Game Nexus

Exploring Social Interaction Components in VR Movement-Based Games for Group Career Counseling Contexts

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ABSTRACT

This study explored how social interaction components within virtual reality (VR) movement-based games contribute to group career counseling processes, focusing on communication, collaboration, emotional engagement, and vocational reflection. A qualitative design was employed using semi-structured interviews with 23 participants from Canada. Participants were selected purposively to include individuals with prior exposure to VR environments and familiarity with group-based counseling contexts. Data collection continued until theoretical saturation was reached. Interviews lasted between 45 and 75 minutes, were audio-recorded, transcribed verbatim, and analyzed thematically using NVivo 14. Coding followed an inductive process of open, axial, and selective coding, with constant comparison techniques applied across transcripts to ensure validity. Inter-coder reliability was established through independent coding of selected transcripts and consensus discussions. Four overarching themes emerged. First, communication dynamics highlighted verbal clarity, nonverbal avatar signals, and feedback mechanisms, while also noting barriers such as technical glitches. Second, collaboration and group processes emphasized team cohesion, trust building, role distribution, and joint problem-solving within VR tasks. Third, emotional and psychological experiences revealed that participants reported a strong sense of belonging, motivation, confidence development, and flow states, alongside challenges such as performance anxiety. Fourth, career counseling relevance demonstrated that VR facilitated career exploration, transferable skill development, vocational identity formation, and decision-making support, with participants noting applicability of these experiences beyond the virtual setting. The study demonstrates that VR movement-based games provide a powerful platform for enhancing social interaction and vocational reflection in group career counseling contexts. By fostering communication, collaboration, and emotional engagement, VR extends the reach of traditional counseling methods and prepares learners with transferable skills applicable to real-world career challenges. These findings underscore the potential of integrating immersive technologies into counseling programs to enrich educational and vocational outcomes.

Keywords: Virtual reality, movement-based games, career counseling, social interaction, vocational guidance, group processes.

Introduction

The field of career counseling has undergone profound transformations in recent decades, shaped by the rapid evolution of educational practices, labor market demands, and technological innovation. Traditional models of career guidance, once centered primarily on individual counseling sessions and standardized assessments, are increasingly complemented by interactive, technology-mediated, and group-oriented approaches. As schools and higher education institutions confront the challenges of preparing students for complex career trajectories, new methods of guidance and counseling that integrate digital technologies, immersive environments, and collaborative activities are becoming central to the discourse (1-3).

Career counseling is widely recognized as an integral component of the educational process. From early childhood education to vocational high schools and universities, students are encouraged to explore interests, talents, and potential professional paths (1, 3). Research emphasizes the importance of structured vocational guidance in supporting personal growth, socialization, and informed career decision-making (4). For example, early career guidance embedded in playful activities fosters self-discovery among preschool children, setting a foundation for later exploration (4). Similarly, counseling interventions during early childhood education have been shown to strengthen social and cognitive readiness for future vocational choices (3).

At the secondary and vocational levels, career counseling takes on a more targeted form, guiding students toward aligning interests with labor market realities. The emergence of applications such as U-Career illustrates how digital platforms can help vocational high school students choose educational tracks that resonate with their aspirations and talents (2). Scholars argue that career counseling in vocational schools not only influences immediate decisions but also equips learners with transferable life skills (5-7).

The integration of technology into career counseling has reshaped how services are delivered, making them more interactive, accessible, and engaging. The adoption of mobile and digital applications allows students to engage with guidance tools beyond physical counseling sessions (8, 9). Smart career applications, for example, support planning and self-assessment in vocational schools, enabling learners to develop a structured career trajectory (8). Messaging platforms such as WhatsApp have also been leveraged to provide guidance and foster career maturity among students (9).

Beyond traditional digital tools, immersive technologies such as virtual reality (VR) and gamification are becoming powerful instruments in career guidance (10, 11). VR-based systems offer realistic simulations of workplace environments, enabling experiential learning that deepens understanding of career options (12). Serious games designed for vocational contexts, such as hazard perception training tools, illustrate the capacity of VR to enhance engagement, usability, and skill acquisition (13, 14). These technologies not only replicate professional scenarios but also encourage collaborative problem-solving and critical thinking.

