013). Self-report can be problematic, especially when measuring a construct like 3C, as the method operates under the assumption that individuals are aware of how well (or how poorly) they tend to perform in cross-cultural contexts and are therefore able to provide an accurate evaluation of their cross-cultural ability (see Dunning, Heath, & Suls, 2005). Self-report methods also assume that individuals are motivated to respond honestly when asked to rate their performance, an assumption that becomes increasingly concerning in high-stakes environments where people may be more motivated to respond in ways that are socially desirable or consistent with administrators' (e.g., employers') expectations (Paulhus & Vazire, 2007). As a result of these concerns, researchers have begun to explore other methods by which to more validly assess 3C. This project focuses on one such method, namely, game-based assessment.

In the sections that follow, we describe the development of a prototype game-based assessment to measure perspective taking, an important sub-facet of 3C (Abbe et al., 2008). In addition to presenting the theoretical premise for the game, we will focus on critical elements of the game's design, including the operationalization of perspective taking within the game, game mechanics and features, gameplay objectives, and scoring criteria. Included as part of this discussion will be an overview of a system that was developed specifically to help streamline authoring of non-player character (NPC) dialogue. We will conclude with a brief commentary on the prototype's limitations as well as suggestions for future research and development.

PERSPECTIVE TAKING: AN OVERVIEW

Perspective taking, often referred to as social role taking, is a social-emotional skill that enables individuals to consider another's point of view. More specifically, perspective taking facilitates the accurate identification of others' mental states, including their thoughts and feelings, in service of better understanding their behavioral responses to situations (Selman, 1973). Perspective taking is a particularly valuable skill within cross-cultural contexts, as it not only facilitates awareness of how cultural norms influence the behavior of others, but also allows for more accurate prediction of others' behavior in future situations.

Perspective taking is a skill that typically develops in middle childhood, but has been claimed by some to develop as early as three or four years of age (Dixon & Moore, 1990). Though younger children tend to be egocentric and unaware of perspectives other than their own, as they grow and gain social experience, they begin to recognize individual differences in others and the complexity of social interactions, both of which contribute to the differentiation between

their perspectives and those of others. As children's ability to think in broader, more abstract ways develops, so, too, does their ability to anticipate and predict the perspectives of others, which allows for more effective social interactions, overall (Selman, 1973).

Despite the universal capacity to develop perspective taking, individual differences in perspective taking skill are largely due to dispositional and cognitive factors, with individuals higher in openness and cognitive flexibility developing perspective taking more readily (Caligiuri & Tarique, 2012). On the other hand, individuals who are less comfortable navigating social or cultural situations may experience greater interpersonal stress, which may, in turn, inhibit perspective taking development. Regardless of individuals' predispositions, however, perspective taking is a malleable skill that can be fostered through mindful self-awareness, increased social and cross-cultural experience, refinement of communication skills, and integration of interpersonal feedback (Roan et al., 2009). As such, individuals who seek out and are motivated to learn from opportunities engaging with others may be capable of both improving and refining their perspective taking skills.

Like assessments of 3C, assessments of perspective taking have generally relied on self-evaluation (Davis, 1983; Long, 1990). For example, the *Perspective Taking Scale*, a subscale of the *Interpersonal Reactivity Index* (Davis, 1983), solicits test takers' ratings of their own perspective taking ability with items such as, "I sometimes find it difficult to see things from the other guy's point of view." Very few assessments, on the other hand, ask individuals to actually demonstrate their ability to take another person's perspective (a notable exception being Selman, 1973), and even fewer require individuals to do so within the context of another culture. A likely reason why so few performance-based assessments of perspective taking exist is that perspective taking itself is a psychological process that is not easily observed. Although the act of "taking one's perspective" is not directly measureable, however, it is still possible to infer that perspective taking has occurred by evaluating the decisions an individual made over the course of an interaction. For instance, if an individual learns new information about someone during an interaction and incorporates that information into subsequent responses with that person, then it can be presumed that he or she understands the value of that information to that person within the context of that interaction. It is this premise that informed the design of our prototype, namely, that individuals' decisions within a game environment would be reflective of how well they can take the perspective of game characters and use that information to achieve game goals. Because interpersonal interactions are the primary context in which perspective taking is most applicable, we elected to design a roleplaying game (RPG), as the format was most conducive to measuring player interactions and decisions.

