



# **Coping with university education: The relationships of time management behaviour and work engagement with the five factor model aspects**

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## Abstract

We examined the construct validity of time management behaviour and work engagement, defined as a positive work-related state of mind. Two-hundred and eighty-one participants completed the Time Management Behaviour Scale, the Utrecht Work Engagement Scale - Student Version, and the Big Five Aspect Scales. Linear regression analyses revealed that Time Management Behaviour was positively predicted by the Conscientiousness aspects, Industriousness and Orderliness. Work Engagement variables were also predicted by Industriousness, and both aspects of Openness/Intellect. Openness significantly predicted Vigor and Dedication, while Intellect predicted Absorption. These findings indicate that those higher in both time management behaviour and work engagement are more likely to use time effectively and minimise distractions. While individuals higher on time management behaviour are more likely to work in an orderly fashion, individuals higher in work engagement might be quicker to understand information. The implications for supporting students at university to learn more effectively are discussed in light of these findings.

ABSTRACT WORD COUNT: 154

KEYWORDS: big five aspects; time management behaviour; work engagement; construct validity; self-regulated learning

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## **1. Coping with University Education: The Relationships of Time Management**

### **Behaviour and Work Engagement with the Five Factor Model Aspects**

Using time more efficiently is widely assumed to be a key skill for students (Claessens, van Eerde, Rutte, & Roe, 2007; Kelly & Johnson, 2005; MacCann, Fogarty, & Roberts, 2012). However, the evidence indicating that students who plan their time achieve better grades is mixed (Britton & Tesser, 1991; Burt & Kemp, 1994; Macan, Shahani, Dipboye, & Phillips, 1990; Trueman & Hartley, 1996). In contrast, university students who engage more with their studies might achieve higher grades (Salamonson et al., 2013). A number of interventions have been designed to improve university students' engagement with their studies (Wolters & Hoops, 2015). However, personality traits might confer a higher likelihood of using self-regulated learning strategies in the first place. The aim of this study was to examine the trait antecedents of Time Management Behaviour (Macan et al., 1990) and Work Engagement (Schaufeli, Salanova, Gonzalez-Roma, & Bakker, 2002b), in order to determine which students might benefit more from self-regulated learning interventions. A secondary aim of this study was to establish evidence for the discriminant validity of both constructs in a tertiary student sample.

#### **1.1. Work Engagement**

Work engagement is defined by Schaufeli et al. (2002b) as a "...positive, fulfilling, work-related state of mind" (p. 74). Work engagement consists of three affective-cognitive states. *Vigor* is characterised by high levels of mental resilience while working, a willingness to invest effort in work, and persistence with work activities. *Dedication* refers to a sense of enthusiasm, pride, and challenge towards work. *Absorption* refers to being concentrated and engrossed in work. Schaufeli et al. (2002b) found that all three work engagement constructs were negatively associated with the three dimensions of burnout (emotional exhaustion, depersonalisation, and lack of personal accomplishment) in both student and employed

samples. Vigor was positively associated with academic performance as measured by the number of exams passed (Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002a).

### **1.2. Time Management Behaviour**

Claessens et al. (2007) defined time management behaviour as “behaviours that aim at achieving an effective use of time while performing certain goal-directed activities” (p. 36). It can be broken down into the behaviours of planning tasks, prioritising, making to-do lists, and limiting the influence of interruptions. A recent review indicated that time management has an unclear relationship with student learning outcomes (Claessens et al., 2007). Some evidence indicates that time management behaviours are related to cumulative grade point average (Britton & Tesser, 1991; Hamdan, Nasir, Rozainee, & Sulaiman, 2013; Macan et al., 1990; MacCann et al., 2012).

