Digital Therapeutics For Long-Term Post-Stroke Care

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Simple C Cognitive Health

THINK BIG — BRAIN INJURY IN GEORGIA — 2020 CONFERENCE

What We Learned:

1: The SimpleC Platform, using digital therapeutic programs in the home, delivered positive care outcomes to persons living with cognitive impairment, their family caregivers, and paid care providers.

2: Post-stroke cognitive and physical care needs can be successfully addressed with digital therapies despite complexity with comorbidities.

What is Next:

1: Our research underscores the great potential for behavioral health technology to support a patient's post-stroke plan of care. We are expanding our library of digital therapies for long-term post-stroke care and rehabilitation.

2: We are directing research efforts, with partnerships, to solve the unique needs of stroke patients and their care team.

Introduction / Background

The care-related challenges faced by persons with cognitive impairments are highly varied and individual. Further, due to high incidence of comorbidity, the plan of care can be very complex. As a result, persons with cognitive impairments often develop depression and anxiety following diagnosis [1-2].

It is important to treat depression and anxiety as early as possible because they can hinder the effectiveness of post-stroke rehabilitation [3-4]. Technology can deliver digital therapeutics to reduce symptoms of depression and anxiety while simultaneously providing support for the plan of care to improve health outcomes [5-7].

The present study is a randomized controlled trial that aimed to identify and quantify the care-related challenges faced by a care triad that includes a person with cognitive impairment, their family caregiver, and paid care providers.

The study further explores how technology can address the care-related challenges for cognitive impairment through digital therapeutics presented on the SimpleC Companion.

Participants Enrolled and Methods

Persons with Cognitive Impairment (N=32)
- Age: M=80 years (SD=10, Range=54-96)
- MMSE < 26
- Living at home

Family Caregivers (N=32)
- Age: M=60 years (SD=10, Range=51-81)
- Relative or friend of person with cognitive impairment

Paid Care Providers (N=24)
- Age: M=47 years (SD=12, Range=40-66)
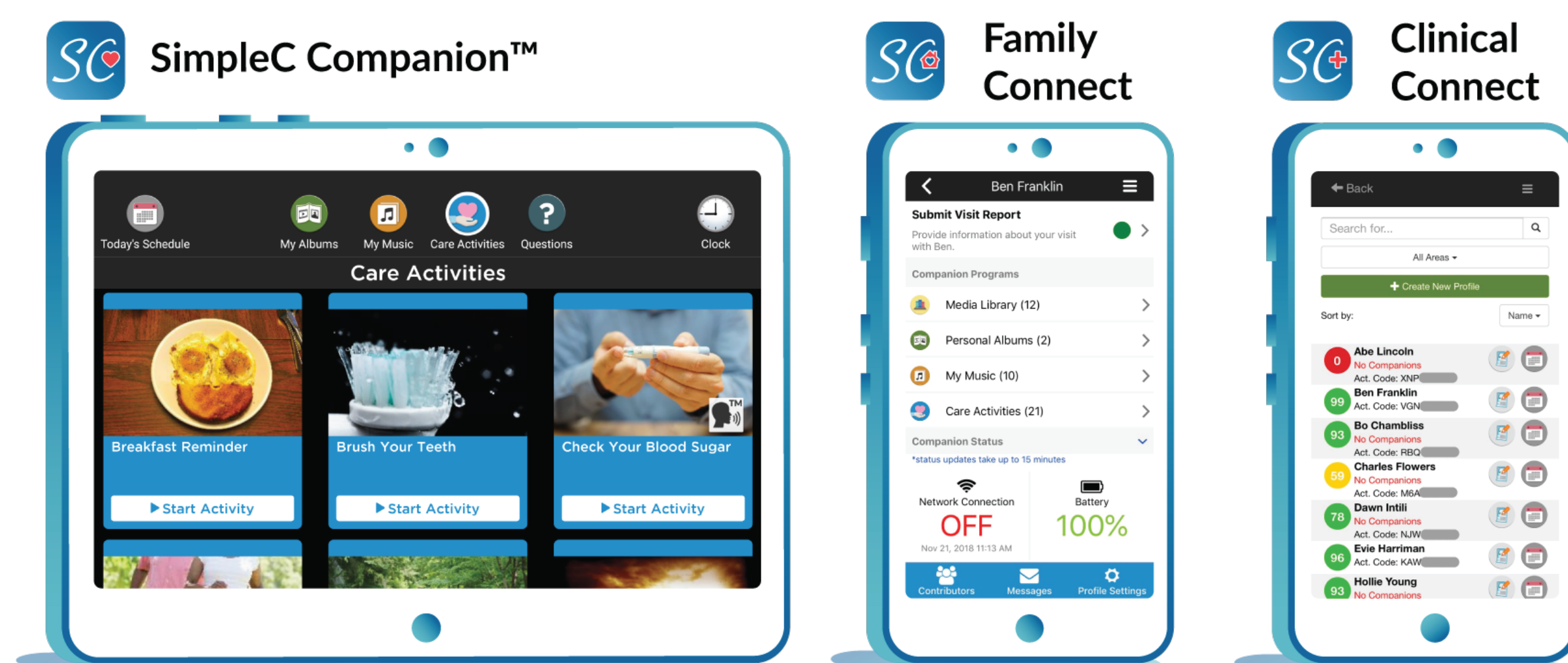- Occupation: 50% CNA, 50% Other (e.g. RN)

