Click-East: Using data collected within a therapeutic iPad app to elucidate results of a randomised controlled trial

Click-East: Using data Collected within a Therapeutic iPad app to Elucidate Results of a Randomised Controlled Trial

DART development autism research technology

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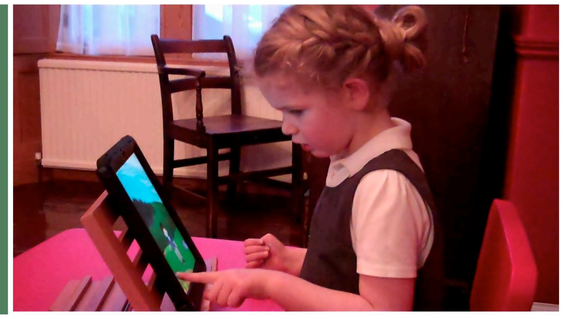
Background

- Children with autism can struggle to attend to social information and to use social cues - this affects their ability to learn, especially from people [1]
- Children with autism often show a strong preference and facility for using technology, including computer games [2,3]
- There is a widely-held assumption that early intervention has the greatest potential to benefit children with autism [4]
- FindMe is a specially-designed iPad app, targeting social skills development and accessible to very young children
- A recent RCT of the app (n=54) produced no group-level effects on real world social and communication skills. However a sub-set of participants may have shown a treatment benefit
- Here we investigate the utility of detailed in-app data collected on game play to elucidate possible intervention effects



The App, FindMe

Figure 1:
Top row: images from part 1 of the app, which rehearses the skill of prioritising people for attention
Middle row: images from part 2 of the app, which rehearses the skill of following social cues
Bottom row: images from the rewards embedded in the app
The app was created using a participatory design framework and then developed with extensive user testing

The Trial, Click-East

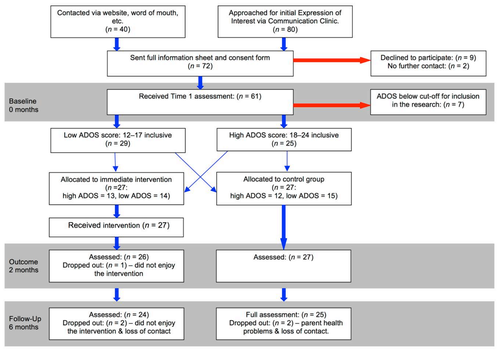


Fig 2: CONSORT diagram showing the RCT process

RCT results

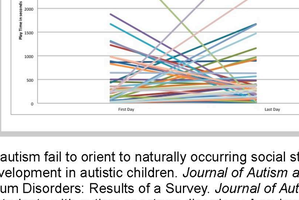


Fig 3: Group mean change scores on primary outcome
t(47) = .975, p=.335, *d* = .028

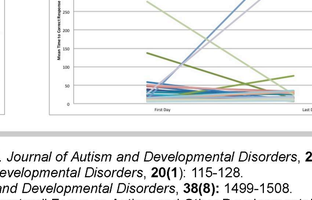


Fig 4: Parent attitudes to the intervention

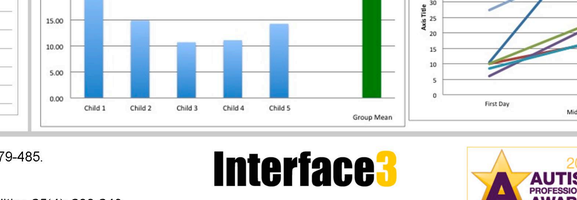


Fig 5: Individual change scores on primary outcome: children demonstrating reliable change are shown in red

	Intervention n=27	Waitlist n=27
Age (months)	49	50
Gender (% male)	78%	82%
Maternal education: % Uni or above	41%	40%
SIMD, bottom cintile	15%	18%
SIMD, top cintile	39%	30%
Mullen VR age equivalent (months)	30	31
Mullen FM age equivalent (months)	31	27
ADOS-2 comparison score	7.74	7.26
MCDI words used	142	123
CSBS social communication sub-scale	24	25

Table 1: Group characteristics at baseline

- Groups were well matched at baseline (see Table 1 on the left)
- There was no group level intervention effect on primary outcome, a measure of social communication in parent-child play
- No group effects were found on other outcomes including parent-report social communication skills, vocabulary and ADOS
- Parent attitudes to the intervention were positive
- A sub-set of children in the intervention group (n=5) showed reliable change

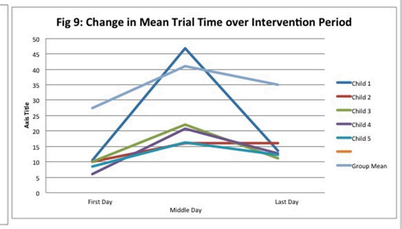
In-App Data

Whole group data (n=41 including waitlist controls)

- Mean date span of intervention = 58 days
- Mean number of days with play = 25 days
- Mean sessions of play per day = 1.6
- Mean play time = 11hrs, or approx 26 mins on play days.
- Percentage reaching highest level = 74%
- Children showed consistency in response time to trials but three distinct patterns of change in play time (Fig. 6 & 7)

Comparing 'Intervention Responders' with group data

- Children who showed reliable change had consistently poor joint attention scores (ADOS) and high ADOS-C scores at Baseline
- Children showing reliable change seem to be quicker at completing each intervention trial than the group average
- However their 'learning profile' across the intervention period follows a fairly typical trajectory. This is interpreted as an increase in exploratory play followed by an increase in accuracy.



Conclusions

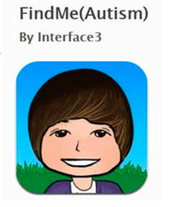
- Children showing benefits as a result of the intervention appeared to:
  - Have relevant impairments at baseline
  - Show skill in response to the technological intervention
- But their trajectories of change over time appeared to be typical
- Technology-based interventions provide an opportunity for collection of detailed data on intervention 'dose'
- These may help in interpreting group-level findings
- Further investigation of the link between amount of play, response times, app complexity level and touches to distractors and background items may be revealing of learning trajectories in children with ASD

Conflict of Interest:

Authors HP, SFW and HM declare that they may receive royalties in the future if the FindMe app paid downloads exceed a certain threshold.

FindMe is also available in a free, reduced-content version via iTunes

With thanks to all our participating families and experts and our funder, the Nuffield Foundation



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