### **1.3. Self-Regulated Learning and Personality Functioning**

Time Management Behaviour and Work Engagement are both examples of processes underlying self-regulated learning. Self-regulated learning has been defined as the self-beliefs and self-directive processes that enable learners to transform their mental abilities into an academic performance skill (Zimmerman, 2008). Zimmerman (1990) described self-regulated learners as students who “...plan, set goals, organise, self-monitor, and self-evaluate...report high self-efficacy, self-attributions, and intrinsic task interest” (pp. 4-5). According to the work of Pintrich and colleagues (Pintrich, 2004; Pintrich & De Groot, 1990; Pintrich, Wolters, & Baxter, 2000; Pintrich & Zusho, 2002; Wolters, 2003; Wolters, Pintrich, & Karabenick, 2005), self-regulated learning includes at least four areas of learning. Of these four, the motivation and behaviour areas are directly relevant to the current study. Motivation refers to the process through which goal-directed behaviour is initiated and sustained, as well as an individual’s willingness to persist at academic tasks. Behaviours under self-regulated learning refer to the actual participation, conduct, or other physical actions required to

complete learning tasks (Wolters & Taylor, 2012). The motivation and behaviour aspects of self-regulated learning correspond to the definitions of Work Engagement and Time Management Behaviour respectively.

Identifying the personality traits that confer a higher likelihood of using TMB and WE might assist us to identify those students more likely to achieve at university. According to a cybernetic model of personality, traits determine an individual's most likely strategy for dealing with certain classes of goals and rewards in the environment (Van Egeren, 2009). Instead of the usual question "how does trait X control action Y", cybernetic models ask instead how traits provide the controls for the required action, in other words "what about action Y needs to be controlled, and how does trait X provide the controls" (Van Egeren, 2009, p. 94). For students at university, self-regulated learning processes might be more effectively deployed if the individual in question has higher levels of a particular trait. In line with a cybernetic model of personality, in this study we conceive of both TMB and WE as an outcome of traits. Consequently, below we review the previous literature exploring the relationships of both TMB and WE with traits.

#### **1.4. The Five Factor Personality Model**

The antecedents of goal-directed behaviour have been explored by the literature linking personality and work engagement (Akhtar, Boustani, Tsivrikos, & Chamorro-Premuzic, 2015). The personality antecedents of time management behaviour have not been as consistently explored (Claessens et al., 2007; MacCann et al., 2012). The Five Factor Model (FFM) is arguably the current dominant paradigm in personality, and consists of five factors labelled Agreeableness (A), Conscientiousness (C), Extraversion (E), Neuroticism (N), and Openness/Intellect (O/I) (Costa & McCrae, 1992, 1995; Digman, 1990; Goldberg & Rosolack, 1994; Norman, 1963). This model has also been referred to as the Big Five or the Five-Factor approach (DeYoung, Quilty, & Peterson, 2007).

**1.4.1. The Big Five Aspects.** Research on the FFM has typically focused on a two-level hierarchy of traits, with the five domains each subsuming six narrower traits, labelled “facets” (Costa & McCrae, 1992). However, more than two levels can be identified (Digman, 1997), including a level between the domains and the facets, referred to as “aspects” (DeYoung et al., 2007). Agreeableness has the aspects of Politeness and Compassion; Conscientiousness has the aspects of Industriousness and Orderliness; Extraversion facets are Enthusiasm and Assertiveness; Neuroticism has Volatility and Withdrawal as aspects; and the Openness/Intellect domain consists of the aspects called (rather confusingly) Openness and Intellect (DeYoung et al., 2007). The advantage of the aspect-level traits as opposed to the facets is that they are broader and more parsimonious, while still allowing trait differentiation within the big five domains. Only one study that we are aware of (Woods & Sofat, 2013) has investigated the aspect-level correlates of either time management behaviour (TMB) or work engagement (WE), though the study did not use the Big Five Aspect Scales created by DeYoung et al., nor did they investigate all ten aspects. Furthermore, research on both TMB and WE constructs typically concentrates on the higher-order scores instead of treating both TMB and WE as multi-dimensional constructs. Measuring all ten aspects of the Big Five confers the advantage of examining TMB and WE while allowing for trait differentiation within the five domains. Because we are examining a specific skill that might lead to increased overall performance, using similarly specific and narrow measures of personality traits will provide us with a more fine-grained understanding of the individual more likely to engage in TMB and WE (Ones & Viswesvaran, 1996). It will also allow us to better discriminate the trait antecedents of TMB versus WE, which as we review below appear to have overlapping trait associations.

## **1.5. FFM Aspects as Antecedents**

Preliminary evidence suggests that work engagement might be characterised by high Conscientiousness, high Openness/Intellect, and low Neuroticism (Akhtar et al., 2015), and the literature on time management behaviour suggests that it is associated with higher Conscientiousness and lower Neuroticism (Claessens et al., 2007).

