

# WEC Screening Tool: Identifying Student Risks for Wellbeing and Academic Achievement

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#### **Executive Summary**

This report, commissioned by the South Australian Department for Education, evaluates the potential of Wellbeing Engagement Collection (WEC) items as an initial screening tool to identify mental health concerns and academic underachievement for *individual children*. Currently the WEC is used as a population monitoring tool, meaning that although data is collected for individual children, results are presented at an aggregated level (i.e., by school) with the intention of informing action planning, policy formation and the monitoring of trends over time. For example, schools can use the data to determine where they stand in comparison to state benchmarks, and with repeated use the data can be used to evaluate any wellbeing programs and policies that they put in place.

With the increasing popularity of the WEC, stakeholders often ask if the instrument could be used at an individual level. There are both measurement and practical aspects to consider in response to this question. For example, practical considerations would include the student consent process making it clear that their responses to the survey would be shared with their teacher and school personnel (currently students know that their data is confidential). Further, by providing individual student data to teachers, significant training and supports would be required for them to appropriately respond to wellbeing concerns. Of greatest concern is that there are very few evidence-based interventions or programs that are known to support student wellbeing other than clinical individually targeted programs. Such programs are costly and require clinically trained staff. As such, there is a real risk that identifying individual students through an instrument like the WEC could result in increased system wide pressures on teachers and school psychologists and consequently contribute to greater demands on the education budget.

From a measurement perspective, the fundamental question is if the instrument would have adequate sensitivity and specificity to identify individual students. To state this clearly; if the WEC doesn't have adequate sensitivity and specificity, then there is no point even considering the system consequences of allowing it to be used at an individual level. As such, this report aims to determine if the WEC has the measurement properties to be used as an individual screening tool for later mental health outcomes. Specifically, by analysing cognitive and emotional variables from the WEC, we aim to determine if these could effectively predict academic performance and wellbeing as measured by NAPLAN results and the Kessler's psychological distress scale.

#### Key Findings

- The analysis of WEC items, including perseverance, cognitive engagement, emotion regulation, and resilience, did not reveal predictive thresholds for mental health concerns or academic underachievement.
- ROC curves showed AUC values larger than 0.7 (and thus diagnostically predictive at the individual level) for Year 10 worries predicting Year 11 distress and also for Year 11 worries predicting Year 12 distress.
- These findings suggest that the majority of WEC items alone are insufficient for individuallevel diagnosis of mental health concerns or academic performance issues.

#### **Recommendations**

Should the Department wish to identify individual students for poor wellbeing we would recommend a multifaceted approach using teacher observations followed by clinical assessment. While teachers may observe students' behaviour and emotional wellbeing in the classroom, collaboration between teachers and mental health professionals is essential for a comprehensive approach to supporting students' wellbeing. Mental health professionals can provide consultation, guidance, and support to teachers in identifying students who may benefit from further assessment and intervention.

Our results indicate that the WEC should not be applied at the individual diagnostic level. For perspective, we are unaware of any existing survey instruments with strong sensitivity and specificity for early identification of poor mental health in young children other than comprehensive assessments undertaken by a clinician with the child. Survey instruments like the Kessler Psychological Distress Scale can be considered with older teenagers, though the applicability of shorter versions, especially for younger children needs further investigation.

Simple survey instruments are unlikely to ever meet adequate sensitivity and specificity considering the variability in behaviours and developmental trajectories among younger children. As such, the current practice of teacher observation and consequent referral to school psychologists when concerns are identified is current best practice. Given the increasing popularity of wellbeing "pulse checks", it is worth noting that these also should also not be used for individual diagnostic purposes. We are unaware of any wellbeing pulse checks with published psychometrics or sensitivity and specificity. Whereas the WEC is undertaken annually, pulse checks are undertaken regularly, thus also increasing the risk of normalising distress while increasing burden on the school system.

Although the WEC doesn't meet the criteria required for an individual diagnostic, it has established psychometrics and is well received by the school system. The instrument has been used effectively for the purposes of policy formulation, benchmarking and targeting. It informs service delivery and helps schools and the broader system to monitor and evaluate student wellbeing over time. Linked to administrative records the WEC also stands as an important longitudinal research data base to be able to evaluate specific school-based programs and to investigate trajectories of wellbeing.

#### Introduction

This primary objective of this report, commissioned by the South Australian Department for Education, was to assess the potential use of Wellbeing Engagement Collection (WEC) items as an initial screening tool to identify concerns related to both mental health and academic performance in children. Our inquiry was centred on ethical and reliable application, taking into account the child's agency in the diagnostic process. This study included cognitive and emotional variables extracted from the WEC, considering their potential as indicators of underlying challenges.

Central to our investigation was the overarching question: Can WEC items effectively predict the likelihood of mental health and wellbeing issues (measured as psychological distress by Kessler in Year 11 and Year 12), as well as academic underachievement (measured by national standards in NAPLAN numeracy and reading in Year 5 and Year 9), among students, with a specific emphasis on identifying those at risk? To answer this question in a comprehensive manner, our data analysis strategy revolved around Receiver Operating Characteristic (ROC) curves. By using items from various WEC scales, including perseverance, cognitive engagement, emotion regulation, and resilience, we sought to establish predictive thresholds.