Gamification further strengthens vocational self-determination by making career exploration more interactive. Research demonstrates how game mechanics foster motivation and professional orientation across diverse age groups (11, 15). In this sense, gamified platforms become more than entertainment—they operate as structured interventions that guide students toward future identities. Importantly, projects such as career quests delivered through WebAR demonstrate the potential for scalable, engaging career guidance that integrates seamlessly with digital education environments (16).

While technological advancement expands the toolkit of career guidance, the social dimension of counseling remains critical. Group-based interventions provide students with opportunities to share experiences, exchange perspectives, and receive feedback from peers (17, 18). Collaborative career counseling, especially when mediated through digital tools, has been shown to enhance self-management skills, vocational maturity, and reflective practices (17, 19).

Peer engagement is particularly relevant in vocational high schools, where adolescents are developing both personal identities and career aspirations. Studies highlight that interest and talent recognition, facilitated by group guidance, improves alignment between study choices and industry needs (20). Similarly, guidance programs that encourage group reflection on vocational identity formation help foster resilience and long-term commitment to career paths (5).

In international contexts, pilot programs have demonstrated that group-based career guidance can substantially increase awareness of vocational options and improve decision-making outcomes (21, 22). Instructors and counselors facilitating these programs often use structured techniques—such as problem-solving groups or critical reflection sessions—to support the development of career maturity (19, 23).

The psychological dimension of career counseling underlines the importance of fostering not only decision-making competence but also emotional and social well-being. Research highlights the pedagogical and psychological aspects of professional work in schools, emphasizing that career guidance is inherently tied to the broader educational mission (24). Supporting vocational identity requires addressing multiple intelligences, creativity, and adaptability, ensuring that students are prepared for a fluid and uncertain labor market (25).

For Generation Z students in particular, guidance must be adapted to the unique characteristics of digital natives. Scholars describe their strong affinity for technology, preference for interactive learning, and need for guidance approaches that reflect their digital realities (26). Similarly, innovative approaches—such as integrating higher-order thinking skills (HOTS) and 21st-century competencies—have been successfully piloted with career counselors working in vocational settings (18).

Among technological approaches, VR movement-based games stand out for their ability to combine embodied learning with immersive social interaction. Unlike traditional career counseling methods, VR offers learners the opportunity to role-play, explore environments, and engage in problem-solving within simulated career contexts (10, 12). These games not only allow individual exploration but also foster group collaboration, communication, and teamwork—skills essential for professional life (13, 14).

Game-based VR platforms can be adapted to career guidance through the design of scenarios that reflect vocational challenges. For example, immersive quests and gamified tasks allow learners to practice decision-making, leadership, and adaptability in simulated career pathways (16, 27). In addition, game mechanics such as feedback loops and achievement systems create motivational environments that support vocational identity formation (15).

Despite promising evidence, several gaps remain in the integration of VR movement-based games into career counseling. First, most existing studies focus on technical training or individual learning outcomes rather than social and group-based interaction (13, 14). Second, while gamification has been recognized as a tool for motivation and exploration, its specific impact on collaborative vocational identity-building has not been sufficiently explored (11, 15). Third, limited research has investigated the psychological dynamics of VR-mediated group counseling, including belonging, trust, and confidence (17, 24).

Furthermore, although career applications and online platforms have been widely adopted, there remains a lack of studies examining embodied, interactive VR environments that allow both individual exploration and collective reflection (8, 28). Addressing this gap is particularly timely given the growing demand for innovative counseling models that combine technological immersion with group-based peer support (5, 7).

The present study addresses these gaps by exploring the components of social interaction within VR movement-based games in the context of group career counseling.

Methods and Materials

Study Design and Participants

This study employed a qualitative research design aimed at exploring the components of social interaction within virtual reality (VR) movement-based games in the context of group career counseling. A qualitative approach was chosen to capture participants' lived experiences, perspectives, and meanings in depth. Data were gathered through semi-structured interviews, which allowed for flexibility in questioning while ensuring coverage of key topics related to social interaction and counseling applications.

The participants consisted of 23 individuals recruited from various regions of Canada, representing a diverse group in terms of age, educational background, and professional experience. Participants were purposefully selected to include those with prior experience in VR movement-based games and familiarity with group counseling or career guidance contexts. Recruitment continued until theoretical saturation was achieved—that is, the point at which no new insights or themes emerged from the interviews.

