

# Recreational Therapists Consider Leisure Motivation when Evaluating Virtual Reality Games



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## Abstract

Virtual reality (VR) interventions can be motivating for clients when presented as treatment in healthcare settings. Researchers know little, however, about the elements of specific VR games that contribute to this motivation. This study aimed to describe differences among a sample of commercially available VR games using the four subscales of the Leisure Motivation Scale (LMS). The research team used a mixed-methods design, and compiled an expert panel of recreational therapists ( $N = 5$ ) who evaluated eight VR games using Q-sort methodology. Semi-structured interviews generated additional data for the evaluation. Results indicated participants viewed certain VR games as containing elements more closely aligned with each of the LMS subscales of intellectual, social, competence-mastery, and stimulus avoidance than others. These findings represent a critical step in developing guidelines for the purposeful selection of VR games as treatment interventions in recreational therapy practice based on a client's leisure motivation.

## Keywords

*Leisure motivation, motivation, recreational therapy, therapy, virtual reality*

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## Introduction

Virtual reality (VR) has experienced rapid growth in recent years and has emerged as a new and innovative way for people to participate in recreational activities and leisure experiences. Additionally, increasing numbers of patients/clients in health care and human service settings are encountering VR interventions as part of their treatment. This has occurred since health care providers have recognized VR interventions are well suited for a variety of treatments offered to diverse populations. For example, clinicians have used VR therapeutically for individuals diagnosed with stroke, cerebral palsy, hemiplegia, traumatic brain injury, spinal cord injury, autism spectrum disorder, sensorimotor deficits, and pain, among other conditions (Ma & Zheng, 2011).

In addition to producing functional outcomes (Howard, 2017), therapists have noted that VR interventions are highly motivating for patients (Zimmerli et al., 2013). Since high patient motivation can contribute to positive treatment outcomes (Espel et al., 2016; Gathright et al., 2020; Ilgen et al., 2006), gaining a greater understanding of the motivational elements of VR participation is an essential step in capitalizing on patient/client motivation and maximizing therapy outcomes. Unfortunately, little is known about why VR interventions are motivating for patients/clients. Most of the literature to date has focused on motivational factors associated with the VR equipment and VR experience generally. The recreational focus of specific VR games and applications (apps), and the leisure experiences they provide, has been notably overlooked in this discussion. Therefore, there is opportunity for researchers to better understand VR motivation by examining patient/client responses to different VR apps (Proffitt & Lange, 2015). One possible approach is to focus specifically on leisure motivation.

### Virtual Reality

There are currently three main types of VR: non-immersive, semi-immersive, and fully immersive (Poetker, 2019). Non-immersive VR provides a computer-generated environment, but users do not experience a feeling of immersion in the virtual world. Traditional console or computer video games are an example of non-immersive VR (Pallavicini et al., 2019). Semi-immersive experiences provide users with a partially virtual environment during their interactions. During semi-immersive VR activities the user can still see what is going on around them while simultaneously focusing on the three-dimensional virtual objects on some type of screen (Tsyktor, 2019). Fully immersive simulations give users the most realistic experience possible by blocking out all other images. Gaming and VR for other entertainment purposes are common uses for this type of VR experience (Poetker, 2019).

Using technology to create an interactive, three-dimensional, and 360° experience for the user, fully immersive VR affords customization through a wide variety of games and apps (Yeo et al., 2019). Immersive VR systems include a variety of technological devices that typically include: (a) a wearable head-mounted display (HMD) that projects images of the virtual space, (b) hand controllers that enable the user to navigate the virtual environment while providing tactile responses through haptic feedback, (c) sound that is most commonly transmitted through earphones, (d) sensors that track the user's movement and positioning, and (e) a computer system. Pairing the hardware with VR software and specific VR games and apps enables the user to select a variety of

activities based on personal preferences. The ultimate goal of this type of VR is to create an immersive experience for the user that is both fun and engaging.