**1.5.1. Conscientiousness.** Conscientiousness has been described as the tendency to be organised, planful, reliable, responsible and thorough (McCrae & John, 1992).

Conscientiousness has been positively associated with work engagement in adult workers from a range of industries (Akhtar et al., 2015; Kim, Shin, & Swanger, 2009), and even among unemployed adults (Van Hove & Lootens, 2013). In a study of undergraduate students a positive relationship between time use efficiency and Conscientiousness was identified (Kelly & Johnson, 2005). Individuals more likely to engage in short- and long-term planning were also more likely to have a preference for a planned, orderly, and controlled way of living (Williams, Verble, Price, & Layne, 1995).

The Conscientiousness aspect of Industriousness reflects a tendency to settle into work quickly, stay focused on the task at hand, and carry out plans while the aspect of Orderliness describes an individual who prefers keeping things tidy, follows a routine, and pays attention to detail (DeYoung et al., 2007). Work engagement characterises an individual more likely to be absorbed, resilient during tasks, difficult to distract and able to focus their mind on the task at hand. This suggests that Work Engagement is more likely to be positively associated with Industriousness (Woods & Sofat, 2013). In contrast, Time Management Behaviour reflects an individual who prefers to plan and structure their time. An individual who exhibits more of these behaviours might be more likely to also demonstrate high levels of Orderliness.



**H1:** Both Conscientiousness aspects will be significant predictors of time management behaviour.

**H2:** Work engagement will be significantly predicted by Industriousness but not Orderliness.

**1.5.2. Neuroticism.** Neuroticism has been described as being prone to worry, emotionally unstable, tense, touchy, anxious, and self-pitying (McCrae & John, 1992). Neuroticism has also been identified as a negative predictor of engaged and planful behaviour while working. Work engagement has been negatively associated with Neuroticism in multiple studies (Kim et al., 2009; Langelaan, Bakker, van Doornen, & Schaufeli, 2006; Woods & Sofat, 2013). Individuals higher on Neuroticism appear less likely to use time management strategies (Bond & Feather, 1988; Van Hove & Lootens, 2013). At the aspect level of Neuroticism, Volatility characterises an individual who has difficulty controlling their emotions and often loses their composure. Withdrawal on the other hand represents an individual who is easily discouraged, worries a lot, becomes overwhelmed and is filled with doubts. Of the two aspects Withdrawal might be more likely to interfere with planning tasks effectively, and also with becoming engaged in studies and staying absorbed in them for long periods of time.

**H3:** Both work engagement and time management behaviour will be negatively correlated with Withdrawal but will be unrelated to Volatility.

**1.5.3. Openness/Intellect.** This domain describes a curious and imaginative individual, with wide interests, and a tendency to be insightful and innovative (Digman, 1990; McCrae & John, 1992; Roccas, Sagiv, Schwartz, & Knafo, 2002). Individuals high on this trait might be expected to find working on new study material interesting, but find it difficult to structure their time effectively to complete tasks. In partial support of this, Akhtar et al. (2015) found a positive relationship between Openness/Intellect and Work Engagement;

though Kim et al. (2009) found no evidence that the two constructs were related. Some studies have found a negative relationship between Openness/Intellect and feeling a sense of purpose in their time use (Van Hoye & Lootens, 2013). MacCann et al. (2012) further identified a small but positive relationship between time management behaviour and Openness amongst community college students.

Examining each constructs' relationships with the aspects of Openness/Intellect might shed some light on these apparently contradictory findings. The Openness aspect describes an individual who needs creative outlets, enjoys the beauty in nature, loves to reflect on things and often becomes lost in thought (DeYoung et al., 2007). These individuals might also display a tendency to become easily absorbed in their work tasks and enjoy spending time reflecting on them, both markers of Work Engagement. In contrast, Intellect describes an individual who learns quickly, likes to solve complex problems, and engages with complex learning material (DeYoung et al.). Such an enjoyment of challenging material might be particularly reflective of work engagement.

**H4:** Work engagement will be associated with both Aspects of Openness/Intellect, whereas time management behaviour will not be associated with this domain.

