EMPOWERING DIVERSE HEALTH LITERACY NEEDS WITH MULTI-AGENT HEALTH INTERVENTIONS: DESIGN CHALLENGES FOR SOCIALLY AWARE MULTI-AGENT SYSTEMS

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INTRODUCTION

MOTIVATION
Clinical trials are important for advancing cancer treatment, but participation remains low (2-8%)

PROBLEM
Limited awareness due to poor communication — especially for low health literacy populations

GAP
Mixed results with helping low health literacy populations in past virtual agent work, but these use single virtual agent systems

APPROACH
Multi-agent systems that mirror real clinical dynamics (doctor + companion) to improve clinical trial awareness and decision-making support

RESEARCH QUESTION

How do multi-agent interventions affect decision-making experiences across different health literacy levels?

STUDY DESIGN

CONDITIONS | *Single-agent vs Multi-Agent*

Single-Agent
Doctor

Multi-Agent
Doctor + Caregiver

METHOD | *Randomized, Between-subjects*

INTERVENTION | *Web-based*

Virtual agent intervention addressing clinical trial barriers

Users select questions to ask via multiple-choice button input

For every answer the virtual agent provides, users can select from 3 explanation options based on varying levels of health literacy

Less Technical	***Standard NCI***	***More Technical***
"…checks how well new treatments work…"	*"…tests how well new medical approaches work…"*	*"…evaluates the efficacy of novel medical interventions…"*

Responds with information:
- *Doctor in **single-** & **multi-**agent conditions*

Facilitates information delivery:
- *Doctor in **single-**agent condition*
- *Caregiver in **multi-**agent condition*

MEASURES

User health literacy

Decision-Making Outcomes

Perceived decision-making ***pressure***

Amount of ***information*** received

Satisfaction with decision-making

PARTICIPANTS

Online research platform

Past or current diagnosis

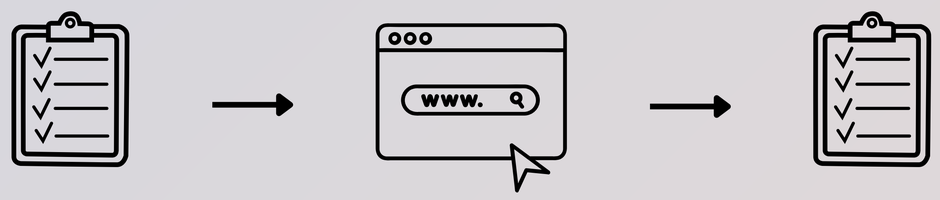
61 *participants*

49 *median age*

69% *female*

74% *white*

PROCEDURE



Pre-Survey
Informed Consent, Health Literacy

Intervention
Single- or Multi-agent intervention

Post-Survey
Decision-making, Demographics

RESULTS

Align Rank Transform (ART) ANOVA

PRESSURE

Multi-Agent Condition	*Participants in the **multi-agent condition** felt **less pressure** during decision-making*
Low Health Literacy	*Participants with **low health literacy** felt **less pressure** during decision-making*

INFORMATION

Low Health Literacy	*Participants with **low health literacy** felt they **received more information***

SATISFACTION

High Health Literacy	*Participants with **high health literacy** had **higher satsifaction** with the decision-making*

DISCUSSION

Multiple virtual agents may reduce pressure during decision-making, but health literacy appears to drive satisfaction and perception of information received.

DESIGN IMPLICATIONS

Second agent could detect cognitive overload and intervene
Adaptive scaffolding based on literacy level
Need for real-time emotion/confusion detection
Role differentiation between agents matters

FUTURE DIRECTIONS

Free-text/voice input for better state detection
Dynamic role adaptation based on user needs
Building more socially aware multi-agent systems

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