DESIGN PRINCIPLES

In developing a game-based assessment of perspective taking, we were guided by several principles, all of which were incorporated into the game to ensure that its design was both rigorous and met the criteria of being an RPG. These principles fall into two categories, assessment principles and game principles.

Assessment Principles

A game-based assessment designed to measure perspective taking in cross-cultural contexts necessarily requires (a) at least one focal culture, (b) cues that signify or communicate the norms of that culture to be learned by the player, and (c) situations in which the cues can manifest. It is important to note here that the culture developed for this game, though realistic, is artificial. In other words, the culture's norms were developed using dimensions that are universal to nearly all real-world cultures (e.g., Hofstede, 2001), although the culture itself has no exact real-world counterpart. There are three reasons why it was important to develop an artificial culture for the purposes of this game. First, performing within the context of an artificial culture standardizes the entry point for all players; in other words, players' prior experiences or cultural biases are minimized, as is the impact of those experiences and biases on players' performance. Second, employing an artificial culture circumvents any stereotyping of real-world cultural groups that would otherwise occur when authoring based on what one believes are "typical" behavior or responses exhibited by individuals from those groups. Third, developing an artificial culture allows the assessment developer to have complete control over which norms to manifest and in what way (or to what degree) they should be manifested. The following is a summary of how the game culture was created and the elements that were implemented in the game environment as a means to evaluate players' perspective taking skill:

- *Artificial culture development*. In developing an artificial culture for this game, we compiled dimensions from several existing cultural frameworks (e.g., Hofstede, 2001; Nolan, LaTour, & Klafehn, 2014). From these dimensions, a subset of dimensions was identified based on how readily they could be implemented within a game context. That is, we sought dimensions whose cues were (a) observable and (b) could be represented through dialogue, nonverbal behavior, or artifacts/symbols. As an example, hierarchy/egalitarianism, or the degree to which cultures recognize and organize themselves according to differences in status, is one culturally-universal dimension that can manifest itself in a variety of forms, including honorifics (e.g., "Sir" or "Madam"), nonverbal gestures (e.g., bowing), and symbols (e.g., crowns, badges, colors). On the other hand, time orientation, or the degree to which cultures focus on the present vs. the future, manifests itself more indirectly and is therefore less suitable to implementation in a gaming context. For the perspective taking game, we chose to focus on hierarchy/egalitarianism, as it offered a wide range of cues from which to select and was a dimension with which the team was familiar, given previous similar work.
- *Cultural cue identification*. Having decided upon a dimension, the next step was to determine how that dimension would manifest itself within the artificial culture. Multiple cues were developed by the team, each of which fell into one of three categories: verbal/dialogue-based cues, nonverbal cues, and artifacts/symbolic cues. Although cues from any of these categories could reasonably have been represented within the game environment, we chose to focus solely on artifacts, as they most directly related to the game's equipping/inventory mechanism, which we would be using to evaluate player decision making (see the section on Game Principles below). For this game, the artificial culture operates according to a strong, vertical hierarchy in which status differences are manifested primarily via clothing color. Specifically, green shirts reflect the lowest status (i.e., the "worker" class), green shirts with white stripes reflect a middle status (i.e., the "foreman" class), and yellow shirts reflect the highest status (i.e., the "elder" class).
- *Situation/context design*. The final step in designing the game environment was to develop the context in which the cultural cue of NPC clothing color would be exhibited; that is, it was necessary to create situations that would provide players an opportunity to learn about the culture in service of completing game goals. Whereas the situations themselves are described in greater detail in the sections that follow, the premise behind the situations was to use the cultural cue in a "lock and key" fashion, such that an awareness of the significance of shirt color in the artificial culture was necessary to "unlock" the next series of tasks in the game.