Baseline Assessment and Monthly Reassessments

SimpleC Condition
Technology Implementation
1. Personalized Profile Creation
2. Device Delivery
3. SimpleC Platform Training

Control Condition

3-Month Intervention and Data Collection

Final Reassessment and Interview

SimpleC Companion™ / Family Connect / Clinical Connect
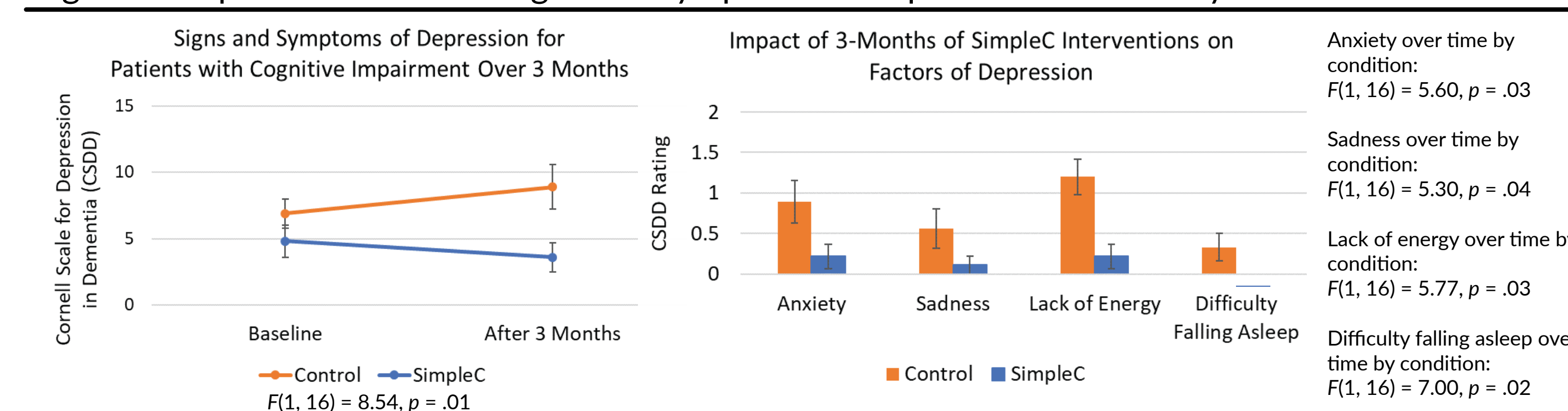

