

ASX Release

## TALi Reports Positive Study Results for DETECT Product

### Highlights

- TALi DETECT was successfully tested with 340 children aged four to eight years<sup>1</sup> to *establish its accuracy as an attention assessment tool*.
- Primary endpoint achieved in determining the validity and reliability of TALi DETECT as an effective psychometric tool
- The results confirmed that six game-based (cognitive) subtests of TALi DETECT provide a foundational assessment of the key attentional domains
- TALi DETECT can provide an index for a child's attention-related cognitive capabilities relative to the reference group, allowing identification of children with performance outside the typical range
- The Company will accelerate full commercial launch from July 2020

TALi Digital Ltd (ASX:TD1, "TALi" or "the Company"), a leading health technology business seeking to address the most commonly reported childhood issue of inattention, has today announced the results of a study for its TALi DETECT ("DETECT") product conducted in Victorian primary schools, kindergartens and childcare centres.

This game-based program takes approximately 20-25 minutes and provides a baseline assessment of a child's attention skills relative to a normative performance measure, which has been established through TALi's large-scale study examining cognitive abilities in childhood.

"DETECT is a triage tool for attention difficulties, which is designed to be used in a classroom environment, at home or in partnership with health specialists. It complements existing observation-based assessments of attention and will provide an essential check point. Early detection of attention issues facilitates earlier intervention which is not only critical to the wellbeing of a child but also has significant published economic benefits to the community<sup>2</sup>," said TALi Digital Managing Director, Glenn Smith.

DETECT was successfully tested with 340 children aged four to eight years. Researchers at Swinburne University of Technology conducted a comprehensive analysis on DETECT performance data to *establish its accuracy as an attention assessment tool*. "As part of our strategic initiatives on

<sup>1</sup> TALi DETECT was in part developed under the Cooperative Research Centres Program (CRC-P) from the Department of Industry, Innovation and Science. The TALi DETECT CRC-P Project and study has now concluded.

<sup>2</sup> James Henderson, Nobel Laureate in Economics

research and international expansion we have formed relationships with pre-eminent researchers in their fields at Swinburne University and Duke Clinical Research Institute (see announcement on 22<sup>nd</sup> June 2020) that are designed to further cement TALi's first to market mover advantage in the segment " said Mr Smith.

The results confirmed that six game-based (cognitive) subtests of DETECT provide a foundational assessment of the key attentional domains<sup>3</sup>. Using the data collected through the study as a normative sample, DETECT can provide an index for a child's attention-related cognitive capabilities relative to the reference group, allowing identification of children with performance outside the typical range.

TALi Health Chief Scientist, Dr Azadeh Feizpour, said the study results position DETECT as a leading tool to facilitate an objective baseline measurement of attention skills in early childhood.

"TALi DETECT features a comprehensive battery of diverse attention assessment tasks that facilitate estimation of a child's strengths and weaknesses in the major domains of attention, which include the ability to orient attention, referred to as Selective Attention in neuroscientific literature; the ability to maintain attention, referred to as Sustained Attention; and the ability to switch/regulate attention, referred to as Executive Attention," said Dr Feizpour.

The purpose of the study was to determine the validity and reliability of TALi DETECT as an effective psychometric tool. *Validity* is a term used in psychology which is *partly* evaluated by investigating what psychological qualities/constructs are measured by a test. The study results showed that participants who were tested using TALi DETECT had three main qualities (attentional domains) assessed across the six TALi DETECT subtests. Analysis showed that there is an acceptable differentiation between these three qualities, indicating that each one measures a unique construct.

*Reliability* is another important psychometric property for a test, which is defined as the stability of scores obtained by a person when re-examined with the same test multiple times. In testing the reliability of DETECT, two attentional domain scores showed acceptable reliability (Selective and Sustained), while one showed lower reliability (Cognitive Flexibility). This means the next version of DETECT will include refinements to increase the reliability of estimating Cognitive Flexibility.

### Study Results in detail

Data are presented for 340 neurotypical children on three important psychometric characteristics: validity, sensitivity to cognitive growth during childhood, and reliability:

Construct validity: Structural Equation Modelling showed that TALi DETECT has an excellent factor structure (fit indices for a three-factor model:  $\chi^2(df = 6) = 5.569$ ,  $p = .473$ , CFI = 1.000, RMSEA = .000,

<sup>3</sup> Raz and Buhle, 2006; NATURE REVIEWS | NEUROSCIENCE:

*Selective attention* is the ability to select specific information from among multiple sensory inputs. This is the most studied attentional network. *Alerting or sustained attention* is the ability to increase and maintain vigilance and response readiness in preparation for an forthcoming stimulus. *Executive attention* is the ability to monitor and resolve conflict between computations in different neural areas, regulate thoughts and feelings and overcome habitual actions.