It is important to note that generally ROC analyses are applied when a "hard" outcome is known, for example ROCs are used to determine the diagnostic sensitivity and specificity of a mammography for actual breast cancer. In our application of ROCs, we do not have a hard outcome (i.e., we do not have data on a student's clinical diagnosis of depression or any other mental health condition). As such there is measurement error and natural variability in the outcomes that we are testing the WEC against, which will result in lower ROC values. However, unlike simple correlations these analyses will still determine the ability of the WEC to discriminate for later outcomes.

Moreover, we acknowledge the increasing interest in wellbeing "pulse checks", particularly within the private school sector, where they are being actively promoted by various private companies (see <u>EiPulse</u> for example). These pulse checks are designed to be administered more frequently than the annual WEC and aim to provide regular and immediate insights into students' wellbeing. This growing interest in pulse checks highlights a broader trend towards the continuous monitoring of student wellbeing, reflecting a desire among educators and stakeholders to gain timely data that can inform responsive and adaptive support strategies.

In light of these considerations, it is important to underscore that the practical application of the WEC as a first stage screening tool within educational settings is contingent upon the success of the ROC

statistical analysis. Should the findings demonstrate the efficacy of discrete WEC items in diagnosing later mental health concerns and academic underachievement, teachers could leverage this tool as a preliminary screening mechanism. The incorporation of cognitive and emotional variables within WEC items presents an opportunity for early intervention, empowering educators to proactively address students' needs. This can already be instigated by the WEC results at a whole class or school level, however, currently data is not provided to identify individual children with concerns. Further, students on completion of the WEC are provided with contact information for school counselling services that they can follow-up with directly should any personal concern be raised.

#### Variable selection

The selection of cognitive and emotional variables within the WEC was grounded in robust empirical evidence supporting their significant influence on both academic achievement and overall wellbeing among students. These variables have been identified as key determinants of academic success and psychological health, and their inclusion in predictive models aligns with the objective of early identification and intervention. Moreover, these variables are conducive to teacher intervention within classroom settings, enhancing their practical utility as potential screening tools.

*Perseverance*, often characterised by sustained effort and resilience in the face of challenges, has been consistently linked to academic achievement across various educational contexts. Empirical research indicates that students who demonstrate higher levels of perseverance are more likely to exhibit positive learning outcomes, such as improved grades, higher academic motivation, and increased engagement in academic tasks (Wolters & Hussain, 2015; Xu et al., 2023). Additionally, perseverance plays an important role in fostering resilience, which enables students to navigate setbacks and persist in the pursuit of academic goals (Vinothkumar & Prasad, 2016).

Academic self-concept refers to students' perceptions of their academic abilities, competence, and worthiness in educational domains (Marsh, 1990). Extensive empirical evidence suggests a strong association between academic self-concept and academic achievement, with positive self-perceptions correlating positively with academic performance and motivation (Marsh & Martin, 2011). Students with positive academic self-concept are more likely to set challenging goals, exhibit greater effort in learning tasks, and persevere in the face of academic challenges. Conversely, negative academic self-concept has been linked to decreased academic engagement, lower academic aspirations, and diminished academic performance.

*Cognitive engagement* encompasses students' active involvement, investment, and effort in learning activities, reflecting the quality of their cognitive processing and participation in academic tasks

(Fredricks et al., 2004). Research indicates a robust relationship between cognitive engagement and academic achievement, with higher levels of engagement predicting superior learning outcomes and academic performance (Lei et al., 2018). Engaged students demonstrate deeper understanding, critical thinking skills, and mastery of academic content, leading to enhanced academic success. Moreover, cognitive engagement has been associated with positive affective states, such as interest, enjoyment, and intrinsic motivation, which further contribute to academic persistence and achievement.

*Peer and school belonging* encompass students' sense of connectedness, acceptance, and affiliation within their peer groups and school environment. Empirical evidence highlights the significant impact of peer and school belonging on students' academic achievement and psychological wellbeing. Students who perceive a strong sense of belonging within their peer networks and school community are more likely to experience positive academic outcomes, including higher academic motivation, engagement, and achievement (Kiefer et al., 2015; Slaten et al., 2016). Conversely, feelings of social isolation, rejection, or alienation have been associated with academic disengagement, lower academic performance, and increased risk of mental health concerns (Buhs et al., 2006).

*Engagement/flow* represents a state of optimal experience characterised by deep absorption, focused concentration, and heightened enjoyment during challenging activities. Empirical research suggests that experiencing flow in learning tasks is associated with enhanced academic performance, creativity, and intrinsic motivation (Csikszentmihalyi, 1990; Shernoff et al., 2003). Students who enter a state of flow demonstrate increased sustained attention and heightened productivity, leading to improved learning outcomes and academic achievement (Csikszentmihalyi & Csikszentmihalyi, 1992).

*Emotion regulation* refers to the ability to monitor, evaluate, and modulate one's emotional responses in accordance with situational demands and goals. Extensive empirical evidence highlights the key role of emotion regulation in academic achievement and psychological wellbeing (Gross, 2015). Effective emotion regulation strategies enable students to cope with academic stressors, manage negative emotions, and maintain adaptive functioning in academic settings. Research indicates that students who exhibit strong emotion regulation skills demonstrate higher levels of academic performance and resilience (Berking et al., 2008; Grazanio et al., 2007). Conversely, deficits in emotion regulation have been associated with academic difficulties and emotional distress (Gross, 2002).