Also essential to the development of the game was the identification of perspective taking parameters that could be adjusted in terms of their difficulty. Prior research has suggested that the extent to which individuals employ their perspective taking skills often depends on situational factors, with some contexts and topics being easier for individuals to take another's perspective in than others (Selman, 1973). This research was used to guide the development of four parameters that could be manipulated within the game environment to evaluate individual differences in perspective taking skill. These parameters are as follows:

- *Number of NPCs.* Generally speaking, it is more difficult to take into account several different perspectives than it is one perspective. As such, game situations in which players are only expected to consider the perspective of a single NPC are expected to be less difficult than situations in which players must consider the perspectives of multiple NPCs at the same time. For this prototype, we chose to focus on only one NPC perspective at a time.
- *Subject matter difficulty*. The extent to which taking another's perspective involves consideration of morally or ethically challenging subjects may influence the difficulty with which an individual can effectively engage in perspective taking, with more challenging material creating more difficulty for the individual than less challenging material.[1] In the prototype, the subject matter (i.e., shirt color as a symbol of status) was kept relatively benign.

[1] We recognize that the meaning of "morally and ethically challenging" can vary from one person to the next. Whereas we do not seek to explicitly define what is considered to be morally or ethically challenging material, we do presume that the extent to which an individual sees another person's perspective as being morally or ethically divergent from their own perspective as influencing the ease with which that individual can take that person's perspective.

- *Degree of abstraction*. In addition to subject matter difficulty, perspectives can also vary in terms of their degree of abstraction. For instance, one can literally take another's perspective by standing where that individual is standing to more closely approximate that individual's visuospatial viewpoint. In this case, the perspective is concrete, objective, and observable, involving little to no subjective interpretation on behalf of the person holding the perspective or the individual taking that person's perspective. On the other hand, perspectives that involve thoughts or feelings tend to be more abstract and subjective, and are therefore likely to be more difficult for individuals to process. In this version of the game, the degree of abstraction is mixed, with some perspectives being concrete (i.e., understanding that the NPC recognizes the color shirt the player is wearing) and others being more abstract (i.e., understanding that shirt color holds symbolic meaning within the game culture).
- *Directness of cues*. The ability of someone to engage in perspective taking can be influenced by the directness with which the target of an individual's perspective taking expresses his or her perspective. For instance, if an individual discusses his or her perspective and provides an argument or justification as to why he or she holds that perspective, another individual may find it easier to take that person's perspective than if no explicit discussion of the perspective occurred. In the prototype, the directness of cues is increased with each subsequent incorrect decision made by the player. Thus, the cues at the start of the game are very subtle and would only be detected and implemented by players with advanced perspective taking skills, whereas the most direct cues (i.e., telling the player that he or she must wear a green shirt) are given only to players who fail to detect and implement the cues provided to them via prior interactions.

Game Principles

Roleplaying games (RPGs) is an umbrella term for several genres of games in which the player takes on a role or character in a storyworld (Tresca, 2010). Analog genres include tabletop games like *Dungeons & Dragons* (Bowman, 2010), live action roleplaying (Saitta, Holm-Andersen, & Back, 2014), and even re-enactments of historical events (Schneider, 2013). The work presented in this paper is based in computer roleplaying games (CRPGs) in which the player takes on the role of a character in a digital storyworld via an avatar (Ryan, 2001). The roleplaying experience is supported by a conventional set of complementary game systems. As each of these systems support avatar-based roleplaying of a character in a fictional world, they provide meaningful choices for a player that are ideal for game-based assessment of perspective taking. The following is a summary of the major features of an RPG:

- *Non-player characters (NPCs)*. Non-player characters, or NPCs, are character entities in the game world with whom the player can interact via the conversation system. NPCs have locations in the game environment and can move and take actions in the game. As our prototype requires visual details, such as clothing, to convey culturally relevant-information, the characters' pixel art representations are procedurally generated as the game is executing. This allows for changes in the social world to be immediately reflected by the visual representation of the characters.
- *Navigation*. In this mode of gameplay, the player controls a representation of a character that can move around the game environment. This mode provides information about where characters are located, and, in general, provides the setting in which the game takes place. Additionally, because the scenery and NPCs are only visible through a player's exploration of the environment, much of the gameplay will naturally involve navigation. With respect to the perspective taking game, navigation can facilitate the acquisition of important information about the NPCs and NPC culture through such sources as NPCs' placement relative to one another and NPCs' interactions with other NPCs.
- *Conversation*. When players interact with NPCs, the conversation generally appears as dialogue in conversation windows. Often this is paired with voice acting or an expressive portrait of the speaking character. In our game, the conversation system has been augmented to support the detailed selection of dialogue based on game state (see the Technical Details section for more information). NPC dialogue, in addition to progressing the game narrative, serves as a direct source of feedback for players in response to players' most recent course of action.
- *Quest Series*. A quest series is a set of "breadcrumbed" tasks that tell a subplot in a story. Each task is composed of some completion criteria, which exerts some effect on the game world. For example, one task might be to speak to a particular NPC in town. The completion criteria is that the player speaks to that NPC. The effect on the game state would be that the social history record would note that the player has spoken to that NPC, and that a subsequent task would now be available for the player to complete.