SC SimpleC Research

"We drive the development and assessment of digital interventions that are grounded in research and supported by scientific evidence."
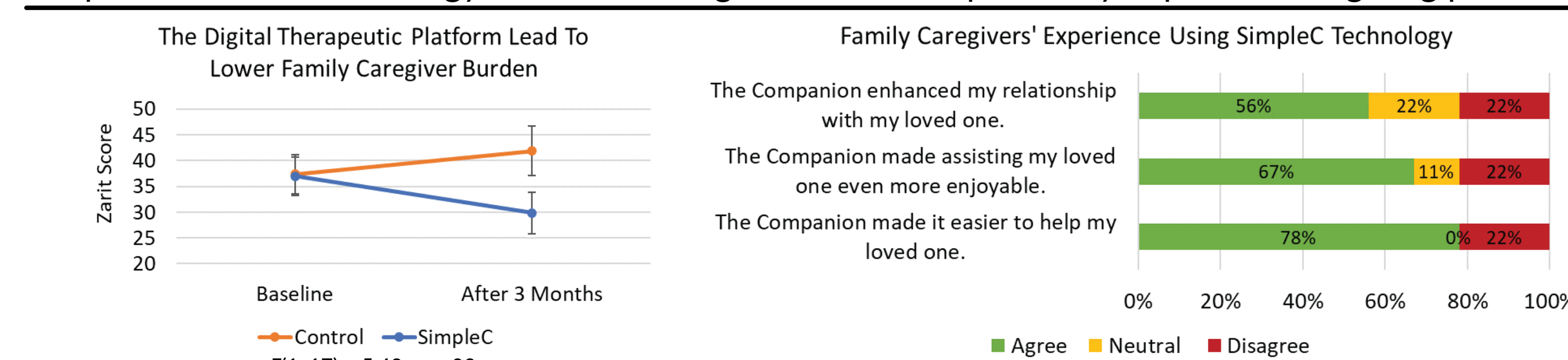- Dr. Anne Adams
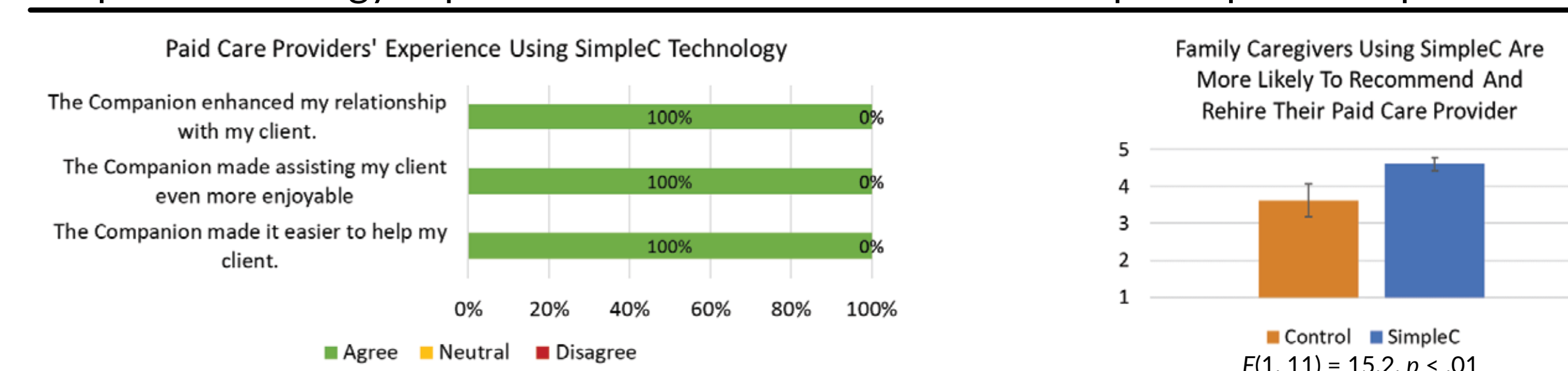 Managing Director of Applied Research

Results

Digital therapeutics decreased signs and symptoms of depression and anxiety.