### Virtual Reality and Motivation

Hypothesizing that high participant motivation during VR interventions is a result of the immersive nature of VR that promotes engagement, researchers have discovered that VR using a HMD is more motivating for individuals than typical, non-immersive treatments offered in a clinical setting (Dias et al., 2019; Kern et al., 2019). Immersive VR has also been found to provide patients with a superior feeling of presence, or the feeling of “being there” over other VR systems (Schmidt et al., 2018).

While these findings are insightful, the current literature has not considered motivating factors associated with specific VR games, which play a critical role in the overall VR experience for the user. Furthermore, investigators have not viewed motivation specifically through the lens of leisure motivation. This is unfortunate since individuals typically find different leisure experiences motivating based on unique and specific qualities of the leisure experience that are appealing to them personally.

### Leisure Motivation and the Leisure Motivation Scale

Defined as the requirement, reason, or satisfaction that stimulates involvement in a leisure activity (Crandall, 1980), leisure motivation is an intervening factor that facilitates the behavior of leisure participation (Chen et al., 2013). As such, recreational therapists frequently evaluate and consider leisure motivation when they aim to use recreational activities with specific patients/clients not only to foster positive leisure experiences, but also to engage them in treatment focused interventions that ultimately contribute to their overall health and well-being. Emphasizing person-centered care and individualized treatment, recreational therapists recognize they must consider individual factors such as leisure motivation in order to yield the best possible outcomes for clients.

Beard and Ragheb (1983) state that leisure motivation can broadly be categorized within four subscales: (a) intellectual, (b) social, (c) competence-mastery, and (d) stimulus-avoidance. They developed the Leisure Motivation Scale (LMS) to assess motivational tendencies in specific individuals. Contending that these four main motives determine whether people derive satisfaction from specific leisure pursuits, they assert that different factors motivate different individuals. For example, motivation for people with strong intellectual scores stems from activity experiences that enable learning, exploring, discovering, creating, or imagining. Individuals who are more socially motivated derive pleasure from leisure experiences that involve friendship, interpersonal relations, or value from others. A strong competence-mastery score is characteristic in persons who seek out specific leisure activities in order to achieve, master, challenge, or compete. Finally, individuals who desire leisure experiences related to stimulus-avoidance usually prefer activities that meet their need to escape or get away from an overstimulating life situation. The LMS takes approximately 5 to 25 minutes to complete and is appropriate for clients who are cognitively intact or present with no more than moderate cognitive disability (Beard & Ragheb, 1983).

### Selecting VR Games for Therapeutic Interventions

Researchers have not specifically examined how clinicians select VR interventions for their clients in health care environments. However, much of the research to date implies providers aim to select VR experiences that incorporate tasks aligning with

a patient's therapy goals. While this is certainly important, this process overlooks the role leisure motivation might play in individual client response to specific VR games and apps. Recreational therapists would benefit from guidelines that would assist them in considering a client's leisure motivation when selecting specific VR games for treatment purposes. Unfortunately, resources to help recreational therapists select VR games to use as interventions in their practice are notably lacking.

### **Purpose Statement**

The purpose of this study is to describe differences among a sample of commercially available VR games using the four subscales of the LMS. This goal is a critical first step in determining how recreational therapists can best select specific VR games for treatment interventions based on an individual's leisure motivation.

A secondary goal includes documenting a formal procedure for evaluating VR games in terms of their alignment with different leisure motivation categories. This will add a valuable professional resource to enable recreational therapists in their practice.

Ultimately, this study aims to establish evidence for the value of purposefully selecting specific VR games and apps for patients/clients and considering the role of leisure motivation in an individual's response to VR interventions.

## **Methods**

This research study used a descriptive, mixed-methods design. The University of Utah's Institutional Review Board (IRB) reviewed all study procedures and deemed the study exempt from IRB oversight due to the minimal risks posed to participants. Nonetheless, all participants provided informed consent prior to enrolling in the study.