- *Inventory and Equipping*. In most RPGs, players have an inventory of items. Some of these items can consumed (e.g., a potion that gives the player additional health), whereas others can be equipped (e.g., changing one's appearance, updating gameplay capabilities of the player). In our game-based assessment, equipping the correct shirt color is central to assessing players' ability to incorporate and apply culturally-relevant information into making game-based decisions.
- *Currency and Vendors.* In many RPGs, players can purchase items and objects to equip from vendors. These vendors typically exchange these objects for some sort of currency (e.g., gold). Earning gold through completing quests and purchasing objects from vendors is a necessary part of progressing through an RPG.
- *Story Scenes.* Story scenes are non-interactive scenes where NPCs move around and speak to one another in the environment. These scenes are typically used to advance the story of the game, but in an assessment context, such as the one described here, they can be used to provide indirect socio-cultural information to the player.

THE GAME

The prototype discussed here is an RPG that takes place in outer space. Specifically, the player takes on the role of a space traveler looking for their lost friends and family members. In this version of the prototype, the player intercepts a distress signal from a nearby planet. As the player's ship is in need of refueling, they decide to land on the planet to address both issues (see Figure 1). Through speaking with the villagers near the landing site, the player discovers that

Figure 1. Screenshot of town at game start.

the village was the source of the distress call. There is a child in the village who is suffering from an alien pathology whose cure is known to the player but not to the inhabitants of the planet. The cure for the pathology lies in the planet's wilderness. The only villager who can navigate the dangers of the wild is Mick. The player's task is to convince Mick to join them in gathering the essential ingredients for the antidote.

All playable aspects of the game will take place on the surface of the planet within a town square. The town square is just one of many settings that would be available for the player to explore in an extended version of the game. The player is tasked with building a group of characters that agree to help the player with his mission of finding his/her lost friends and family. For this prototype, the goal of the quest is to convince Mick, to join the player's party.

This narrative was specifically designed to capitalize on the social and cultural aspects of the story world. With this context, situations or challenges requiring perspective taking can be designed and integrated into standard RPG gameplay.

Game Objectives

As previously mentioned, there are a number of tasks players must complete in order to accomplish a superordinate quest goal, in this case, persuading Mick to join their search party. Mick is currently sitting in a pub, which is only patronized by workers, a fact that is unbeknownst to the player at the outset of the game. The player, upon approaching the pub, is denied entry by the pub guard, Emma, and the player must determine why it is she is denying entry and what must be done to gain access. Overall, the gameplay for this quest is divided into the following tasks:

1. **Task 1:** Find Mick in the pub
   Completion Criteria: Approach the door to the pub
   Effect: Guard (Emma) denies the player entry (see Figure 2)