*Worries* encompass students' concerns, anxieties, or apprehensions about academic tasks, performance expectations, or future outcomes. Empirical studies have consistently demonstrated a negative association between excessive worries and academic achievement, with persistent worrying

interfering with cognitive functioning, attentional processes, and academic performance (Eysenck et al., 2007; Owens et al., 2012; Lauermann et al., 2017). Students who experience high levels of worries may exhibit decreased concentration, impaired problem-solving abilities, and avoidance behaviours, which can undermine their academic success. Moreover, chronic worrying has been linked to heightened levels of stress, anxiety, and psychological distress, further compromising students' overall wellbeing and mental health (Anniko et al., 2019; Gregory et al., 2021a).

*Perfectionistic concerns* pertain to students' preoccupation with meeting excessively high standards, avoiding mistakes, and fulfilling external expectations or perceived obligations. Research shows that perfectionistic concerns are associated with maladaptive academic behaviours, such as procrastination, fear of failure, and self-criticism, which can impede academic performance and achievement (Madigan, 2019). Students who harbor perfectionistic concerns may engage in rigid, inflexible thinking patterns, setting unattainable goals and experiencing heightened levels of stress and anxiety in pursuit of academic success. Perfectionistic concerns have also been linked to decreased psychological wellbeing, including symptoms of depression and anxiety (Castro et al., 2017; Kahn et al., 2022; Zeifman et al., 2020).

*Resilience* refers to students' capacity to adapt, bounce back, and thrive in the face of adversity, setbacks, or stressors. A large body of research underscores the importance of resilience in predicting academic achievement and psychological wellbeing among students (Hunsu et al., 2023; Sakiz & Aftab, 2019). Resilient individuals demonstrate greater perseverance, problem-solving skills, and optimism, enabling them to navigate academic challenges and setbacks more effectively. Research suggests that resilient students exhibit higher levels of academic engagement, motivation, and achievement, even in the presence of academic stressors or adverse circumstances (Ayala & Manzano, 2018; Nota et al., 2004). Additionally, resilience serves as a protective factor against the development of mental health problems, buffering the impact of stress and adversity on students' psychological wellbeing (Southwick et al., 2014).

*Hope/agency*, marked by a sense of personal agency, directed goal setting, and confidence in one's capability to pursue and attain desired objectives, can influence students' academic success (Stenalt & Lassesen, 2022; Day et al., 2010). Hopeful individuals are more likely to set challenging academic goals and persist in the face of obstacles to achieve their aspirations (Marques et al., 2014). Hope/agency serves as a determinant of psychological wellbeing, fostering resilience, optimism, and proactive coping strategies in the face of adversity. Individuals with a strong sense of hope/agency are better equipped to navigate life's challenges, maintain a positive outlook, and cultivate adaptive responses to stressors.

These variables were examined individually to assess their predictive capabilities within the domains of academic success and wellbeing. Note that correlational associations between the WEC domains/subdomains on to later wellbeing and academic outcomes have already been evidenced (Grace et al., 2022; Gregory et al., 2021b). This report sought to determine if these domains/subdomains can discriminate between students who will, from those who will not, have later academic and wellbeing concerns at a level that would reach individual diagnostic criteria. Additionally, we explored the combined impact of some of these variables, recognising the interconnectedness within the theoretical framework of *self-regulated learning* (SRL). Perseverance, academic self-concept and cognitive engagement are all key components of SRL, which refers to the ability to set goals, monitor progress, and adjust strategies to achieve those goals effectively (Zimmerman & Schunk, 2008).

Perseverance involves the ability to persist in the face of challenges and setbacks. In the context of self-regulated learning, perseverance plays an important role in maintaining effort and motivation over time, especially when learning tasks become difficult or complex (Wolters & Won, 2017). Students who possess a strong sense of perseverance are more likely to persist in their learning efforts, even when they encounter obstacles or encounter failures along the way. They understand that setbacks are a natural part of the learning process and are willing to put in the necessary time and effort to overcome them.

Cognitive engagement is a central component of self-regulated learning because it involves the use of metacognitive strategies, such as planning, monitoring, and evaluating one's learning progress (Li & Lajoie, 2022). Learners who are cognitively engaged are better able to regulate their learning behaviours and adapt their strategies as needed to achieve their learning goals.

Academic self-concept is also intricately linked to SRL (Burnette et al., 2013). Students with positive academic self-concept tend to set challenging yet attainable goals, driven by intrinsic motivation and confidence in their abilities. This positive perception influences their engagement in metacognitive processes, such as planning, monitoring, and adjusting learning strategies, leading to more effective self-regulation. Additionally, a positive academic self-concept promotes attributions of success to internal factors like effort and ability, enhancing motivation and persistence in the face of challenges.

### Methods

#### Data source

Administratively linked longitudinal data was provided by the Department for Education, whereby students annual WEC and academic data was joined at an individual level. This enabled us to determine if a student's WEC responses in the earlier school years predicted their WEC and academic outcomes in their later school years. For example, did a student's WEC results in Year 4 predict their NAPLAN results in Year 5, or did a student's WEC results in Year 10 predict their WEC results in Year 11 and Year 12? The longitudinal analytical sample included 7925 students; however, these were not complete cases and in some of the analyses presented below the samples are significantly smaller (ranging from 2251 to 6280).

The following scales from the WEC were used in the analyses.