SRMR = .016) which indicates that, based on the participants who were tested on the TALi DETECT, there appears to be three main constructs that are being assessed across the six DETECT subtests. There was sufficient differentiation between Sustained Attention and Selective Attention (0.72) factors and much better differentiation between Sustained Attention and Cognitive Flexibility (0.41) and Selective Attention and Cognitive Flexibility factors (0.27).

Developmental sensitivity: associations of test scores with age reflect the validity of the tests for measuring cognitive development during childhood. DETECT has good developmental sensitivity. The effects of age on the three latent variables were examined. Age was positively associated with performance on selective attention ( $\beta = .57, p < .001$ ), sustained attention ( $\beta = .44, p < .001$ ) and cognitive flexibility ( $\beta = .23, p < .001$ ).

Reliability: stability of test scores across time is important for longitudinal studies. Reliability of DETECT was investigated using two methodologies: assessing Measurement Invariance and test-retest reliability.

- **Measurement Invariance:** Measurement invariance testing ensures that a factor model is measuring the same construct at Times 1 (test) and 2 (retest). The results indicate that scalar invariance was established which shows that it is possible to compare factor estimates at Times 1 and Times 2, as the measurement properties do not change over time.
- **Test-retest reliability:** two factors, Sustained Attention and Selective Attention, showed high test-retest reliability (.76 and .97 respectively). However, the third factor (Cognitive Flexibility) showed lower test-retest reliability (.45). A high reliability in this context would normally be considered at around or larger than 0.7 and an intermediate reliability at around 0.6 (Fan et al. (2002)). A slightly lower figure also could be argued for children as they generally show much higher unreliability or variance. However, TALi has commenced internal development to improve the test-retest reliability for the Cognitive Flexibility factor.

Concurrent validity: concurrent validity can be assessed by correlations between DETECT and a well-established “gold standard” measure of the same construct (attention). Evaluating concurrent validity in young children (ages 3–7 years) was challenging because of the scarcity of specific gold standard performance-based measures of targeted constructs, appropriate for these ages.

For the purpose of this clinical trial, TEA-Ch2<sup>J</sup> was used which includes subtests that measure selective attention and sustained attention in 5- to 7-year-olds (but not Cognitive Flexibility). Given that TEA-Ch2<sup>J</sup> composite scores (selective and sustained attention indexes) couldn't be collected through this study, each DETECT and TEA-Ch2<sup>J</sup> subtest scores were compared. The concurrent validity of all five TALi DETECT subtests, that had comparable subtests in TEA-Ch2<sup>J</sup>, was in a satisfactory range (~0.3-0.7; Carlozzi et al. 2017)<sup>4</sup>. Future studies will use additional various

<sup>4</sup> Any correlation coefficient greater than 0.3 is sufficient to provide *adequate* evidence that the two tasks share common variance and are similar (Carlozzi et al. 2017).

performance-based assessments of cognitive attention for further establishing DETECT's concurrent validity at a latent variable (factor/construct) level.

The latent factor of Cognitive Flexibility is currently estimated using only one indicator. Therefore, TALi is adding another cognitive task measuring the same construct (Executive Function/Cognitive Flexibility) to the DETECT battery of tests.

The insights acquired through this large-scale study enables TALi to continue to refine TALi DETECT and test in large neurotypical and clinical paediatric populations in Australia and other international jurisdictions with its partners to further enhance the specificity of and global use of the technology.

TALi DETECT is now available via the App store and Google Play for use on a tablet device.

For more information visit [talihealth.com](http://talihealth.com)

**Release authorised by:**

Glenn Smith  
TALi Digital Managing Director

**ABOUT TALi DIGITAL**

TALi Digital Limited (ASX:TD1) a leading medical device and technology business is seeking to improve attention in early childhood through its breakthrough TALi platform. TALi combines evidence-based proprietary algorithms inside a game-based program to assess and strengthen core attention skills. Learn more at [talihealth.com](http://talihealth.com).

**CONTACT**

**General + Investor Enquiries**

Glenn Smith  
TALi Digital Managing Director  
p. 1300 082 013  
e. [info@talihealth.com](mailto:info@talihealth.com)

**Media enquiries**

Haley Chartres  
HACK Director  
p. +61 423 139 163  
e. [haley@hck.digital](mailto:haley@hck.digital)

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