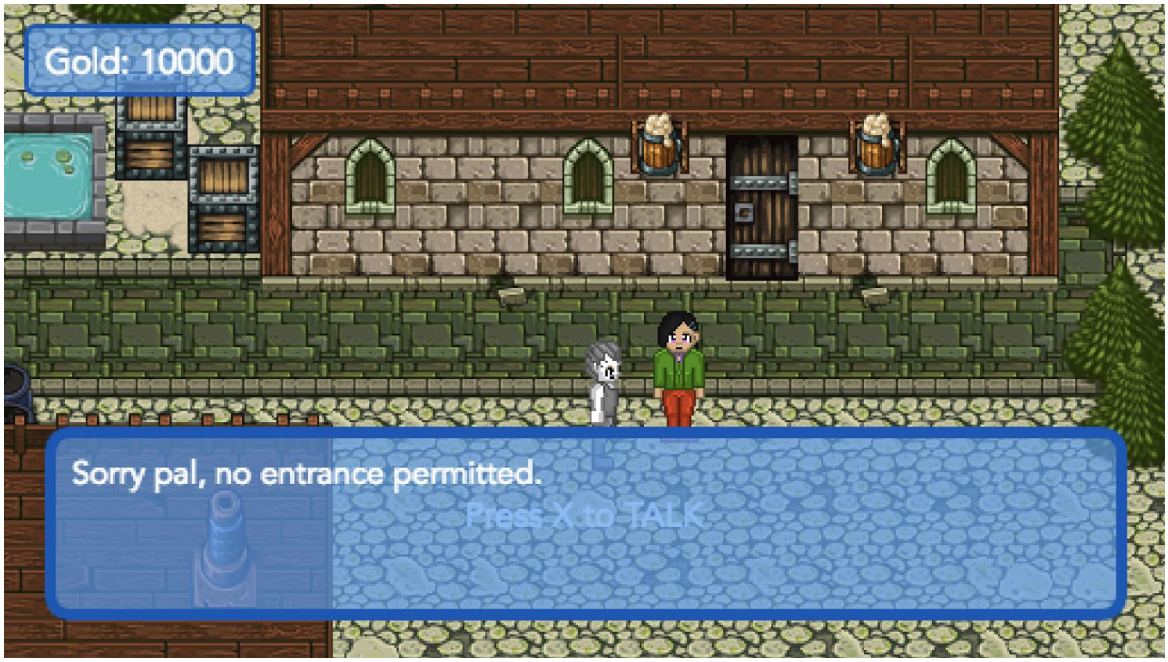

Figure 2. Screenshot of Emma denying player entrance to pub (Task 1).

2. **Task 2:** Find out why Emma won't let you into the pub
   Completion Criteria: Realize the pub is for workers only and you aren't dressed like a worker
   Effect: None

3. **Task 3:** Purchase worker clothing at store (see Figure 3)
   Completion Criteria: Talk to shopkeeper and purchase worker clothing
   Effect: The player is now wearing green worker clothing

Figure 3. Screenshot of clothing purchase menu in store (Task 3).

4. **Task 4:** Enter the pub and speak to Mick
   Completion Criteria: Talk to Emma while wearing worker clothing (see Figure 4)
   Effect: Gain entry to pub; quest series is complete (see Figure 5)

Figure 4. Screenshot of Emma allowing player to enter pub (Task 4).

Figure 5. Screenshot of player talking with Mick.

Learning Objective and Scoring Criteria

Whereas there are several game objectives that must be completed to advance through the tasks, there is only one learning objective, which is to understand that, in the artificial culture, clothing color is associated with status. With that being said, there are various approaches players can take in completing the tasks that provide differential evidence for their level of perspective taking skill.

Most variation between players will occur during completion of Task 2 (i.e., finding out why Emma won't allow them access to the pub). Specifically, players may be more or less efficient in incorporating the feedback they receive from the environment and interacting with NPCs to inform their next response. In this sense, players' perspective taking skill is operationalized as the efficiency with which they incorporate feedback to accurately recognize that they need to equip green worker's clothing in order to gain access to the pub.

Scoring criteria for the game is based entirely off of the level of feedback required by the player to gain entrance to the pub, with little, indirect feedback gaining players the most points and substantive, direct feedback gaining players the fewest points. The feedback itself progresses incrementally as players continue to make decisions, with the most indirect feedback being given first and the most direct feedback given last. For example, when the player first approaches the bar, a non-interactive story scene plays out where an NPC wearing a green shirt approaches the pub, speaks to Emma, and is let in. Presumably, an extremely savvy player may recognize that both Emma and the NPC are wearing green shirts and that, if green is a symbolic color for this culture, it would behoove him/her to also be wearing a green shirt before trying to enter the pub. In this case, the player would earn a score of "3". If, after this scene, the player approaches the pub entrance without having changed his/her attire, however, Emma tells the player simply that he/she is not allowed entry. At this point, the player may explore the town, talk to other characters, and may gather from both Emma's statement and other environmental information (e.g., NPCs in green shirts gathered together in parts of the town square) that clothing color is symbolic. If the player has made several failed attempts to enter the pub, Emma will directly tell the player that he/she needs to go put on a green shirt if he/she wants to come in, earning the player a score of "0"[2].

