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Comparisons of Intrinsic Motivation for Novel Stroke Rehabilitation Interventions for UE

Dorothy Kalmbach
Washington University in St. Louis

Introduction

Purpose

To compare how intrinsically motivating stroke patients found upper extremity (UE) rehabilitation carried out in the HPL to how intrinsically motivating stroke patients who participated in other studies found their UE rehabilitation.

Background

Stroke is the leading cause of long-term disability in US: 795,000 /year[1].

- 80% experience UE dysfunction[2]; impediment to ADLs

Motor rehabilitation can improve motor function in chronic stroke.

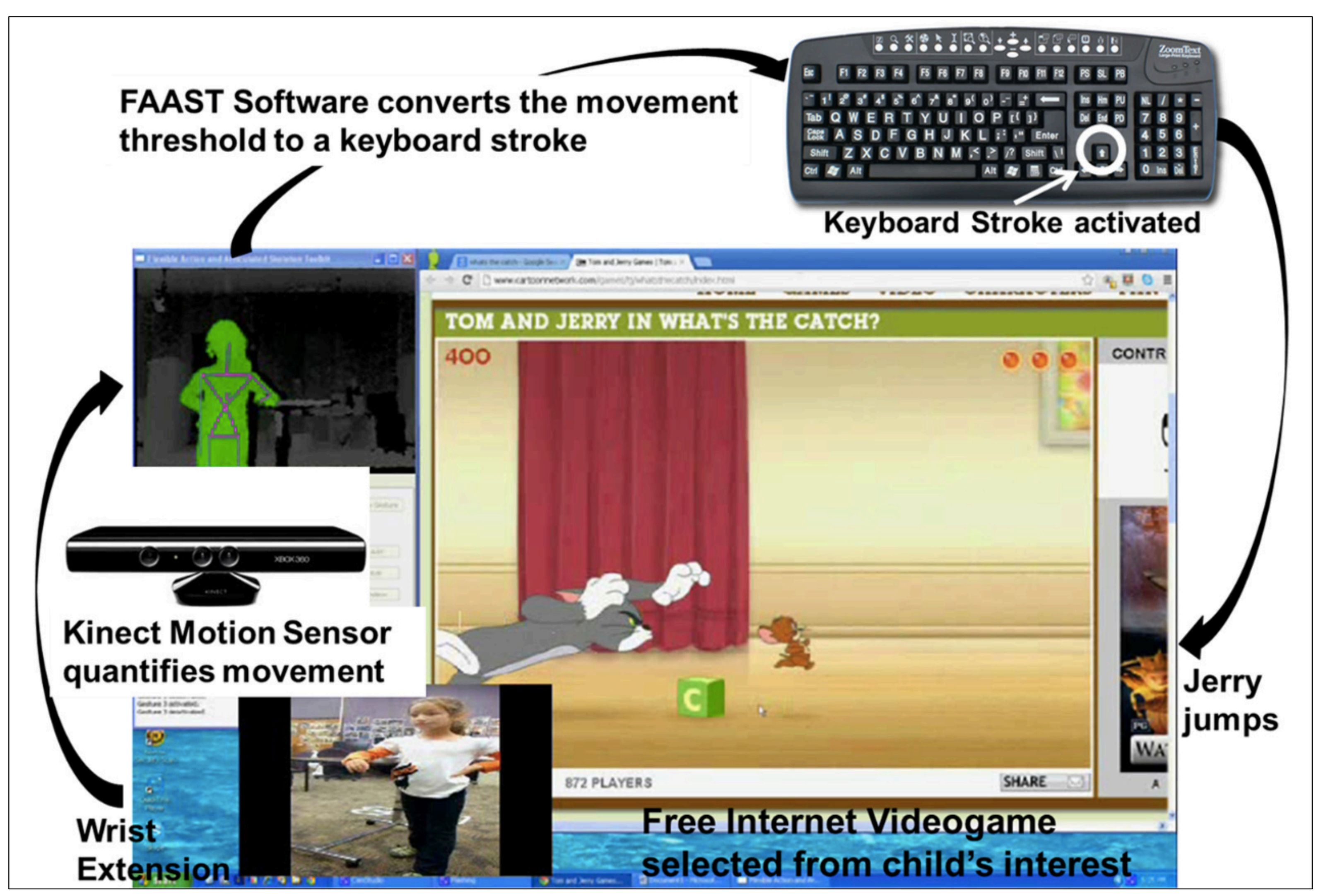
- Little chance of success if a patient is nonadherent to regime
- Approximately 65% of patients demonstrate nonadherence[3]

Motivation is linked to better adherence and therapeutic outcomes[4-5].

- Most patients are provided with extrinsic motivation; it is crucial to provide them with intrinsic motivation (IM)
- IM can be quantitatively measured by the I/E subscale of the IMI

Motor intervention in the HPL utilizes virtual reality (VR) gaming.