### **Participants**

The investigators recruited an expert panel of five recreational therapists to serve as participants. Purposive sampling methods ensured representation from individuals with diverse clinical perspectives consistent with the overall recreational therapy (RT) profession. To achieve this, the research team recruited one participant from each of the top five RT primary service settings specified in the most recent RT Job Analysis (2014) conducted by the National Council for Therapeutic Recreation Certification (NCTRC). These settings are: (a) hospital, (b) skilled nursing facility, (c) residential/transitional, (d) outpatient/day treatment, and (e) adaptive recreation.

Inclusion criteria required participants to: (a) be over the age of 18, (b) hold the Certified Therapeutic Recreation Specialist (CTRS<sup>®</sup>) credential from NCTRC, (c) be licensed in the state of Utah as either a Therapeutic Recreation Specialist (TRS) or Master Therapeutic Recreation Specialist (MTRS), (d) have a minimum of 2,000 hours paid work experience as a CTRS<sup>®</sup>, and (e) be currently employed as a CTRS<sup>®</sup> in one of the five service settings previously specified. Exclusion from participation occurred for individuals reporting pregnancy or a history of seizures since VR activities represent a contraindication for these conditions.

Individuals were recruited locally (within a 50-mile radius of the study location) since study procedures required participants to travel to the study location. The research team completed initial outreach via e-mail, and then used email or phone for follow-up communications, depending on participant preference. Following completion of informed consent procedures, eligible individuals enrolled in the study, provided demographic information through an online survey, and scheduled an

individual VR session with the research team member responsible for providing the intervention. Participation was voluntary, and participants did not receive incentives or compensation for their involvement in the study.

## Setting

The study's intervention and data collection occurred on the University of Utah campus in classroom space that provided privacy and minimized disruptions. The designated room afforded adequate space for the set-up of all VR equipment and enabled participants to move about comfortably while engaging in the physical movements required during VR game play. A table and chairs were also available to facilitate the assessment and evaluation procedures of the study. All sessions occurred in the same space, with the intervention and data collection for each participant scheduled on different days.

## Virtual Reality Equipment

The research team selected the original HTC Vive, a popular commercial VR system, for use in this study based on previous findings indicating its appropriateness for use in clinical settings (Statista Research Department, 2021). Additionally, a series of VR training sessions facilitated by the research team previously yielded systematically collected data that revealed recreational therapists perceived this system to be a usable option in their professional practice. As part of the current study's procedures, all participants received a brief orientation to the VR equipment prior to their participation in specific VR games.

## Virtual Reality Games

During individual sessions, the lead author introduced each participant to eight different commercial VR games. Two recreational therapists from the research team selected these games following a comprehensive evaluation of available games and their applicability for RT treatment. Selected games are all compatible with multiple VR systems including the original HTC Vive, current HTC Vive Pro, HTC Vive Pro 2, the Oculus Rift, and Oculus Rift S. Users can play all games from either seated or standing positions. The investigators used activity analysis to ensure each game's primary activity tasks aligned with common RT treatment goals, and games were relevant for diverse RT treatment settings. They also considered the popularity of specific games, since this could be a possible predictive factor of ongoing product availability. Finally, the research team reviewed game ratings according to the Entertainment Software Ratings Board (2020), and excluded games if they contained intense violence, blood and gore, sexual content, strong language, or gambling activities as these game elements generally represent contraindications in therapeutic settings.

The eight VR games selected and used in the study were (in alphabetical order): Acron: Attack of the Squirrels, Beat Saber, Fantastic Contraption, Fruit Ninja, Guided Meditation VR, Job Simulator, Takelings House Party, and Tiltbrush. A brief description of each game follows.

### ***Acron: Attack of the Squirrels***

This is a multiplayer game that presents a gaming scenario where squirrels are trying to steal acorns from a tree. The participant wearing the VR HMD adopts the role of the tree and aspires to protect the acorns using the VR hand controllers. Additional players engage in the game by using their smart phones. They play the role of the

squirrels and navigate around the game space to collect virtual acorns and score points. A unique aspect of this game is that the additional players can join remotely and do not have to be in the same room to play with each other.