Data Collection

Data were collected through semi-structured interviews conducted either face-to-face or via secure online conferencing platforms to accommodate geographical accessibility. An interview guide was developed to probe participants' experiences with VR movement-based games, with emphasis on their perceptions of social interaction, collaboration, and group dynamics in relation to career counseling contexts. Each interview lasted between 45 and 75 minutes and was audio-recorded with participants' consent. Field notes were taken during and after the sessions to supplement the recordings.

The interview protocol included open-ended questions covering topics such as:

- Experiences of cooperation, competition, and communication in VR games.
- Perceived benefits and challenges of VR group interactions in counseling settings.
- Reflections on how VR-mediated social dynamics could influence career exploration and decision-making.

Data analysis

Data analysis followed an inductive thematic approach to identify, refine, and interpret recurring patterns and themes. Interviews were transcribed verbatim, and transcripts were imported into **NVivo 14** software for systematic coding and analysis. An iterative process of open, axial, and selective coding was employed. Initially, open codes were generated to capture participants' raw expressions. These were subsequently organized into broader categories through axial coding, and overarching themes were derived through selective coding.

Throughout the analysis, constant comparison techniques were used to assess similarities and differences across participants' accounts. Memos were written to track analytical decisions and emergent ideas, ensuring transparency and rigor. To enhance credibility, two researchers independently coded a subset of transcripts and compared coding results, resolving discrepancies through discussion.

The final set of themes reflects the key components of social interaction in VR movement-based games, particularly as they pertain to fostering collaboration, engagement, and mutual support in group career counseling contexts.

Findings and Results

The study involved 23 participants from across Canada who had prior experience with VR movement-based games and an interest in group counseling contexts. Of these, 12 participants were female and 11 were male, ranging in age from 21 to 42 years (M = 29.4). Regarding educational background, 8 participants were undergraduate students, 10 held master's degrees, and 5 had completed doctoral studies. In terms of professional background, 9 participants were career counselors or psychology practitioners, 7 were graduate students in counseling or related fields, and 7 were individuals from diverse professional sectors (e.g., IT, education, health care) who had prior exposure to VR platforms. Most participants (n = 18) reported prior experience with group-based virtual or digital games, while 5 described themselves as relatively new to VR environments. This diversity

in demographic and professional characteristics contributed to a broad range of perspectives on social interaction and career counseling applications.

Table 1. Thematic Coding Results

Categories (Themes)	Subcategories (Subthemes)	Concepts (Open Codes)
1. Communication Dynamics in VR Counseling	Verbal Expression	clarity of speech, tone adaptation, pauses, active listening cues
	Nonverbal Signals	avatar gestures, head nodding, gaze direction, proxemics, body posture
	Emotional Expression	emotive voice, avatar facial mimicry, use of emojis, intensity of reactions
	Barriers to Communication	technical glitches, lagged responses, misinterpretations, reduced eye contact
	Feedback Mechanisms	immediate verbal response, reinforcement phrases, constructive critique
2. Collaboration and Group Processes	Team Cohesion	shared goals, collective motivation, supportive climate
	Role Distribution	informal leadership, rotating roles, peer mentoring, responsibility sharing
	Conflict Resolution	negotiation strategies, de-escalation techniques, humor to diffuse tension
	Joint Problem-Solving	brainstorming tasks, scenario-based challenges, trial-and-error exploration
	Engagement Strategies	cooperative missions, synchronized actions, achievement recognition
	Trust Building	consistency of behavior, reliability in actions, openness in sharing
3. Emotional and Psychological Experiences	Sense of Belonging	group identification, inclusivity, peer acceptance, shared enjoyment
	Motivation Enhancement	sense of challenge, achievement rewards, curiosity stimulation
	Stress and Anxiety	performance pressure, fear of judgment, technical stressors
	Confidence Development	self-efficacy growth, validation from peers, gradual risk-taking
	Flow State	immersion, loss of time awareness, balance of challenge and skill
4. Career Counseling Relevance	Career Exploration	role-play of professions, exposure to scenarios, reflection on personal fit
	Transferable Skills	teamwork, communication, adaptability, problem-solving
	Identity Formation	self-concept exploration, values clarification, envisioning future self
	Guidance Integration	counselor facilitation, structured debriefs, linking VR to real goals
	Decision-Making Support	weighing career options, peer feedback, scenario-based evaluation
	Long-Term Applicability	skill retention, confidence in career paths, applicability to real settings