Signs and Symptoms of Depression for Patients with Cognitive Impairment Over 3 Months
$F_{(1, 16)} = 8.54, p = .01$

Impact of 3-Months of SimpleC Interventions on Factors of Depression

Anxiety over time by condition: $F_{(1, 16)} = 5.60, p = .03$
Sadness over time by condition: $F_{(1, 16)} = 5.30, p = .04$
Lack of energy over time by condition: $F_{(1, 16)} = 5.77, p = .03$
Difficulty falling asleep over time by condition: $F_{(1, 16)} = 7.00, p = .02$

SimpleC assistive technology alleviated caregiver stress and positively impacted caregiving practices.

The Digital Therapeutic Platform Lead To Lower Family Caregiver Burden
$F_{(1, 17)} = 5.42, p = .03$

Family Caregivers' Experience Using SimpleC Technology
- The Companion enhanced my relationship with my loved one. 56% / 22% / 22%
- The Companion made assisting my loved one even more enjoyable. 67% / 11% / 22%
- The Companion made it easier to help my loved one. 78% / 0% / 22%

Agree / Neutral / Disagree

SimpleC technology improved workflow and care relationships for paid care providers.

Paid Care Providers' Experience Using SimpleC Technology
- The Companion enhanced my relationship with my client. 100% / 0%
- The Companion made assisting my client even more enjoyable. 100% / 0%
- The Companion made it easier to help my client. 100% / 0%

Agree / Neutral / Disagree

Family Caregivers Using SimpleC Are More Likely To Recommend And Rehire Their Paid Care Provider
$F_{(1, 11)} = 15.2, p < .01$

Control / SimpleC

Case Studies: Study Participants Using SimpleC Technology with Post-Stroke Care Needs

Case Study 1: Sarah

History of multiple strokes over the 7 years prior to the study that led to vascular dementia. Has diagnosed depression. Daughter is primary caregiver.

How Digital Interventions Helped

Engagement to Reduce Rumination and Anxiety
- Paid care provider added trivia games (e.g. Name That Flower) to Sarah's Companion.
- Paid care provider reported Sarah would play until the battery ran out. "She is also inviting friends to play trivia in her room."
- Daughter: "She is happier than before. She is engaged most of the day."

Manage Depression

CSDD Score (depression cutoff > 6)		
Assessed By	Baseline	After 3 Months
Daughter	0	0
Paid Care Provider	12	6

After using the digital therapies on the SimpleC Platform for 3 months, the Sarah dropped below the depression cutoff, as assessed by her paid care provider. The difference between the family caregiver's and paid care provider's perceptions of signs and symptoms of depression is astonishing and important.

The success of this case lied in SimpleC's approach to involve multiple caregivers in personalizing the Companion profile to ensure care needs are being met.

Case Study 2: Lily

History of transient ischemic attacks (TIAs) over the 2 years prior to the study that lead to vascular dementia. Lily had a TIA during the first week of the study resulting in a fall and used the Companion to support rehabilitation. Has diagnosed type 2 diabetes and hypertension. Daughter is primary caregiver.