### ***Beat Saber***

Beat Saber is a single-player game that incorporates rhythmic music with physical movements intended to be coordinated with the beat of the music. The player's VR controllers appear visually as a red and blue light saber. As traveling boxes with colored arrows approach the player, the individual moves their corresponding-colored saber to slash the box in the direction of the specific arrow. The player scores points by staying on beat and slashing in the correct direction in time with the music.

### ***Fantastic Contraption***

This is a single-player problem-solving game where the user must solve a variety of puzzles through a series of building tasks. The player aims to build elaborate machines or "contraptions" in order to move across a virtual island. Using the VR hand controllers, participants select and manipulate a variety of building materials including springs, wheels, stretchable rods, and other tools. There are multiple ways to solve presented problems and manipulate materials, so participants can engage in a way that is interesting to them. Once the user reaches the goal, they advance to the next, more challenging level. This game does require the use of both hands to manipulate building materials.

### ***Fruit Ninja***

Fruit Ninja is an arcade style game where the user's VR controllers appear as swords. A variety of fruits float through the air, and the player aims to slice them in half with the swords. In the basic level of game play, the player works simply to collect points by slicing as many fruits as possible. The game also includes a more advanced "survival" level where the participant must use divided attention in order to navigate and stop approaching obstacles while simultaneously attempting to slice the fruit objects and earn points. There are options within the game that enable one- or two-handed play.

### ***Guided Meditation VR***

Guided Meditation VR is a relaxation app where the user can choose an environment, length of time, and intentional focus for a personal meditation. Participants design their preferred experience by first selecting from a variety of virtual environments including forests, deserts, oceans, and mountains. Meditation intervals can be set for 2, 5, or 10 minutes. An alternative option to customize the length of the meditation also exists. The app comes with pre-programmed guided audio tracks for meditations focused on topics including relaxation, attention, depression, compassion, movement, and sleep. There is also an option to eliminate the audio track. Players can move throughout their environment of choice to gain different vantage points or simply listen to the meditation track and ambient sounds. Individuals can navigate all features with one hand.

***Job Simulator***

This is a single-player game set in the year 2050. In this scenario, robots have replaced all human workers and the user steps into the “job simulator” to learn what it was like to work a human job in the past. Participants can choose from jobs including: chef, office worker, convenience store clerk, and auto mechanic. A computer gives the participant instructions and assigns tasks for the user to complete. Tasks for the chef include making meals with certain ingredients in a specific order. The office worker’s duties include transferring calls, making copies, answering emails, and eating doughnuts. Workers in the auto mechanic role simulate changing auto headlights or engine oil, and fixing tires. The VR controllers in this game appear as human hands to aid in realistic imaging of task completion.

***Takelings House Party***

This is a multi-player game that presents a scenario where Takelings, which are colorful cartoon-like critters, have invaded a home. The user wearing the VR HMD assumes the role of the homeowner who is trying to exterminate the Takelings. Up to eight additional game players participate as the Takelings, and must be in the same room as the VR user. They access the game using either their smart phones or a computer rather than a VR system. The person playing the role of the homeowner in this game can move to different rooms in the house including the kitchen, attic, and basement. This participant can exterminate the Takelings in a variety of ways. For example, in the kitchen, the VR user can put the Takelings in the toaster, hit them with a frying pan, or put them down the garbage disposal. The Takelings earn points by collecting coins that randomly pop up in the scene and by avoiding capture by the homeowner. The game is playable with one or two hands, but the HMD user must be able to turn in a 360° radius.

***Tiltbrush***

Tiltbrush is a single-player room-scale 3D painting application. Users can choose different colors for their artistic creation from a virtual color palette. A wide selection of brushes enables the user to achieve different shapes and textures. In addition to traditional brushes that produce thin and thick paint strokes, alternative brushes provide the participant with options to create images such as stars, fire, and neon dancing lights with their strokes. Users can select a blank canvas in space or choose from a variety of pre-set canvases, objects, or environments to decorate. Two hands are required to navigate the controllers, since one serves as the artist’s palette and the other as the brushes.