1. Communication Dynamics in VR Counseling

Verbal Expression. Participants highlighted that clarity of speech and tone adaptation were essential to maintaining group flow. One participant noted, *"If someone mumbled or spoke too fast, it broke the rhythm of the game and the conversation"* (Participant 7). Active listening cues such as short affirmations and pauses reinforced engagement during interactions.

Nonverbal Signals. Avatar gestures and proxemics emerged as substitutes for physical cues. Many participants described using nodding animations or maintaining avatar eye contact to build rapport. As one interviewee explained, *"Even though it's not real eye contact, when the avatar looks toward you, you feel heard"* (Participant 14).

Emotional Expression. Emotional tones were conveyed through voice modulation and avatar mimicry. The use of emojis and expressive gestures allowed participants to externalize feelings of excitement or frustration. *"When I waved my avatar's arms after solving a puzzle, it really felt like celebrating with the group,"* remarked Participant 3.

Barriers to Communication. Some participants experienced technical glitches, lag, and misinterpretations that hindered interaction. One participant stated, *"The lag sometimes made me interrupt others without meaning to"* (Participant 10). Reduced eye contact was also perceived as a barrier compared to face-to-face settings.

Feedback Mechanisms. Immediate feedback from peers, often in the form of verbal reinforcement or constructive critique, played a role in building confidence. According to Participant 21, *"Hearing someone say 'good point' or 'let's try your idea' instantly boosted my confidence."*

2. Collaboration and Group Processes

Team Cohesion. Shared goals and supportive climates enhanced group performance. One participant reflected, *"We weren't competing against each other; it felt like we were all pushing toward the same finish line"* (Participant 5).

Role Distribution. Informal leadership and rotating roles naturally emerged. Participant 12 explained, *"Sometimes I led, other times I stepped back and let someone else take charge—it kept things balanced."*

Conflict Resolution. Groups resolved disagreements through negotiation, humor, and de-escalation. *"We joked about our mistakes instead of blaming—it kept the mood light,"* said Participant 2.

Joint Problem-Solving. Brainstorming and trial-and-error exploration characterized collaborative efforts. Participant 16 observed, *"It was like we were all testing ideas live—sometimes one person's failure sparked another person's solution."*

Engagement Strategies. Cooperative missions and synchronized actions sustained interest. *"When we had to move in sync, like lifting virtual blocks together, it really made me feel part of the team,"* noted Participant 20.

Trust Building. Reliability and openness were emphasized as critical. One participant summarized, *"I trusted that others would show up and give their best—it made me share more openly about myself too"* (Participant 11).

3. Emotional and Psychological Experiences

Sense of Belonging. Feeling included and accepted by peers enhanced group bonding. Participant 8 remarked, *"I actually felt part of a community, even though it was just avatars on a screen."*

Motivation Enhancement. Challenges and curiosity acted as motivators. Participant 18 shared, *"Every new task made me want to prove myself, not just for me but for the group."*

Stress and Anxiety. Despite positive dynamics, performance pressure and technical stressors were noted. *"I sometimes worried about messing up in front of others, even though it was just a game,"* admitted Participant 4.

Confidence Development. Participants described growing self-efficacy and risk-taking abilities. According to Participant 9, *"After getting positive feedback, I felt braver to share my career ideas."*

Flow State. Immersion and balance between challenge and skill facilitated flow experiences. *"I lost track of time completely—it was like the real world disappeared,"* described Participant 15.

4. Career Counseling Relevance

Career Exploration. VR simulations allowed participants to role-play professions and test career fit. Participant 13 commented, *"When I played as a virtual engineer, I actually reflected on whether I could see myself doing that in real life."*

Transferable Skills. Communication, adaptability, and teamwork were repeatedly identified as career-relevant skills. One participant stated, *"It wasn't just gaming—it was practicing collaboration in a professional sense"* (Participant 1).