**1.5.4. Extraversion.** Extraversion describes an individual who is active, sociable, assertive, energetic, enthusiastic, and talkative. Studies on work engagement have hypothesised a positive relationship between the two traits, and there is some evidence for this found in a study of managerial-level employees (Langelaan et al., 2006) and a general working population sample (Akhtar et al., 2015). In contrast, Extraversion was not a significant predictor of maintaining a routine during unemployment (Van Hoye & Lootens, 2013), nor was it a significant predictor of time management behaviour in a group of community college students (MacCann et al., 2012), or a group of middle school students (Liu, Rijmen, MacCann, & Roberts, 2009). Woods and Sofat (2013) examined the aspects of

Extraversion in their study and found that Assertiveness was significantly and positively associated with work engagement. While Assertiveness indicates a personality that takes charge and is quick to act, Enthusiasm describes an individual who enjoys having fun with lots of people (DeYoung et al., 2007). This suggests that work engagement is more likely to be related to Assertiveness than Enthusiasm.

**H5:** Work engagement will be associated with Assertiveness, but not Enthusiasm.

**H6:** Time management behaviour will not be associated with either aspect of Extraversion.

**1.5.5. Agreeableness.** This domain describes an individual who is generous, kind, sympathetic, altruistic, and appreciative of others (McCrae & John, 1992). Politeness is one aspect of Agreeableness that describes an individual who is considerate of others, avoids conflict with others, and does not like to impose their will. Compassion is the other aspect, and an individual who scores high on this trait has time for others, takes an interest in their lives, and enquires about other people's well-being (DeYoung et al., 2007). There is limited evidence that this trait domain or either of its aspects are relevant to either work engagement (Kim et al., 2009; Woods & Sofat, 2013; for conflicting evidence see Akhtar et al., 2015) or time management behaviour (Claessens et al., 2007; Liu et al., 2009; Van Hove & Lootens, 2013; for conflicting evidence see MacCann et al., 2012).

**H7:** There will be no relationship observed between the Agreeableness aspects and either time management behaviour or work engagement.

## **1.6. Research Rationale and Aims**

The research on the dispositional antecedents of both time management behaviour and work engagement has not specifically examined the contribution of the aspects of the five-factor model as described by DeYoung et al. (2007). Most of the research examining the dispositional antecedents of both conclude that Conscientiousness is a key predictor.

However, based on the literature reviewed above we suggest that WE and TMB might have different trait drivers. Examining the antecedents of both constructs together with the trait aspects underlying domains might assist to determine their unique trait antecedents, and subsequently help to identify those students more likely to effectively use each of these self-regulated learning processes. The aim of this study was to examine the trait antecedents of Time Management Behaviour and Work Engagement, in order to determine which students might benefit more from self-regulated learning interventions. A secondary aim of this study was to establish evidence for the discriminant validity of both constructs in a tertiary student sample, to ensure that educators are not measuring redundant concepts.

**H8:** In contrast to the Big Five Domains, the Big Five Aspects will differentiate between work engagement and time management behaviour.

## **2. Method**

### **2.1 Participants**

Participants were 322 undergraduate psychology students (259 women, 63 men, 1 unreported, age  $M = 22.2$  years,  $SD = 7.1$ ). The sample included 256 Caucasian (91.1%), 13 (4.6%) Asian, and 4 (1.4%) Aboriginal Australian students.

### **2.2. Measures**

The measures used in the current study are described below. The Cronbach's alpha for each subscale has been reported in Table 1.

**2.2.1. The Big Five Aspects Scale (BFAS)** consists of 100 items rated on a five-point Likert scale providing five domain and ten aspect scores for the Five Factor Model. The items for this scale are reported in DeYoung et al. (2007). Each aspect is measured using ten items. An example item from Orderliness is "I want every detail taken care of". The alpha reliability coefficients reported by DeYoung et al. were high for all scales, ranging between .72 and .89.

**2.2.2. The Utrecht Work Engagement Scale-Student Version (UWES-S)** is a 14-item measure rated on a 7-point Likert scale, with five items each for Vigor and Dedication, and four items for Absorption. An example item from the scale is “when I’m studying, I feel mentally strong”. The UWES-S items are reported in Schaufeli et al. (2002a). The UWES-S has acceptable internal reliabilities, ranging between .75 and .91.