[2] It is possible that, even with a score of "0" on this particular quest, players may still have engaged in some perspective taking. Whereas the prototype described here features only one quest series, players' ability to engage in perspective taking over several interrelated quest series will provide more robust evidence of their perspective taking skill, specifically, their ability to adjust perspectives in light of new cultural information/feedback. These quest series have been designed, but have yet to be programmed.

Technical Details

In order to capture elements of gameplay relevant to players' perspective taking skill, the traditional RPG systems need to be made more dynamic and responsive. To incorporate this capability, our game has been augmented with a rules-based conversation system used for modeling and authoring playable social interactions to support the quest system and to make it more sensitive to player differences in perspective taking skill (see Figure 6). The rule-based system in this prototype is adapted from the artificial intelligence model of playable social interaction, *Ensemble* (McCoy et al., 2014).

For every task in a quest series, the dialogue system produces a script that an NPC will speak when prompted by the player. Given the variety of game states that are possible, the system affords the ability to have what it is the NPC says dependent on contextual conditions. As an example, when the player speaks to the pub guard, Emma, for the first time and is not wearing a green shirt (required for entry into the pub), one line of dialogue is produced (e.g., "Sorry, pal, I can't let you in") and a historical record is made that Emma has denied the player entry one time. After this, when the player speaks to Emma, the system recognizes the historical record and produces a different line of dialogue for the situation given the game's current social state. In this sense, the dialogue system not only allows for more flexible/responsive interactions between players and NPCs, but also makes the scoring of player actions more straightforward. This rules-based approach to authoring conditional dialogue is a novice-friendly version of the authoring environment featured in the game *Prom Week* (McCoy et al., 2013)

Whereas the conversation engine is embedded in the game, the authoring system itself is externalized to a spreadsheet interface designed for non-experts to use with minimal training. This interface features the dialogue spoken by NPCs alongside simple game state conditions that determine which line of dialogue is appropriate given the current gameplay state and task.

Limitations and Future Directions

As with the development of any assessment, the collection of validity evidence for this prototype is essential in helping support any inferences that could be made based on players' performance. A clear limitation of this prototype, then, is that, to date, validity evidence has not yet been collected, meaning that it is entirely possible that game performance does not reflect perspective taking nor does it predict important real-world outcomes. As such, establishing convergent and divergent validity with similar and related constructs, such as personality, cognitive ability, and other sub-facets of 3C, would be a necessary step before further development on the prototype could continue. Additionally, identifying and operationalizing the "real-world" outcome of interest would be an equally critical step, and one that may vary depending on the population for whom the prototype would be applicable.

A second limitation of the prototype is that the gameplay follows a linear, deterministic trajectory. By this it is meant that players largely progress through the same tasks in relatively the same order, and that, beyond the dialogue system described previously, NPC responses are static and non-reactive. This is, of course, not how interpersonal interactions transpire in the real world, as individuals bring their own predispositions, attitudes, biases, and memories to the table during an interaction, all of which serve to influence the interaction in different ways. Thus, future iterations of this (and other) game-based assessments should explore functionalities that allow for less deterministic and more reactive gameplay (see McCoy et al., 2014).

Finally, this prototype features only one game system (i.e., equipment), however, other game systems, such as combat or mini-games, exist that could be incorporated into the game to provide a more authentic and diverse gameplay experience. Future plans include integrating these other gameplay systems into the prototype, while simultaneously respecting the game's overall goal of assessing differences in perspective taking. As this integration proceeds, we will be looking for ways to deepen the relationship between these systems and the concerns of 3C research, in general. With every gameplay system augmented with AI-based models that address 3C, we plan to explore what levels of assessment, training, and novel interactive experiences can be achieved.

Though by no means a perfect solution, the prototype described here represents one potential method by which perspective taking can be more validly assessed. By providing opportunities for individuals to demonstrate their skills in realistic, but controllable and standardized settings, this prototype reflects an attempt to move beyond traditional

methods such as self-report and embrace new, innovative perspectives on the measurement of critical performance-based skills.

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