

An Investigation of Attention, Sleep, Impulsivity, and Employment in College
Students.

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Bachelor of Arts (Hons) in Psychology

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ATTENTION, SLEEP, IMPULSIVITY, AND EMPLOYMENT
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Abstract

The relationship of attention and sleep quality, daytime sleepiness, chronotype, social jetlag, sleep duration, impulsivity, hours of weekly employment were studied in 37 college students. Participants completed a continuous performance test (CPT) of attention, Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), Munich Chronotype Questionnaire (MCTQ), Barratt Impulsivity Scale (BIS) and were asked demographic questions. Correlation analyses were run to investigate if an association was present between attention and all other variables. All correlations returned non-significant results indicating none of the assessed variables had a relationship with attention. In addition, a t-test was run to check for differences between males and females on attention. Similarly it returned a non-significant result indicating that no difference existed between the groups on attention levels. A t-test was also run for high levels of sleep duration and low levels of sleep duration on attention. Again, no significant difference was evident and predictions did not hold through. In conclusions findings were contradictory towards predictions based on the literature.

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Introduction

Attention is a very broad concept that contains various different dimensions. The two main components of attention are intensity and selectivity. Attention can be seen as quality of information processing decided by selection of stimuli and intensity of focus directed toward the stimuli. The ability to optimally tune selectivity and intensity in attention results in an efficient information processing system (Spikman & van Zomeren, 2010). Attention is an important ability for improving individual's performance at different tasks. For instance, attention improves sensory processing in different visual tasks (Carrasco & Barbot, 2019). Cohen and Maunsell (2009) conducted research that also suggests visual attention improves behavioural performance of participants in focusing on important information in complex scenes. It is important to understand that attention is not a single concept but is built up of different types of attention all of which activated based on situation presented (Spikman & van Zomeren, 2010). Naturally as some aspects of attention improve cognitive abilities, deficits in attention can also negatively impact cognitive abilities. One study on college students with and without Attention deficit hyperactivity disorder (ADHD) found that students with ADHD had a significantly lower grade point average, supporting the idea that attention problems may affect academic performance (Heiligenstein, Guenther, Levy, Savino & Fulwiler, 1999).

Attention and college students

The previously mentioned research highlights the importance of attention for improving our cognitive abilities. It also identifies that any deficits or reductions in attention can have a negative impact cognitive functioning. The population of college students is one which has been substantially researched with regards to attention (Ramsay & Rostain, 2006; Swartz, Prevatt & Proctor, 2005; Wei, Wang & Klausner, 2012). In particular the clinical population of college students with ADHD and their academic performance is researched. Academic performance problems related ADHD are well documented in school children (Currie & Stabile, 2006; Frazier,

Youngstrom, Glutting & Watkins, 2007) and through adolescents to college students (Barkley, Fischer, Smallish & Fletcher, 2006; Biederman et al., 2006).

The research suggests that college students with ADHD are more likely to face academic problems. Barry, Lyman and Klinger (2002) reported that severity of ADHD is a significant predictor of academic underachievement in reading writing and mathematics. Biederman and his colleagues (2004) found adolescents with ADHD to be at high risk of impaired academic performance due to lack of ability to maintain attention. The negative effects of ADHD on academic performance in college students appear to be highly supported in the previously mentioned literature. The emphasis on ADHD has led to a lack of research with the aim of investigating attention in non-clinical college student populations. Similarly, there is a wealth of research comparing gender differences and attention focusing primarily on ADHD populations (Rucklidge, 2010; Gaub & Carlson, 1997). Gender difference studies tend to report inconsistent findings potentially through variation in measures.

Sleep quality and college students

An abundance of research has been conducted on student's sleep, which is often assessed in different variables such as sleep quality, daytime sleepiness, and chronotype. The voluntary sleep deprivation of college students on weekdays and subsequent excessive recuperation sleep on the weekend has been identified as a common problem among students (Hawkins & Shaw, 1992). In addition to voluntary sleep schedule variations many students report involuntary sleep disturbances. Two thirds of which report occasional disturbances and about one third of those report severe sleep difficulties (Coren, 1994). Additional research found that only 11% of students assessed met the criteria for good sleep quality (Buboltz, Brown & Soper, 2001). As a result of depriving themselves of sleep, college students increase their daytime sleepiness and subsequently decrease their ability to pay attention in class (Pilcher & Walters, 1997).

The association of poor sleep quality and how it is associated with a reduction in an individual's attention is highlighted in the research (Niu et al., 2011; Gobin, Banks, Fins & Tartar,

2015). Other supportive research in children showed that poor sleep quality and shorter sleep duration resulted in more errors on a continuous performance task (CPT) of attention (Sadeh, Gruber & Raviv, 2002). One theory suggests that reduced performance of a sleep deprived individual stems from lack of ability to focus attention and complete task at hand (Johnson, 1982).