**2.2.3. The Time Management Behaviour Scale (TMBS)** consists of 29 items rated on a five-point Likert-type scale. Setting Goals and Priorities is measured by 10 items, Mechanics of Time Management by 11 items, and Preference for Organization by 8 items. An example item from the scale is “I carry a notebook to jot down notes and ideas”. Permission was given by the author of the scale to use the TMBS. The internal reliability coefficients reported by Macan et al. (1990) ranged from .65 to .86.

### **2.3. Procedure**

Participants were recruited and reimbursed with course credit using an online research participation system. On this system they were provided with an electronic link to access the web survey. Participants were informed that the study was investigating the association between Big Five personality traits and other measures of personality, and that their responses were anonymous. Participants were informed that once they had completed the web survey, their implied consent to participate was assumed. Participants completed the TMBS, the BFAS, and then the UWES-S in one testing session as a part of a larger battery taking two hours to complete. The order of measures was counterbalanced to account for fatigue effects, none of which were present in the TMBS, the BFAS, or the UWES-S. The responses to all questions were then downloaded into a spreadsheet for cleaning and scoring. This research was approved by the University of Newcastle Human Research Ethics Committee.

### 3. Results

SPSS 22.0 was used to perform all statistical analyses. Forty-one participants (12.7%) who did not complete one or more of the questionnaires were excluded from further analysis. Missing item-level data, indicating an unanswered item within a scale, was present in 4.7% of the remaining cases. Missing value analysis was conducted using the expectation-maximisation algorithm (Dempster, Laird, & Rubin, 1977). The analysis indicated that EM estimation was appropriate for replacing the missing data,  $\chi^2(5030) = 463.624, p > .05$  (Little, 1988). Responses from 281 participants were subsequently available for statistical analyses. After the data was cleaned, scoring was conducted. The distributions of all subscale scores were checked for normality using the Shapiro-Wilk test and parametric statistical techniques were considered to be appropriate in all cases.

#### 3.1. Descriptive Statistics

The means, standard deviations, and internal reliabilities for all scales can be found in Table 1 together with correlations between all variables. In support of hypotheses 1 and 2, Industriousness was significantly and positively related to all six subscales of TMB and WE, while Orderliness was related to all three TMB subscales and Absorption (WE). As expected, individuals higher on Withdrawal were less likely to set goals and priorities, have a preference for organisation, or demonstrate Vigor and Absorption while studying. Volatility was also negatively associated with Vigor. As expected, all three work engagement subscales were positively associated with Intellect, and Dedication with Openness, while none of the TMB subscales were associated with Openness or Intellect. Only the work engagement subscales of Dedication and Absorption were positively associated with Assertiveness, in support of hypothesis 5. As expected, TMB was not associated with either aspect of Extraversion. The only significant association between the Agreeableness aspects and the

dependent variables was a small positive relationship between Compassion and Dedication, in partial support of hypothesis 7.

### **3.2. Hierarchical Regression Analysis**

Six hierarchical regression analyses were conducted with the three dimensions of TMB and WE as dependent variables. These results can be found in Table 2. Age and Gender were initially entered as control variables in the first step of each regression.

The aspects accounted for a significant proportion of the variance in Setting Goals and Priorities,  $F(12,268) = 10.987, p < .001$ , Mechanics of Time Management,  $F(12,268) = 7.100, p < .001$ , and Preference for Organisation,  $F(12,268) = 14.262, p < .001$ . Inspection of the beta coefficients in Table 2 indicated that all three TMB subscales were significantly and positively predicted by Industriousness and Orderliness, i.e., both aspects of Conscientiousness. This finding provides further support for hypothesis one. None of the other aspects emerged as significant predictors of any time management behaviour subscale after the variance attributable to Industriousness and Orderliness was accounted for.

The personality aspects also accounted for a significant amount of variance in Vigor,  $F(12,268) = 12.542, p < .001$ , Dedication,  $F(12,268) = 10.078, p < .001$ , and Absorption,  $F(12,268) = 8.326, p < .001$ . As shown in Table 2, all three WE subscales were significantly and positively predicted by Industriousness, in support of hypothesis 2. Openness was a significant and positive predictor of both Vigor and Dedication, whereas Intellect was positively associated with Absorption. These results provide some evidence for the construct validity of Absorption and support for hypothesis 4.