For Year 5 through to Year 9 students:

- Perseverance
- Academic self-concept
- Cognitive engagement
- Engagement/Flow
- Peer belonging
- School belonging
- Emotion regulation
- Worries
- Self-regulated learning (SRL): Perseverance + Academic self-concept + Cognitive engagement

For Year 11 and Year 12 students:

- Emotion regulation
- Worries
- Peer belonging
- School belonging
- Perseverance
- Perfectionistic concerns (Meeting expectations) (Year 10)
- Resilience (Year 10)
- Hope/agency (Year 10)

#### Data analysis

We conducted a comprehensive set of analyses to evaluate the performance of WEC items to predict students' academic achievement and wellbeing using Receiver Operating Characteristic (ROC) curves as our main tool. A ROC curve is a graphical representation commonly used in binary classification to assess the diagnostic performance of a test. It illustrates the diagnostic ability of a binary classifier system as its discrimination threshold is varied.

It assesses the trade-off between *sensitivity*, which measures the ability to correctly identify individuals with the condition, and *specificity*, which measures the ability to correctly identify individuals without the condition. By varying the threshold for classifying individuals as positive or negative, the curve illustrates how sensitivity and specificity change.

The Area Under the Curve (AUC) serves as a widely accepted measure of diagnostic test accuracy. A ROC curve plotted closer to the upper left corner of the graph indicates higher test accuracy, as this position signifies perfect sensitivity (1) and specificity (1). In an ideal scenario, the AUC would equal 1.0. When the true positive rate equals the false positive rate (i.e., a 1:1 ratio), the ROC curve aligns with the 45° diagonal of the graph, resulting in an AUC of 0.5. This situation mirrors random guessing, similar to a coin toss, rendering the diagnostic tool meaningless. Therefore, for a diagnostic technique to hold significance, its AUC must exceed 0.5. A general threshold of 0.7 and above is deemed to have adequate diagnostic capability, suggesting the potential for tailored interventions at the individual level. This analytical approach enables us to determine if the WEC domains can individually identify children that require additional support, offering actionable criteria for both targeted individual intervention and potential adjustments in teaching practices.

#### Results

The following tables summarise the AUC for different year levels. The results have been colour-coded, with darker cells indicating stronger predictive power. AUC values larger than 0.7 (deemed predictive) were only observed for worries predicting distress a year prior (i.e., Year 10 worries predicting Year 11 distress, and Year 11 worries predicting Year 12 distress). Detailed analyses can be found in the Appendix.

#### Year 5 numeracy and reading

	Y4	Y4 Academic	Y4 Cognitive	Y4	Y4 Peer	Y4 School	Y4 Emotion	Y4 Worries	Y4 SRL
	Perseverance	self-concept	Engagement	Engagement	belonging	belonging	regulation	(R)	
				/ Flow					
Year 5	0.58	0.53	0.55	0.50	0.53	0.50	0.49	0.58	0.57
Numeracy									
Year 5	0.58	0.53	0.56	0.48	0.51	0.50	0.49	0.56	0.57
Reading									

Table 1: AUC for Year 5 Numeracy and Reading based on Year 4 WEC data. (R) indicates reverse coded items.

#### Year 9 numeracy and reading

Table 2: AUC for Year 9 Numeracy and Reading based on Year 6 WEC data. (R) indicates reverse coded items.

	Y6	Y6 Academic	Y6 Cognitive	Y6	Y6 Peer	Y6 School	Y6 Worries (R)	Y4 SRL
	Perseverance	self-concept	Engagement	Engagement /	belonging	belonging		
				Flow				
Year 9	0.59	0.55	0.58	0.50	0.53	0.53	0.55	0.59
Numeracy								
Year 9	0.58	0.56	0.58	0.49	0.54	0.53	0.53	0.59
Reading								

	Y7	Y7 Academic	Y7 Cognitive	Y7	Y7 Peer	Y7 School	Y7 Emotion	Y7 Worries	Y7 SRL
	Perseverance	self-concept	Engagement	Engagement/	belonging	belonging	regulation	(R)	
				Flow					
Year 9	0.62	0.58	0.60	0.52	0.55	0.56	0.52	0.55	0.63
Numeracy									
Year 9	0.61	0.59	0.60	0.50	0.54	0.55	0.51	0.53	0.63
Reading									

Table 3: AUC for Year 9 Numeracy and Reading based on Year 7 WEC data. (R) indicates reverse coded items.

Table 4: AUC for Year 9 Numeracy and Reading based on Year 8 WEC data. (R) indicates reverse coded items.

	Y8	Y8 Academic	Y8 Cognitive	Y8	Y8 Peer	Y8 School	Y8 Emotion	Y8 Worries	Y8 SRL
	Perseverance	self-concept	Engagement	Engagement/	belonging	belonging	regulation	(R)	
				Flow					
Year 9	0.60	0.60	0.61	0.52	0.55	0.55	0.52	0.53	0.61
Numeracy									
Year 9	0.59	0.60	0.59	0.50	0.52	0.52	0.50	0.50	0.60
Reading									

#### Year 11 and Year 12 distress

Table 5: AUC for Year 11 distress based on Year 7 WEC data. (R) indicates reverse coded items. There is no available data for emotion regulation in 2016.