Identity Formation. Participants explored self-concept and future aspirations. *"It gave me space to imagine a different version of myself and how I might fit into a workplace,"* said Participant 17.

Guidance Integration. Counselor facilitation and structured debriefs helped participants connect VR experiences to career goals. Participant 6 observed, *"The debrief made me realize what I learned wasn't just about the game, but about me."*

Decision-Making Support. VR interactions encouraged weighing of options and receiving peer input. *"Hearing others' perspectives during the game helped me rethink my choices,"* noted Participant 19.

Long-Term Applicability. Skills and confidence gained were perceived as transferable beyond the VR environment. *"I know I'll carry this teamwork experience into real-life group projects,"* explained Participant 22.

Discussion and Conclusion

The present study investigated the components of social interaction within VR movement-based games as applied to group career counseling contexts. The findings revealed four overarching themes—communication dynamics, collaboration and group processes, emotional and psychological experiences, and career counseling relevance—each of which illuminates how immersive, game-based environments foster meaningful interpersonal engagement and vocational reflection. This discussion situates these findings within existing scholarship, highlighting areas of convergence and extension, while drawing attention to their implications for theory and practice in career counseling and educational innovation.

The results indicate that communication in VR counseling contexts is characterized by both verbal and nonverbal elements, with participants emphasizing clarity of speech, expressive tone, and avatar gestures as essential components of interaction. Nonverbal cues such as eye gaze, posture, and emotive gestures substituted for face-to-face communication, while feedback mechanisms reinforced confidence and group cohesion. However, participants also reported barriers such as technical glitches and reduced eye contact, which sometimes disrupted the flow of conversation.

These findings are consistent with prior research highlighting the importance of communication in vocational and educational settings. Early studies have underscored that effective communication is a cornerstone of career guidance, ensuring that information, advice, and emotional support are clearly transmitted (1, 3). Moreover, the ability of VR technologies to simulate communicative behaviors resonates with research on virtual reality's role in vocational training, where avatars and immersive platforms enable expressive interaction despite physical distance (10, 12).

Our participants' reports of feedback as a confidence booster also align with the use of counseling approaches that prioritize positive reinforcement and behavioral adaptation in vocational schools (17). However, the challenges of lag and misinterpretation parallel concerns raised in prior evaluations of immersive learning platforms, which identified usability issues and technical barriers as limitations to sustained engagement (13, 14). This suggests that while VR facilitates new avenues for communication, ensuring the reliability and stability of platforms remains critical for maximizing counseling outcomes.

Collaboration emerged as a central theme, with participants emphasizing team cohesion, role distribution, trust building, and joint problem-solving. Cooperative missions, synchronized actions, and supportive climates fostered engagement, while informal leadership structures and conflict resolution strategies allowed groups to function effectively. These results reflect the inherently social nature of VR movement-based games, where embodied interaction promotes collective effort.

Existing literature reinforces the importance of collaboration in career guidance contexts. Studies in vocational high schools have demonstrated that group-based counseling enhances self-management, problem-solving skills, and collective decision-making (2, 19). Similarly, peer interaction during vocational guidance has been shown to shape students' abilities to reflect on interests, skills, and long-term goals (5, 20). Our findings suggest that VR provides an amplified environment for these dynamics by embedding collaboration within immersive, game-like tasks that demand coordinated effort.

The observed processes of trust building and leadership rotation resonate with broader pedagogical insights into the value of group counseling in developing resilience and adaptability (18, 25). At the same time, the emphasis on humor and de-

escalation in conflict resolution echoes the cultural and social strategies documented in previous research on group dynamics in counseling (26). By embedding these social strategies within a virtual environment, VR extends the possibilities of group counseling beyond traditional physical spaces.

A third key finding relates to the emotional and psychological dimensions of VR counseling. Participants reported experiences of belonging, motivation, confidence development, and flow, as well as challenges related to stress and performance anxiety. The immersive nature of VR facilitated engagement and absorption, allowing participants to lose track of time and enter states of deep concentration. At the same time, fear of judgment and technical frustrations occasionally heightened anxiety.

These findings resonate with the pedagogical and psychological perspectives that emphasize the role of emotional support and identity development in career counseling (24). Research on multiple intelligences and adaptive pedagogies underscores that vocational guidance must address emotional well-being alongside cognitive and technical skills (25). Similarly, interventions tailored to Generation Z students emphasize the need for interactive, technology-based platforms that reflect their digital identities and learning preferences (26).