**Game Play Procedures**

As each of the eight games were presented, participants were provided a total of 10-20 minutes of game play for each to enable them to become familiar with the main app components and leisure experiences involved in each game. The researcher provided cues and prompts, as needed, to ensure all participants received similar exposure and experiences during each game. To prevent gaming fatigue, all participants received a 30-minute lunch break midway through the study procedures and had the option to take additional shorter breaks between games, as desired. To control for possible order effects, each participant played the eight games in a different order using random assignment.

## Evaluation of Games

Following each game play session, participants evaluated the VR gaming app based on factors related to leisure motivation. To do this, the investigators used the LMS and Q methodology, a research technique developed by William Stephenson (1953).

The LMS is a 48-item survey structured around a primary statement that reads “One of my reasons for engaging in leisure activities is...” Respondents use a Likert scale ranging from 1 (“Never True”) to 5 (“Always True”) to react to the 48 reasons that follow to complete the statement. The assessment yields scores that identify a client’s motivation for participating in leisure activities based on four primary motivators of: (a) intellectual, (b) social, (c) competence-mastery, and (d) stimulus-avoidance (Beard & Ragheb, 1983). Scores for each of the four subscales are calculated based on responses to 12 items each. The LMS has evidence of reliability and validity indicating it is a sound instrument for measuring what it purports to measure (Beard & Ragheb, 1983). Internal consistency reliability is very high for all four subscales: intellectual ( $\alpha = .90$ ); social ( $\alpha = .92$ ); competence-mastery ( $\alpha = .91$ ); stimulus avoidance ( $\alpha = .90$ ).

Q-sort methodology involves gathering subjective first-person viewpoints and then interpreting them holistically (Watts & Stenner, 2012). Individuals are presented with a set of statements and asked to rank-order them from “strongly agree” to “strongly disagree” through a procedure referred to as Q-sorting (Brown, 1993). Participants then organize the statements on a continuum known as the Q-sort continuum.

The number of statements used for each Q-sort study can vary as will the layout of the corresponding Q-sort continuum. This study used 36 statements with 9 statements randomly selected from each of the LMS subscales to fill the 36 slots on the continuum. Slots were spaced over 11 columns labeled from “disagree most” to “agree most” with a “neutral” column in the center. The investigator instructed participants to rank each item based on their opinion of each statement’s relevance for that game. The statements were documented on small squares that participants arranged with one square placed in each designated slot on the Q-sort continuum (Figure 1). During this process, the researcher also asked participants to verbally explain their reasoning in order to obtain both quantitative and qualitative data for each game.

The research team video recorded all sessions. Participants provided qualitative responses to semi-structured interview questions after they had completed the Q-sort process for all eight games. Reflecting on the games collectively, participants identified which game they thought best aligned with each of the four leisure motivation subscales and explained why they came to that conclusion. A member of the research team transcribed responses from the video recordings after the sessions were completed.