	Y7 Emotion regulation (R)	Y7 Worries	Y7 Peer belonging (R)	Y7 School belonging (R)	Y7 Perseverance (R)
Year 11 Distress	0.57	0.63	0.59	0.61	0.54
Year 12 Distress	N/A	0.62	0.57	0.59	0.55

#### Table 6: AUC for Year 11 and Year 12 distress based on Year 8 WEC data. (R) indicates reverse coded items.

	Y8 Emotion regulation (R)	Y8 Worries	Y8 Peer belonging (R)	Y8 School belonging (R)	Y8 Perseverance (R)
Year 11 Distress	0.60	0.66	0.61	0.62	0.57
Year 12 Distress	0.61	0.64	0.61	0.62	0.57

#### Table 7: AUC for Year 11 and Year 12 distress based on Year 9 WEC data. (R) indicates reverse coded items.

	Y9 Emotion regulation	Y9 Worries	Y9 Peer belonging (R)	Y9 School belonging (R)	Y9 Perseverance (R)
	(R)				
Year 11 Distress	0.63	0.68	0.63	0.66	0.58
Year 12 Distress	0.62	0.67	0.62	0.63	0.58

Table 8: AUC for Year 11 and Year 12 distress based on Year 10 WEC data. (R) indicates reverse coded items.

	Y10 Emotion	Y10 Worries	Y10 Peer	Y10 School	Y10	Y10 Hope	Y10 Resilience	Y10
	regulation		belonging (R)	belonging (R)	Perseverance	agency (R)	(R)	Perfectionistic
	(R)				(R)			concerns
Year 11 Distress	0.65	0.72	0.65	0.67	0.61	0.64	0.67	0.68
Year 12 Distress	0.59	0.68	0.63	0.61	0.59	0.61	0.62	0.63

	Y11 Emotion	Y11 Worries	Y11 Peer	Y11 School	Y11	Y11 Hope	Y11 Resilience	Y11
	regulation		belonging (R)	belonging (R)	Perseverance	agency (R)	(R)	Perfectionistic
	(R)				(R)			concerns
Year 12 Distress	0.63	0.73	0.65	0.66	0.62	0.64	0.68	0.66

Table 9: AUC for Year 11 and Year 12 distress based on Year 11 WEC data. (R) indicates reverse coded items.

#### Discussion

This project aimed to evaluate the potential of Wellbeing Engagement Collection (WEC) items as effective screening tools for predicting mental health concerns and academic underachievement among South Australian students. The results did not reveal diagnostic predictive thresholds for mental health concerns or academic underachievement using the selected WEC scales, except for the Worries domain.

The analysis demonstrated that the Area Under the Curve (AUC) values larger than 0.7—considered indicative of diagnostic predictive power—were observed for worries predicting distress a year prior. Specifically, Year 10 worries predicted Year 11 distress, and Year 11 worries predicted Year 12 distress. These findings suggest that while there is predictive capability in specific contexts, the overall predictive power of WEC items as an individually diagnostic tool for mental health and academic outcomes at an individual level remains limited.

Assessing mental health and academic performance through a single screening tool such as the WEC is inherently complex. Mental health and academic performance are multifaceted constructs influenced by a myriad of social, psychological, biological, and environmental factors. These factors interact in ways that are challenging to capture comprehensively with a single tool. For instance, a student's mental health can be affected by family dynamics, socio-economic status, and individual psychological resilience, while academic performance can be influenced by teaching quality, peer relationships, and intrinsic motivation. Thus, a more nuanced approach that incorporates multiple assessment methods and sources of information may be necessary to accurately identify individual students at risk.

While WEC items provide valuable insights into cognitive and emotional variables such as perseverance, cognitive engagement, emotion regulation, and resilience, their discriminatory power to identify individuals for later concerns is limited when used in isolation. Further the constructs collected in the WEC, though important, do not encompass all the factors that contribute to mental health and academic outcomes. For example, a student may exhibit high levels of perseverance and resilience but still struggle academically due to unaddressed learning disabilities or external stressors. Other significant factors not captured by the WEC, such as socio-economic status, family environment, and personal life events, are also likely to play crucial roles in determining student outcomes.

#### Implications and recommendations

The findings have important implications for practice and policy. It is not recommended that educators rely solely on the WEC items as a screening tool for identifying individual students at risk of academic underachievement or low wellbeing. Instead, a comprehensive approach that integrates multiple assessment methods and considers contextual factors is recommended. Additionally, these findings underscore the need for ongoing collaboration between educators, mental health professionals and researchers to refine screening and assessment practices and develop evidence-based interventions that support students' wellbeing and academic success effectively.

#### Recommendations

- 1. Comprehensive assessment approach: Given the findings of our study, it is recommended that caution be exercised in relying solely on the WEC items and scales to identify wellbeing concerns and academic underachievement in children. Instead, a comprehensive approach incorporating multiple assessment methods and sources of information is essential. Using a variety of assessment tools can capture a broader spectrum of student experiences and behaviours. These methods might include standardised psychological assessments, teacher observations, parent and student interviews, and academic performance records. By integrating data from diverse sources, educators can form a more holistic view of each student's wellbeing and academic standing. This approach will provide a more accurate and nuanced understanding of students' needs, allowing for better-targeted interventions.
- 2. Holistic approaches in educational settings: In educational settings holistic approaches should be prioritised to support students' wellbeing and academic success. While the WEC provides valuable insights into cognitive and emotional variables at the population level, it is not suited for individual diagnosis. Instead, it should be complemented with other evidence-based practices and interventions tailored to the individual needs of students. This may include personalised support strategies, additional resources, and collaboration with mental health professionals.
- 3. Collaborative efforts: While teachers may play a role in identifying students who may need additional support, it is important to involve mental health professionals in the assessment and intervention process to ensure that students receive appropriate and effective support tailored to their individual needs. Teachers already have demanding responsibilities related to classroom instruction, student support, and curriculum planning. Adding the responsibility of administering psychological screenings may place an additional burden on teachers and detract from their primary role in education. Ongoing collaboration between teachers, mental

health professionals and researchers is necessary to advance our understanding of children's wellbeing and academic outcomes. By working together, these stakeholders can develop more effective strategies for promoting positive outcomes and addressing the diverse needs of every student. Such collaboration can also facilitate the integration of research findings into practical applications within educational settings.