Overall the linear regressions indicate support for hypothesis 8. An exploratory factor analysis replicated the findings of the regression analyses indicating that Time Management Behaviour is primarily characterised by the Conscientiousness aspects, whereas Work Engagement appears to additionally draw from the trait domain of Openness/Intellect.

#### **4. Discussion**

As predicted by hypothesis eight, we found that the Big Five Aspects distinguished between time management behaviour and work engagement. We expected TMB and WE to share different relationships with the Conscientiousness aspects, and results from the regressions in Table 2 indicated that WE was significantly predicted by Industriousness only, whereas TMB was positively associated with both Conscientiousness aspects. These findings provide support for both hypotheses one and two. They also replicate and extend the findings of previous research in this area (Akhtar et al., 2015; Kelly & Johnson, 2005; Kim et al., 2009; Van Hoye & Lootens, 2013; Williams et al., 1995). Evidence from this study indicates that WE and TMB share a relationship through their shared personality antecedent of Industriousness. Individuals high on either WE or TMB are unlikely to waste time, to postpone decisions, or to find it difficult to finish tasks once they have started. They are likely to be difficult to distract, and unlikely to make mistakes when working on their assigned studies. These findings provide support for the relevance of personality traits for university students.

Consistent with hypothesis three, Both TMB and WE were also correlated with higher levels of Withdrawal (N) as opposed to Volatility (N) in Table 1. In support of hypothesis five, work engagement scores of dedication and absorption were associated with Assertiveness (E) but not Enthusiasm (E) in correlation analyses. Neither of these traits were significant in the regression analyses reported in Table 2. Previous research finding an association with Neuroticism or Extraversion was different to the current study, with some using a measure of perceived effective use of time (Bond & Feather, 1988; Van Hoye & Lootens, 2013). Another study only measured N and E (Langelaan et al., 2006), while yet another split N and E only into aspects (Woods & Sofat, 2013). Two studies were testing specific mediation effects without controlling for other personality variables (Liu et al., 2009;



MacCann et al., 2012). In contrast, the current study included all ten aspects underlying the five domains, providing a higher level of granularity in trait measurement, used regression analyses with all aspects included, and measured TMB as self-report of behaviours. The current study suggests that, at least in general, Neuroticism, Extraversion, and their respective aspects might be of limited importance to experiencing work engagement and using time management strategies at university.

The aspects of Openness further provided a way to distinguish between TMB and WE, as we predicted in hypothesis four. Intellect was a significant predictor of absorption in Table 2, whereas Openness was a significant and positive predictor of vigor and dedication. Individuals high on WE might be quicker to understand things, have a richer vocabulary, be intellectually able to process large volumes of information, and enjoy reflecting on a variety of topics, as indicated by their association with both Intellect and Openness. The traits Intellect and Openness might motivate individuals at university to experience work engagement, which subsequently encourages them to develop an understanding of the material.

Work engagement and time management behaviour represent two of the processes underlying self-regulated learning. The findings of this study demonstrate that Work Engagement and Time Management Behaviour, although both instances of self-regulated learning, likely stem from different trait antecedents. Work engagement represents the cognitive-affective value and enjoyment experienced while learning. This is consistent with its significant associations with both Openness (O) and Intellect (O), two traits reflecting a higher tendency to engage with sensory and intellectual stimuli respectively (DeYoung, Quilty, Peterson, & Gray, 2014). In contrast, Time Management Behaviour represents a self-regulatory behaviour, the means by which students arrange their work in the most efficient way. In support of this finding, we found that TMB was best accounted for by

Industriousness (C) and Orderliness (C), traits by which individuals prefer to pursue their goals actively and keep their goals well organised as they do so (DeYoung et al., 2007).

According to cybernetic theory, traits provide the controls to direct self-regulatory processes in pursuit of goals. The study reported above provides some evidence that students higher in Conscientiousness and Openness/Intellect in particular, might be more effective at initiating the self-regulatory strategies that confer the possibility of better achievement at university. Being high on the Conscientiousness aspects Industriousness and Orderliness will likely enable students to more effectively deploy the time management strategies necessary to complete large volumes of work in restricted periods of time. Concomitantly, Industriousness and Openness enable students to feel higher levels of mental resilience while working, persistence with work activities, and a sense of enthusiasm about the work they are doing. The combination of Industriousness and Intellect might enable students to more easily become engrossed in the work they are doing. The current findings suggest that Conscientiousness, Openness/Intellect and their underlying aspects provide the controls for at least two self-regulated learning processes.