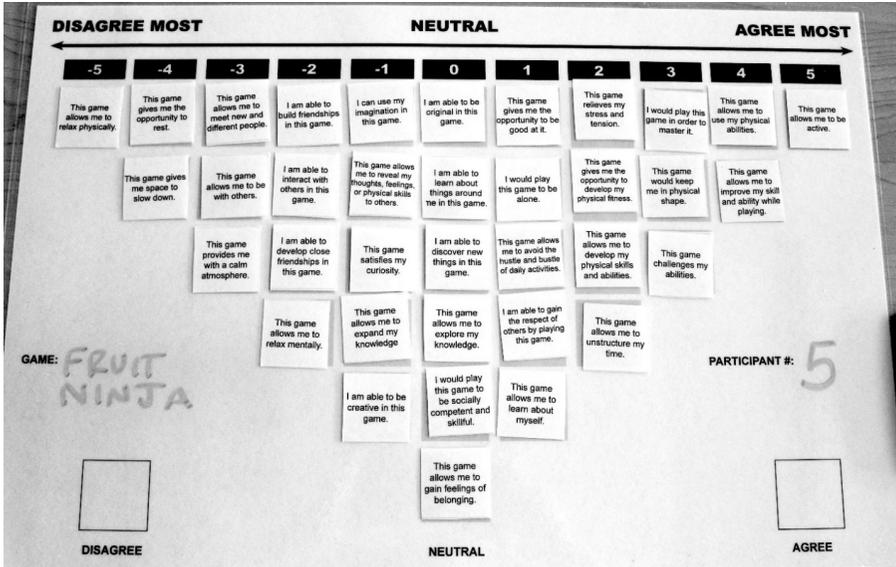
## Data Analysis

Data were compiled, scored, and analyzed using R statistical software (RStudio Team, 2016). Participants’ data ( $N = 5$ ) were collected across eight VR games using Q-sort methodology. Mean rank scores for each leisure motivation category were calculated (Disagree = -5, Agree = +5) for each of the eight games (Acron: Attack of the Squirrels, Beat Saber, Fantastic Contraption, Fruit Ninja, Job Simulator, Guided Meditation VR, Takelings House Party, and Tiltbrush).

The researchers used frequency counts to identify games named by participants as most representative of each leisure motivation category. Then, they extracted additional qualitative data to clarify participant rationale for their decisions.

**Figure 1**

Sample Q-Sort Continuum Documenting Participant Rankings of Statements



## Results

Demographics of the participants ( $N = 5$ ) who comprised the expert panel are summarized in Table 1. All participants who enrolled in the study completed all study procedures.

**Table 1**  
Overview of Participants

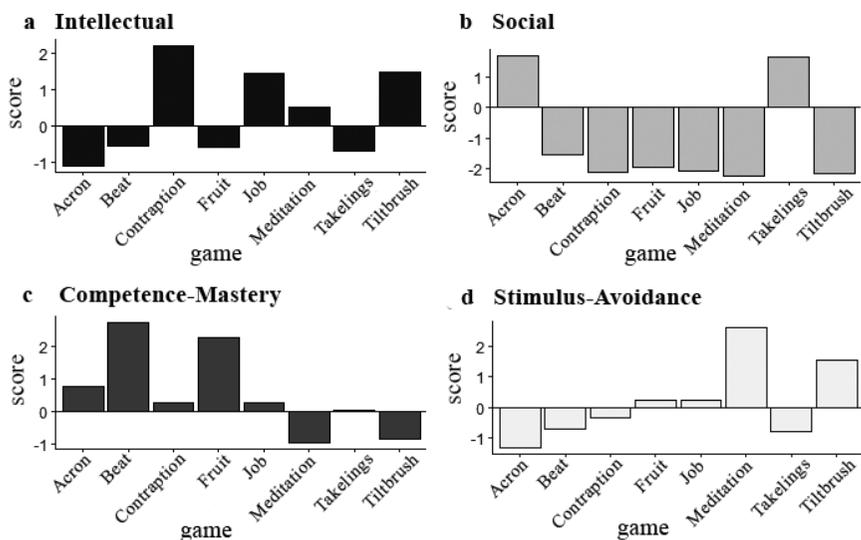
Participant	Service Setting	Sex	Age	Highest Level of Education	License	Years of Experience (CTRS®)
#1	Hospital	M	31	Bachelor's Degree	TRS	5
#2	Skilled Nursing Facility	F	28	Bachelor's Degree	TRS	2
#3	Residential/ Transitional	F	49	Bachelor's Degree	TRS	2
#4	Outpatient/Day Treatment	F	37	Master's Degree	MTRS	7
#5	Adaptive Recreation Program	F	26	Bachelor's Degree	TRS	2

## Comparison of Game Scores by LMS Subscale

Figure 2 graphically presents Mean scores for each game across the four LMS subscales. Higher scores indicate stronger agreement from the participants that the game had elements aligned with that particular LMS category. Following is a summary of specific findings for each LMS category.