- 4. Purpose and scope of the WEC: It is important to acknowledge that the WEC was not originally designed as an individual diagnostic tool. Confidence in the continued use of the WEC as a population measure is warranted as it is a validated and reliable instrument. The WEC is psychometrically sound and performs as a robust population measure of wellbeing. Recognising the intended use of WEC can help ensure its appropriate application and promote the importance of student wellbeing.
- 5. Identification of suitable individual diagnostic tools: To find a single instrument suitable for individual-level diagnosis, a literature search should be conducted to identify tools with demonstrated sensitivity and specificity. For example, instruments like the Kessler Psychological Distress Scale (K10) are used as first-line screening tools in clinical settings. Despite the K10's higher precision and greater information content, ROC analyses on *adult data* revealed that it did not significantly outperform the K6 in discriminating between DSM-IV cases and non-cases (Kessler et al., 2002). This means that if the primary aim is to quickly screen for psychological distress without requiring detailed differentiation, the K6 can be a practical and effective choice. However, the applicability and predictive validity of existing tools for younger children needs further investigation. Should a diagnostic instrument be desired for use in the education system, then future research should focus on identifying similar instruments appropriate for earlier school years, considering the greater variability in young children in terms of behaviours, emotions and developmental trajectories compared to older individuals.
- 6. Caution against regular pulse checks: While the Department for Education is exploring the use of regular pulse checks to monitor student wellbeing, it is important to approach their implementation with care. Pulse checks can provide an overview of student wellbeing, potentially identifying trends and flagging areas of concern at a population level. However, at this stage, their use for individual diagnosis is not recommended because of the lack of demonstrated sensitivity and specificity. Unlike the WEC, pulse checks results are provided to the teachers in real time for individual students and thus prompting action for individual children. Despite their ability to offer quick snapshots of student wellbeing, they do not possess the depth and specificity required for precise individual diagnosis or support. These

checks may identify general trends or immediate concerns but do not allow educators to diagnose complex mental health issues or predict academic underachievementaccurately. Moreover, the results of pulse checks can be influenced by numerous factors, such as the student's mood on the day of the check, recent events, or even the specific phrasing of questions. This variability can lead to inconsistent data, making it challenging to draw reliable conclusions about a student's overall wellbeing or academic prospects. Another limitation is linked to their focus on immediate, observable indicators of wellbeing rather than the underlying causes. They may identify that a student is feeling stressed or disengaged but not why. Without understanding the root causes, it is difficult for educators to design effective interventions and deciding when to act. Additionally, implementing regular pulse checks can be resource-intensive, requiring significant time and effort from educators and support staff. Interpreting the results and following up with appropriate interventions add to the workload, potentially diverting resources from other important activities. Finally, another risk associated with pulse checks is that their frequency may inadvertently normalise expressions of distress, potentially causing students to become desensitised to these measures. Over time, they may start to view these checks as routine rather than opportunities for genuine support.

#### Conclusion

In summary, while the WEC items provide valuable insights into certain cognitive and emotional aspects at the population level, unsurprisingly their ability to predict mental health concerns and academic underachievement is limited when used in isolation at the individual level. A multifaceted approach that incorporates various assessment methods and considers the complex interplay of multiple factors is recommended for accurately identifying and supporting students at risk. Our findings emphasise the need for comprehensive assessment strategies in educational settings to ensure early and effective interventions for student wellbeing and academic success.

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## Appendix

## NAPLAN numeracy SEA in Year 5 based on their Year 4 WEC data

### PERSEVERANCE

#### NAPLAN numeracy (Year 5)





## ACADEMIC SELF CONCEPT

## NAPLAN numeracy (Year 5)

#### **SEA NAPLAN**

	No	Yes
Level		
Low	130	309
Medium	383	1289
High	1160	4746



## **COGNITIVE ENGAGEMENT**

#### NAPLAN numeracy (Year 5)







### **ENGAGEMENT FLOW**

## NAPLAN numeracy (Year 5)

#### **SEA NAPLAN**

	No	Yes
Level		
Low	510	1754
Medium	608	2505
High	582	2086



### PEER BELONGING

### NAPLAN numeracy (Year 5)







## **SCHOOL BELONGING**

### NAPLAN numeracy (Year 5)





## **EMOTION REGULATION**

### NAPLAN numeracy (Year 5)

#### **SEA NAPLAN**





### WORRIES

### NAPLAN numeracy (Year 5)







## Calculated SRL variable

## NAPLAN numeracy (Year 5)

#### **SEA NAPLAN**

No Y	es
------	----

Level		
Low	414	1296
Medium	492	2188
High	322	1956



## NAPLAN reading SEA in Year 5 based on their Year 4 WEC data

### PERSEVERANCE

NAPLAN reading (Year 5)