- Interventions have produced significant improvement in motor impairments and achieved a greater number of repetitions than and are more interesting and enjoyable than traditional therapy[6]



Participant performs the motion. The Kinect converts motion to XYZ coordinates. FAAST software identifies movement threshold and activates keyboard stroke. Jerry jumps[7].

Acknowledgements

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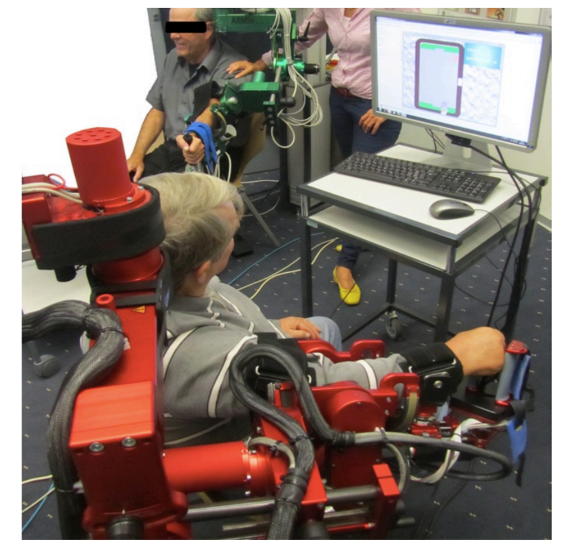
Methods

Literature Review

Extracted I/E subscale scores from 17 studies of novel interventions for UE rehabilitation post-stroke.
Interventions were sorted into categories and average levels of I/E were determined and ranked.

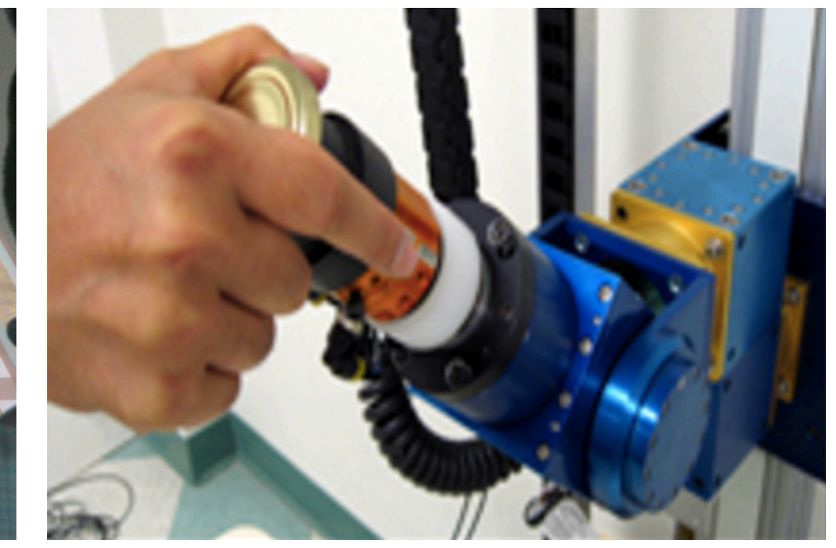
Categories:


Gaming (6)


Gaming with Assistance (6)


Conventional Therapy (5)


Mixed Reality (3)


Robotic Training (1)

Results

Category	Overall M±SD	Participants	IM Rating
Gaming	5.67±0.45	52	Highly Positive
Gaming with assistance	5.69±0.67	83	Highly Positive
Conventional Therapy	5.11±0.31	59	Highly Positive
Mixed Reality	6.18±0.50	42	Highly Positive
Robot Training	6.17±1.25	5	Highly Positive
HPL	5.59±0.86	20	Highly Positive

All of the categories produced a highly positive mean I/E score.

All of the categories except conventional therapy produced a higher mean score for reported I/E than the HPL.

Discussion

Summary

Some approaches to therapy can produce higher levels of intrinsic motivation than others. Work being done in the HPL is more intrinsically motivating than traditional therapy and as intrinsically motivating as other novel therapy approach to UE rehabilitation for persons with stroke.

Comparisons

Mixed Reality, the manipulation of tangible objects to produce on screen consequences, scored highest.

- Use of daily tasks and objects can increase patient motivation

Robot training scored second highest, but only 1 study was included.

Gaming interventions barely outperformed HPL, but they lack the affordability, accessibility, and variety of the HPL.

Future Work could investigate studies that used interviews and other measures of IM or administer each of these interventions types to a group post-stroke and measure their levels of IM for each approach.

References

[1] Go et al. (2013). [2] Jordan, Sampson, & King. (2014). [3] King, Hijmans, Sampson, Satherley, & Hale (2012). [4] Maclean, Pound, Wolfe, & Rudd. (2002). [5] Maclean, Pound, Wolfe, & Rudd. (2000). [6] Proffitt, Kelleher, Baum, & Engsberg. (2011). [7] Sevick et al. (2016).

Images (left to right): Kottnik et al. (2014). Novak et al. (2014). Prange et al. (2015). Colomer et al., (2016). Choi et al. (2011).