How Digital Interventions Helped
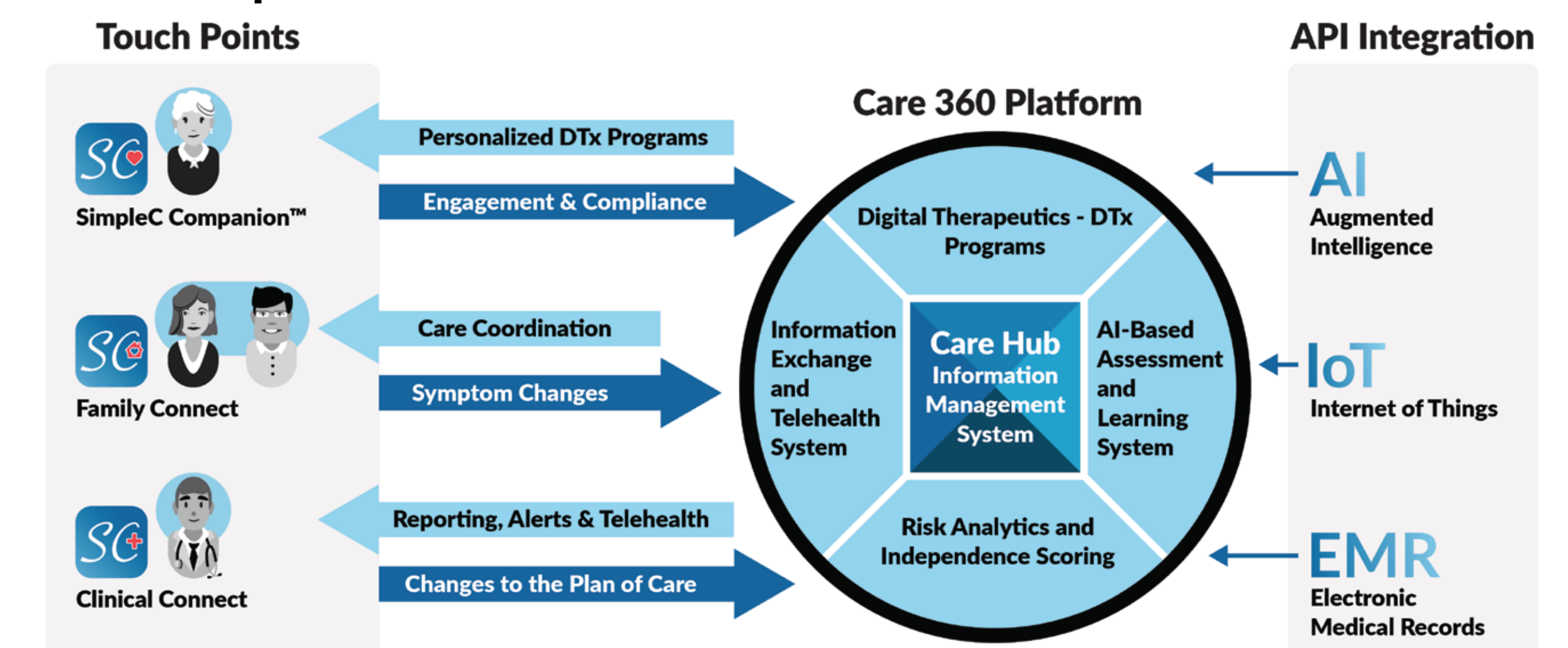
Reduce Agitation
- Daughter uploaded family photos and personalized Lily's music preferences on her Companion.
- Paid care provider used the personalized music programs to calm her when she was agitated, especially during bedtime. Daughter reported that "big band music soothes her."
- Daughter reported that when Lily watched the family photos on the Companion, she engaged and pointed at them.

Reduce Anxiety and Support A Healthy Daily Routine
- Caregivers played digital therapies to cue her morning routine and reduce associated anxiety:
  - "Good Morning, Time To Wake Up"
  - "Someone Will Help Brush Your Hair"
  - "Someone Will Help You Dress"
  - "Someone Will Help Brush Your Teeth"

Due to demands of data collection in the study (e.g. daily diary, regular phone calls), Lily's daughter withdrew from the study after the first month of participation. However, she elected to keep the Companion and continue use due to the benefits for her mother.

The SimpleC Care 360 Platform

Touch Points / API Integration

SimpleC Companion™ / Family Connect / Clinical Connect

Care 360 Platform: Digital Therapeutics - DTx Programs, Information Exchange and Telehealth System, Care Hub Information Management System, AI-Based Assessment and Learning System, Risk Analytics and Independence Scoring

Personalized DTx Programs / Engagement & Compliance / Care Coordination / Symptom Changes / Reporting, Alerts & Telehealth / Changes to the Plan of Care

AI — Augmented Intelligence
IoT — Internet of Things
EMR — Electronic Medical Records

Our digital therapies use the principles of reminiscence, music therapy, validation, and simulated presence to help patients live healthier and happier every day.

Our data analytics platform helps clinicians provide better care while managing their population and workforce.

www.simplec.com

References

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Acknowledgments

ElevAting HOME / HUMAN FACTORS & AGING LABORATORY / VISITING NURSE HEALTH SYSTEM / EMORY UNIVERSITY SCHOOL OF MEDICINE / IBM

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