## ACADEMIC SELF CONCEPT

## NAPLAN reading (Year 5)





Level			
Low	114	324	
Medium	311	1361	
High	921	4986	


## **COGNITIVE ENGAGEMENT**

### NAPLAN reading (Year 5)







### **ENGAGEMENT FLOW**

### NAPLAN reading (Year 5)





### PEER BELONGING

### NAPLAN reading (Year 5)







## **SCHOOL BELONGING**

### NAPLAN reading (Year 5)





## **EMOTION REGULATION**

### NAPLAN reading (Year 5)





## WORRIES

## NAPLAN reading (Year 5)

SEA NAPLAN No Yes Level Low 574 3457 Medium 441 2098 High 352 1185



# Calculated SRL variable

## NAPLAN reading (Year 5)

	No	Yes	
Level			
Low	345	1364	
Medium	369	2311	
High	263	2016	



# NAPLAN numeracy SEA in Year 9 based on their Year 6 WEC data

### PERSEVERANCE





## ACADEMIC SELF CONCEPT







## **COGNITIVE ENGAGEMENT**







### **ENGAGEMENT FLOW**







### PEER BELONGING







## **SCHOOL BELONGING**

### NAPLAN numeracy (Year 9)





## WORRIES



Low	599	1989
Medium	404	1122
High	399	867



# **Calculated SRL variable**

## NAPLAN numeracy (Year 9)

	No	Yes
Level		
Low	587	1226
Medium	379	1315
High	242	1124



# NAPLAN reading SEA in Year 9 based on theirYear 6 WEC data

### PERSEVERANCE

NAPLAN reading (Year 9)





## ACADEMIC SELF CONCEPT

### NAPLAN reading (Year 9)





## **COGNITIVE ENGAGEMENT**

### NAPLAN reading (Year 9)







### **ENGAGEMENT FLOW**

### NAPLAN reading (Year 9)





### PEER BELONGING

### NAPLAN reading (Year 9)





## **SCHOOL BELONGING**

### NAPLAN reading (Year 9)





## WORRIES

## NAPLAN reading (Year 9)





# **Calculated SRL variable**

#### NAPLAN reading (Year 9)





# NAPLAN numeracy SEA in Year 9 based on theirYear 7 WEC data

### PERSEVERANCE





## ACADEMIC SELF CONCEPT

### NAPLAN numeracy (Year 9)





## **COGNITIVE ENGAGEMENT**

### NAPLAN numeracy (Year 9)





596

High

2366



### **ENGAGEMENT FLOW**

### NAPLAN numeracy (Year 9)





### PEER BELONGING

### NAPLAN numeracy (Year 9)





## **SCHOOL BELONGING**

### NAPLAN numeracy (Year 9)





## **EMOTION REGULATION**

### NAPLAN numeracy (Year 9)





## WORRIES

SEA	NAPL	AN
	No	Vac

	INO	res
Level		
Low	627	2075
Medium	426	1152
High	407	858



## **Calculated SRL variable**





# NAPLAN reading SEA in Year 9 based on their Year 7 WEC data

### PERSEVERANCE

#### NAPLAN reading (Year 9)





## ACADEMIC SELF CONCEPT

### NAPLAN reading (Year 9)





## **COGNITIVE ENGAGEMENT**

### NAPLAN reading (Year 9)





### **ENGAGEMENT FLOW**

### NAPLAN reading (Year 9)




### PEER BELONGING

### NAPLAN reading (Year 9)





## **SCHOOL BELONGING**

## NAPLAN reading (Year 9)



Level			
Low	362	719	
Medium	407	1051	
High	709	2207	



## **EMOTION REGULATION**

### NAPLAN reading (Year 9)





## WORRIES

### NAPLAN reading (Year 9)





# **Calculated SRL variable**

### NAPLAN reading (Year 9)





# NAPLAN numeracy SEA in Year 9 based on theirYear 8 WEC data

### PERSEVERANCE

NAPLAN numeracy (Year 9)





## ACADEMIC SELF CONCEPT

### NAPLAN numeracy (Year 9)





## **COGNITIVE ENGAGEMENT**

## NAPLAN numeracy (Year 9)





Level		
Low	411	567
Medium	706	1987
High	460	2131



### **ENGAGEMENT FLOW**

### NAPLAN numeracy (Year 9)





### PEER BELONGING

### NAPLAN numeracy (Year 9)





## **SCHOOL BELONGING**

### NAPLAN numeracy (Year 9)





## **EMOTION REGULATION**

### NAPLAN numeracy (Year 9)





## WORRIES

## NAPLAN numeracy (Year 9)

### **SEA NAPLAN**

No Yes

Level		
Low	590	2025
Medium	605	1651
High	425	1068



# **Calculated SRL variable**

### NAPLAN numeracy (Year 9)



# NAPLAN reading SEA in Year 9 based on their Year 8 WEC data

### PERSEVERANCE

NAPLAN reading (Year 9)