**Figure 2**

*Comparison of Mean Game Scores by Leisure Motivation Subscale*



### Intellectual

As noted in Figure 2a, scores in this category were highest for Fantastic Contraption ( $M=2.22$ ,  $SD=1.70$ ), with Tiltbrush ( $M=1.47$ ,  $SD=2.34$ ) and Job Simulator ( $M=1.44$ ,  $SD=1.98$ ) receiving the second and third highest scores respectively.

When asked to select the game that best represented this category, three out of the five participants chose Fantastic Contraption. One participant struggled to identify one game, so divided their vote between Fantastic Contraption and Tiltbrush. The remaining participant identified Job Simulator as the game they thought best fit this category. Qualitative comments revealed one participant thought Fantastic Contraption was challenging and emphasized problem-solving skills. Another participant noted that while Tiltbrush did not focus on developing intellectual knowledge, they did think it could lead to the development of creative knowledge, which they viewed as being just as powerful. The individual who named Job Simulator explained that finding employment is often a goal of their clients. Thus, participants viewed this game as a fun way to learn about different types of jobs.

### Social

Acron: Attack of the Squirrels ( $M=1.69$ ,  $SD=1.90$ ) and Takelings House Party ( $M=1.67$ ,  $SD=2.22$ ) received the highest scores in the social category based on participant rankings (Figure 2b).

During qualitative inquiry, all participants stated that they thought Acron: Attack of the Squirrels best represented the social leisure motivation category when compared to the other games. However, one therapist expressed some level of ambivalence in choosing this game over Takelings House Party. Drawing on their professional experience, one therapist commented that when clients cannot have visitors, Acron: Attack of the Squirrels had the added benefit that the client could play with friends or family in a remote location.

### Competence-Mastery

Beat Saber ( $M=2.76$ ,  $SD=1.17$ ) and Fruit Ninja ( $M=2.29$ ,  $SD=1.77$ ) yielded the highest scores relative to other games in this category (Figure 2c).

Frequency counts of therapist responses revealed all five participants thought Beat Saber was most representative of this LMS subscale. One participant commented, "I noticed when I was giving up and when I was focusing and doing better." Another mentioned that they could envision their clients getting into a state of flow because they perceived the music to be motivating. They thought this would contribute to the player wanting to be able to master the challenge of the game. Another participant noted, "Beat Saber has the highest skill ceiling. You could spend hundreds of hours and still (develop more competence as you) play."

### Stimulus-Avoidance

Guided Meditation VR ( $M=2.69$ ,  $SD=1.38$ ) and Tiltbrush ( $M=1.56$ ,  $SD=1.12$ ) were the two highest ranked games for the LMS category of stimulus-avoidance (Figure 2d).

Three participants agreed that Guided Meditation VR was most representative of this category. One participant answered Tiltbrush and another could not decide between Guided Meditation VR and Job Simulator. One therapist who identified Guided Meditation VR explained their response by elaborating they thought it would be great for clients who are frustrated, angry, and/or want to leave group sessions as it would give them an opportunity for autonomy. This individual also noted that this particular VR intervention is well suited for one-on-one treatment facilitation. Another therapist commented that in Guided Meditation VR, "You have control over the stimulus and you can choose your own adventure." The therapist who vacillated between Guided Meditation VR and Job Simulator said that Guided Meditation VR aligned with the more classic route of addressing feelings whereas Job Simulator could help someone forget about everything else and escape their current circumstances. The therapist that chose Tiltbrush said, "You can go into your own world, be enveloped, and everything else is gone."

## Discussion

The findings of this study are promising as they indicate certain VR games contain elements that recreational therapists view as aligning with individual subscales of the LMS more than other VR games. Specifically, the results suggest the VR games Fantastic Contraption, Job Simulator, and Tilt Brush are well suited for individuals with high intellectual scores. Clients who are motivated by social leisure experiences are likely to respond more positively to Acron: Attack of the Squirrels and Takelings House Party. Beat Saber and Fruit Ninja would be appealing to clients scoring high in competence-mastery, while individuals whose LMS scores reveal a preference for

stimulus-avoidance are likely to respond more positively to Guided Meditation VR and Tilt Brush.