Educational psychologists have promoted environments that encourage deep learning strategies rather than surface strategies which focus on rote learning material (Biggs, 1978). Recent findings suggest that the traits of Openness and Conscientiousness are associated with deep learning approaches to study (Chamorro-Premuzic & Furnham, 2009; Shokri, Kadivar, Farzad, & Sangari, 2007). This study indicates that individuals higher on Openness and Intellect are more likely to engage with and be absorbed in the study material regardless of the learning environment they experience. In addition to this finding, the current study found that individuals high in the traits of Orderliness and Industriousness, in addition to Intellect and Openness, might be more likely to use study plans to structure tasks such that they divide their time equally and more effectively amongst the competing coursework demands. Both

Work Engagement and Time Management Behaviour are important but distinguishable processes by which traits contribute to achievement at university.

This study is the first that we are aware of to examine both work engagement and time management behaviour together in a university student sample, and it is the first study to measure all of the Five Factor Model aspects with a previously validated scale (DeYoung et al., 2007). As a result the findings provide preliminary evidence that both WE and TMB arise from overlapping, but distinct, trait antecedents. Students high on trait Conscientiousness and Openness/Intellect are both more likely to be interested and use effective strategies to study with minimal support from educators. Future research might wish to conduct observational studies of the behavioural markers of TMB and WE to inform effective behavioural interventions for other students low on such traits. In contrast, individuals low on Openness/Intellect or Conscientiousness are less likely to be engaged or use time management strategies on their own. Such individuals might be more appropriate targets for educators wishing to intervene in the success of students at university.

The study design was cross-sectional, which represents a limitation such that we are unable to infer that the BFAS traits are causally linked to the likelihood of endorsing higher work engagement and time management behaviours among a student sample. Another possible limitation is the use solely of self-report measures, which enhances the possibility of common method variance (Podsakoff & Organ, 1986). Previous research has used a similar approach to relate TMB, WE, and trait antecedents to objectively measured educational achievement (Gerhardt, Rode, & Peterson, 2007; Liu et al., 2009; MacCann et al., 2012; Tabak, Nguyen, Basuray, & Darrow, 2009), suggesting that the current results relating these variables is unlikely to be due to measurement error associated with using the same measurement strategy. Our study includes a large proportion of younger adults and females. From the regression analyses, older adults are more likely to have mastered the mechanics of

time management, have a preference for organisation, and be more engaged with their studies in general. In addition, females were more likely to be dedicated to their studies (as indicated by a negative standardised regression coefficient in Table 2). However, after controlling for these factors TMB and WE were both significantly predicted by the Conscientiousness and Openness/Intellect aspects. The sample were additionally recruited from an undergraduate psychology course, which might limit the generalizability of the study findings.

We did not measure situational antecedents of the likelihood of experiencing work engagement or using time management strategies, such as the availability of study resources (Salanova & Schaufeli, 2008), student sociodemographic variables (Southgate et al., 2014), the influence of assessment task conditions (Kappe & van der Flier, 2010), or whether students were enrolled on a full- or a part-time basis (MacCann et al., 2012). However, the aim of the current study was to examine the personality antecedents of both WE and TMB. Examining the moderating influence of such situational constraints on the association between trait-level individual differences, work engagement and time management behaviours might be a profitable area for future research that will further inform the appropriate design of interventions to affect student engagement with studies.

#### **4.1. Conclusions**

In this study we identified the trait antecedents of work engagement and time management behaviour as Industriousness, Orderliness, Openness, and Intellect. Students high on all four of these traits are more likely to become engaged in their studies, and exhibit the behaviours necessary to ensure their achievement at university. These findings are consistent with a cybernetic view of traits, that they provide the controls necessary to more effectively deploy strategies in pursuit of goals. The identification of such students and the examination of the self-regulated learning strategies they exhibit, could further inform the development of interventions to encourage such strategy use in the rest of the student cohort.

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Table 1.