## ACADEMIC SELF CONCEPT

# NAPLAN reading (Year 9)



Level		
Low	268	348
Medium	621	1356
High	763	2954



## **COGNITIVE ENGAGEMENT**

# NAPLAN reading (Year 9)

#### **SEA NAPLAN**

No Yes

Level			
Low	394	584	
Medium	723	1970	
High	508	2083	



### **ENGAGEMENT FLOW**

### NAPLAN reading (Year 9)





### PEER BELONGING

### NAPLAN reading (Year 9)





## **SCHOOL BELONGING**

### NAPLAN reading (Year 9)



Low	455	1096
Medium	680	1989
High	505	1539



## **EMOTION REGULATION**

### NAPLAN reading (Year 9)





## WORRIES

## NAPLAN reading (Year 9)

9	SEA NAPLAN		
	No	Yes	
Level			
Low	689	1926	
Medium	601	1655	
High	381	1112	



# **Calculated SRL variable**

## NAPLAN reading (Year 9)

**SEA NAPLAN** 

No Yes

Level

Low	805	1615
Medium	480	1863
High	148	828



# Year 11 Distress based on their Year 7 WEC data

## **EMOTION REGULATION**







### WORRIES





### PEER BELONGING





## **SCHOOL BELONGING**





## PERSEVERANCE





# Year 11 Distress based on their Year 8 WEC data

# **EMOTION REGULATION**





## WORRIES



### PEER BELONGING

Level

## Distress Scale (Year 11)

Distress No Yes



# **SCHOOL BELONGING**



## PERSEVERANCE

# Distress Scale (Year 11)

Distress No Yes



# Year 11 Distress based on their Year 9 WEC data

# **EMOTION REGULATION**





## WORRIES

### **Distress Scale (Year 11)**

Distress No Yes Level Low 1585 107 Medium 1422 221

High 882 358



### PEER BELONGING

Level

## Distress Scale (Year 11)

Distress No Yes


# **SCHOOL BELONGING**





# PERSEVERANCE



# Year 11 Distress based on their Year 10 WEC data

# **EMOTION REGULATION**





# WORRIES





# **PEER BELONGING**

Level Low

High

# Distress Scale (Year 11)



# **SCHOOL BELONGING**

### **Distress Scale (Year 11)**

Level Low

High



# PERSEVERANCE

Level Low

High

Distress Scale (Year 11)

Distress No Yes

720 258 Medium 2099 344 1864 215 1.0 True Positive Rate (Positive label: 1) 0.8 0.6 0.4 0.2 Classifier (AUC = 0.61) 0.0 0.8 0.0 0.2 0.4 0.6 1.0 False Positive Rate (Positive label: 1)

# **HOPE/AGENCY**

Level

# Distress Scale (Year 11)



# RESILIENCE

# Distress Scale (Year 11)

Distress No Yes

Level

Low	1402	506
Medium	2624	263
High	536	29



# **PERFECTIONISTIC CONCERNS**

104

# Distress Scale (Year 11)

Distress No Yes

Level Low 1568 Medium 2460

Weuluin	2168	301
High	917	406



# Year 12 Distress based on their Year 7 WEC data

# WORRIES

	Distress		
	No Yes		
Level			
Low	1510	161	
Medium	871	162	
High	603	186	



# PEER BELONGING

### **Distress Scale (Year 12)**



False Positive Rate (Positive label: 1)

# **SCHOOL BELONGING**

### **Distress Scale (Year 12)**

Level Low

High



# PERSEVERANCE

# Distress Scale (Year 12)

Distress No Yes Level Low 671 155 Medium 1066 178 High 1256 176



# Year 12 Distress based on their Year 8 WEC data

# **EMOTION REGULATION**





# WORRIES



# PEER BELONGING

Level

# Distress Scale (Year 12)



# **SCHOOL BELONGING**

# Distress Scale (Year 12)

Level



# PERSEVERANCE





# Year 12 Distress based on their Year 9 WEC data

# **EMOTION REGULATION**





# WORRIES

Distress Scale (Year 12)

Distress

No Yes Level Low <mark>1340</mark> 98 <mark>1178</mark> 184 Medium 690 259 High 1.0 True Positive Rate (Positive label: 1) 0.8 0.6 0.4 0.2 Classifier (AUC = 0.67) 0.0 0.0 0.2 0.4 0.6 0.8 1.0 False Positive Rate (Positive label: 1)

# PEER BELONGING

Level

# Distress Scale (Year 12)



# **SCHOOL BELONGING**

# Distress Scale (Year 12)



# PERSEVERANCE

# Distress Scale (Year 12)

Level		
Low	400	136
Medium	1432	231
High	1391	177



# Year 12 Distress based on their Year 10 WEC data

# **EMOTION REGULATION**





# WORRIES

# Distress Scale (Year 12)

0.0

0.0

0.2

0.4

False Positive Rate (Positive label: 1)



Classifier (AUC = 0.68)

0.8

1.0

0.6

# PEER BELONGING

Level

# Distress Scale (Year 12)



# **SCHOOL BELONGING**

# Distress Scale (Year 12)

Level



# PERSEVERANCE

# Distress Scale (Year 12)



# **HOPE/AGENCY**

# Distress Scale (Year 12)

Distress



# RESILIENCE

# Distress Scale (Year 12)



# PERFECTIONISTIC CONCERNS



# Year 12 Distress based on their Year 11 WEC data

# **EMOTION REGULATION**





# WORRIES





# PEER BELONGING

### **Distress Scale (Year 12)**



# **SCHOOL BELONGING**

### **Distress Scale (Year 12)**

Level Low


### PERSEVERANCE

#### **Distress Scale (Year 12)**

Distress No Yes Level Low 550 205 Medium 1727 283 High 1690 181



# **HOPE/AGENCY**

#### **Distress Scale (Year 12)**

Distress No Yes



## RESILIENCE

#### **Distress Scale (Year 12)**

0.0

0.0

0.2

0.4

False Positive Rate (Positive label: 1)

0.6

0.8

1.0



## **PERFECTIONISTIC CONCERNS**

## Distress Scale (Year 12)

	Distress		
	No Yes		
Level			
Low	1347	84	
Medium	1743	278	
High	835	302	