The reported sense of belonging and motivation parallels findings from studies of gamification and career guidance quests, which demonstrate that game mechanics can enhance engagement, foster collaboration, and stimulate reflective learning (11, 15, 16). At the same time, the stressors described by participants underscore the dual role of VR as both an enabler and a potential source of pressure, echoing prior critiques of immersive learning environments that require careful facilitation (14).

Finally, participants highlighted the direct relevance of VR movement-based games to career exploration, transferable skills, identity formation, and decision-making. Role-playing in VR environments allowed learners to experiment with professional identities, while group debriefs facilitated by counselors connected game experiences to real-world career planning. Participants also identified transferable skills such as teamwork, adaptability, and communication as central outcomes, highlighting the long-term applicability of VR experiences.

These findings align with studies emphasizing the developmental role of career counseling across educational stages (1, 3, 4). For example, immersive simulations have been shown to support vocational identity by providing realistic career scenarios (12, 13). Similarly, the integration of structured guidance within VR activities parallels findings on the importance of counselor facilitation and reflective practices (5, 28).

The recognition of transferable skills in this study echoes prior work emphasizing the broader competencies gained through group counseling interventions (7, 29). Moreover, the emphasis on decision-making support and long-term applicability reflects international evidence that vocational guidance programs enhance awareness of career pathways and prepare students for adaptive lifelong learning (21, 22, 30). In this way, VR movement-based games not only enrich immediate counseling outcomes but also contribute to the broader mission of educational institutions in preparing students for uncertain labor markets.

Taken together, the study's results underscore that VR movement-based games represent a valuable tool for group career counseling, combining communicative, collaborative, emotional, and vocational components into a holistic intervention. This reflects broader trends in the literature emphasizing the convergence of technological innovation, group-based pedagogy, and vocational identity development. For instance, gamified approaches to career guidance have been shown to enhance motivation and engagement across diverse contexts (11, 15). Similarly, the embedding of VR into vocational education demonstrates its utility in providing authentic, experiential learning opportunities (12-14).

The study extends existing scholarship by focusing specifically on the social interaction components of VR games in counseling contexts, an area that has received relatively little attention compared to individual learning outcomes. This contribution is significant given the centrality of peer engagement, identity formation, and collective reflection in vocational

development (17, 18, 20). By demonstrating how VR fosters trust, belonging, and shared decision-making, the findings highlight its potential to strengthen the group-based dimensions of career counseling.

This study is not without limitations. First, the sample size, while adequate for qualitative inquiry, was relatively small and geographically limited to Canada, which may constrain the generalizability of findings. Second, reliance on self-reported experiences introduces the possibility of bias, as participants may have overemphasized positive or negative aspects of VR interactions. Third, the technical setup and VR platforms used in this study may not be directly comparable to those used in other educational or counseling contexts, limiting cross-study comparisons. Finally, the absence of longitudinal data means that the long-term impact of VR movement-based games on career development and identity formation remains unclear.

Future studies should expand the sample size and diversify participant demographics to capture a broader range of cultural and educational contexts. Comparative studies across countries and educational systems could shed light on how cultural norms influence the social interaction components of VR counseling. Longitudinal designs would be valuable in assessing the durability of skills and identity shifts fostered through VR experiences. Additionally, experimental or mixed-method approaches could be employed to triangulate qualitative insights with quantitative measures of career maturity, decision-making, and psychological outcomes. Future research should also investigate the role of counselor facilitation styles and game design features in shaping the effectiveness of VR-based interventions.

For practitioners, the findings suggest several practical applications. Counselors and educators should consider integrating VR movement-based games into group career counseling programs as a means to foster collaboration, communication, and vocational exploration. Training programs for counselors may need to incorporate technological competencies to ensure effective facilitation in immersive environments. Educational institutions should also prioritize investment in reliable VR infrastructure to minimize technical disruptions and maximize engagement. Finally, career counseling programs should design structured debrief sessions that link VR experiences directly to real-world vocational reflection, thereby ensuring that students transfer skills and insights from virtual spaces into their broader educational and career trajectories.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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