*Descriptive statistics and correlations between Time Management Behaviour, Work Engagement, and the Big Five Aspect Scales*

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Politeness (A)	37.29	5.49	(.77)															
2. Compassion (A)	41.10	5.07	.55**	(.85)														
3. Industriousness (C )	30.18	5.48	.17**	.16**	(.80)													
4. Orderliness (C )	33.01	6.05	.22**	.12*	.45**	(.80)												
5. Enthusiasm (E )	36.06	5.95	.23**	.45**	.25**	.14*	(.82)											
6. Assertiveness (E )	32.75	6.12	-.20**	.21**	.32**	.07	.35**	(.85)										
7. Volatility (N)	29.11	6.59	-.16**	-.09	-.30**	.01	-.13*	-.06	(.85)									
8. Withdrawal (N)	30.35	6.29	.04	-.05	-.46**	-.06	-.36**	-.40**	.56**	(.82)								
9. Intellect (O)	35.74	5.39	.00	.23**	.25**	-.12*	.03	.31**	-.21**	-.17**	(.78)							
10. Openness (O)	37.00	5.77	.17**	.35**	-.06	-.20**	.04	.08	-.02	.12*	.40**	(.78)						
11. TMB_SGP	33.35	6.88	.12*	.11	<b>.53**</b>	<b>.40**</b>	.17**	.16**	-.12	<b>-.23**</b>	.12	.02	(.82)					
12. TMB_MTM	31.11	8.15	.17**	.13*	<b>.34**</b>	<b>.38**</b>	.06	.12*	-.01	-.11	.10	.07	.53**	(.80)				
13. TMB_PO	27.33	6.19	.19**	.18**	<b>.46**</b>	<b>.51**</b>	.16**	.08	-.15*	<b>-.20**</b>	-.03	-.07	.45**	.41**	(.78)			
14. Vigor	15.41	5.40	.09	.10	<b>.52**</b>	.15*	.16**	.17**	<b>-.23**</b>	<b>-.30**</b>	<b>.28**</b>	.18**	.41**	.38**	.23**	(.80)		
15. Dedication	21.86	5.28	.15**	<b>.25**</b>	<b>.40**</b>	.16**	.19**	<b>.23**</b>	-.05	-.16**	<b>.26**</b>	<b>.26**</b>	.34**	.26**	.24**	.51**	(.89)	
16. Absorption	13.65	4.92	.03	.08	<b>.41**</b>	<b>.21**</b>	.05	<b>.20**</b>	-.13*	<b>-.20**</b>	<b>.29**</b>	.12*	.27**	.27**	.21**	.57**	.43**	(.82)

*Notes:* internal reliabilities reported in brackets on the diagonal; \* =  $p < .05$ ; \*\* =  $p < .01$ ; A = Agreeableness; C = Conscientiousness; E = Extraversion; N = Neuroticism; O = Openness/Intellect; SGP = Setting Goals and Priorities; MTM = Mechanics of Time Management; PO = Preference for Organisation

Table 2.

*Hierarchical regression standardised weights ( $\beta$ ) for time management behaviour and work engagement dimensions on the Big Five aspects*

Predictor	Setting Goals and Priorities	Mechanics of Time Management	Preference for Organisation	Vigor	Dedication	Absorption
Age	.04	.12*	.20**	.16**	.16**	.22**
Gender	-.04	-.13	.01	-.05	-.17**	-.01
Politeness (A)	-.02	.06	-.04	-.02	-.01	-.04
Compassion (A)	-.04	-.03	.12	-.10	.01	-.05
Industriousness (C)	.43**	.16*	.25**	.48**	.34**	.28**
Orderliness (C)	.22**	.29**	.36**	-.04	.01	.11
Enthusiasm (E)	.05	-.08	.01	.08	.04	-.03
Assertiveness (E)	-.04	.03	-.06	-.07	.05	.03
Volatility (N)	.03	.08	-.07	-.05	.07	-.01
Withdrawal (N)	-.05	-.09	-.03	-.04	-.02	-.01
Intellect (O)	.02	.07	-.09	.11	.11	.20**
Openness (O)	.11	.09	-.01	.17**	.20**	.07
R <sup>2</sup>	.33**	.24**	.39**	.36**	.31**	.27**
Adjusted R <sup>2</sup>	.30**	.21**	.36**	.33**	.28**	.24**

Notes: \* =  $p < .05$ ; \*\* =  $p < .01$ ; for Gender, 1 = females and 2 = male