According to the American Therapeutic Recreation Association's *Competencies in Recreational Therapy Practice Study* (Porter et al., 2019), recreational therapists report high use of the Idyll Arbor Leisure Battery which includes the LMS. Therefore, it should be feasible for recreational therapists to incorporate the findings of this study into their professional practice to assist with VR game selection. When designing individual treatment sessions, the CTRS® can use this information to match specific VR games to each client's primary leisure motivation. The theoretical basis of the LMS posits that individuals will be more motivated to participate in activities that align with their leisure motivation (Beard & Ragheb, 1983). Therefore, this simple process could potentially lead to greater client enjoyment, engagement, and motivation during RT treatment sessions.

Future research should aim to confirm this hypothesis by evaluating the impact of matching VR games to individual clients' leisure motivation on these important factors of clinical treatment (client enjoyment, engagement, and motivation). Researchers should also determine if matching VR games in this manner leads to greater treatment outcomes than VR interventions that present leisure experiences unaligned with a client's leisure motivation.

It is also recommended that the current study and system for evaluating games be replicated on a larger scale with increased numbers of recreational therapists and more VR games. In addition to gathering data from RTs working in different service settings, collecting information on game implications for clients with different diagnoses and functional skills would be helpful. Furthermore, feedback from clients regarding their thoughts on specific games would also strengthen the current findings and clarify the impact of matching VR games to individual clients' primary leisure motivation.

One of the exciting elements connected to the use of VR as a treatment modality is the opportunity to personalize and customize treatments for clients given the extensive volume of VR games available on the market. Unfortunately, navigating all these options could be an overwhelming task for recreational therapists, who may have limited time to research and trial new interventions. Therefore, the findings of this study are also encouraging as they add to the existing VR literature, provide an overview of eight specific VR games, and document a new method for VR game selection uniquely focused on RT specific considerations.

## Limitations

While the findings of this study are encouraging, certain limitations exist. First, although researchers consider Q-methodology a valid approach for documenting differences in samples this size (Watts & Stenner, 2012), the expert panel included a limited number of participants. Additionally, while the investigators attempted to recruit a diverse group of recreational therapists by targeting one CTRS® from each of the top five NCTRC settings, their opinions are not representative of the profession as a whole, and data are not available regarding typical diagnoses of clients they serve. Furthermore, the individuals enrolled in the study presented with a limited number of total years of RT experience ( $M = 3.6, SD = 2.06$ ). It is unknown if their opinions might be different from individuals who have been working in the field for longer periods of time. Also, despite meeting the study's inclusion criteria, this somewhat limited practice experience may cause some to question their role as an "expert."

This study only evaluated eight VR games. Therefore, future studies should include a larger selection of games. This would not only expand options for therapists, but also determine if the evaluation methods used in this study continue to be a feasible way to evaluate VR games for their clinical relevance for specific RT clients. Finally, due to time constraints of the study, the game play period offered the recreational therapists limited exposure to each game. It is possible that participants may not have experienced all essential game features, and additional time may have altered participant perceptions of the gaming experience related to the LMS subscales.

## Conclusion

As VR interventions continue to gain popularity in the health care arena and specifically in RT practice, the novel idea of matching specific VR games to a client's leisure motivation is highly innovative and holds potential to positively impact client response to RT treatment sessions. Therefore, this study's preliminary work in this new area of study adds significantly to the literature, particularly in regard to enhanced understanding of the motivational factors associated with VR and the provision of individualized, evidence-based RT treatment. The findings have also generated a resource for therapists, by describing a small sample of VR games that clinicians can use in clinical practice and match to the primary leisure motivation of individual clients. This should ultimately lead to more positive client response, engagement, and motivation for treatment as well as greater treatment outcomes.

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