Although most research predominantly aims to assess sleep variables in college students with only brief reference to how they affect attention (Pilcher & Walters, 1997; Lund, Reider, Whiting & Prichard, 2010). The literature has less research where attention is the anchoring variable compared to sleep quality and other sleep associated variables in college students. Furthermore, even fewer papers assess these variables in non-clinical student population that do not strictly have ADHD.

Daytime sleepiness

The negative impact of poor sleep quality on attention is evident in the previously mentioned papers (Niu et al., 2011; Gobin, Banks, Fins & Tartar, 2015). Daytime sleepiness is another aspect related to sleep that is associated with poor sleep quality in the literature. Mikulincer, Babkoff, Caspy and Sing (1989) investigated sleep deprivation and found participants reported increased feelings of sleepiness related as levels of sleep deprivation increased. The most common consequence of insufficient or disturbed sleep is suggested to be an increase in daytime sleepiness (Fallone, Owens & Deane, 2002; Moore & Meltzer, 2008). Research conducted in Seoul found that students had poor sleep quality and a consequent increase in daytime sleepiness that highly correlated with decline academic performance (Shin, Kim, Lee, Ahn & Joo, 2003). Increased daytime sleepiness may also impair certain brain areas and reduce cognitive function (Dahl, 1996; Jones & Harrison, 2001). The strongly supported idea that daytime sleepiness is a result of poor sleep quality suggest that it would be practical to look at both while researching attention.

Chronotype and attention

Chronotype is the term used to describe an individual's circadian rhythm and whether it corresponds to morningness or eveningness. An individual with a preference for morningness is someone who gets up easily and is more alert in the morning. In comparison, an individual with a preference for eveningness is someone who is more alert in the evening and sleeps late into the afternoon (Preckel, Lipnevich, Schneider & Roberts, 2011). Studies consistently show that morningness and academic achievement have a strong positive correlation. In contrast, eveningness has a strong negative relationship with academic achievement (Kirby & Kirby, 2006). Considering that deficits in attention correlate with poor academic performance and eveningness has strong negative relationship with academic performance. An investigation of eveningness and attention would appear to be rational as academic performance may be a confounding variable. Overall, papers investigating chronotype and cognitive ability appear inconsistent (Killgore & Killgore, 2007). Chronotype is an individual difference in sleep timing and some individuals may benefit more from eveningness while others benefit more from morningness. Considering this may explain why inconsistencies occur while comparing the chronotype of individuals on certain cognitive abilities.

The use of social jetlag which is the difference between an individual's circadian clock and social clock may produce more consistent results (Roenneberg, Allebrandt, Mellow & Vetter, 2012). The circadian clock is governed by internal cues that are influenced by external factors such as light. In contrast the social clock is decided by external factors, such as an individual being required to start work at 8 o'clock in the morning (Wittmann, Dinich, Mellow & Roenneberg, 2006). Large discrepancies between the circadian clock and social clock are recorded to result in chronic sleep loss (Roenneberg et al., 2007; Wittmann, Dinich, Mellow & Roenneberg, 2006). Chronic sleep loss is also related to an individual's sleep quality and daytime sleepiness which the research suggests both can have an effect on attention (Gobin, Banks, Fins & Tartar, 2015). In comparison, social jetlag appears to be superior to chronotype for assessing psychological variables such as attention due to its incorporation of individual differences. Although, chronotype

is not directly interchangeable with social jetlag so it may still hold value in some areas of research.

Impulsivity, chronotype, and attention

Impulsivity is a concept that covers a broad range of actions that are poorly considered, prematurely expressed and often inappropriate to the situation at hand (Evenden, 1999). Impulsivity appears to have an inverse relationship with academic achievement (Fink & McCown, 1993; Vigil-Colet & Morales-Vives, 2005). A close relationship can be seen between attention and impulsivity when considering ADHD. One of the main characteristics of ADHD is impulsive behaviours that reduce the ability to maintain attention (Miller, Derefinko, Lynam, Milich & Fillmore, 2009; Toplak et al., 2009). In addition the Barrett Impulsivity Scale (BIS) a validated measure of impulsivity contains a specific component of attention factors (Patton, Stanford & Barratt, 1995). Furthermore, higher rates of impulsiveness has linked with individuals that report eveningness compared with those that report morningness (Caci, Robert & Boyer, 2004; Russo, Leone, Penolazzi & Natale, 2012).

Although impulsivity is highly associated with ADHD a lack of papers investigating impulsivity and attention in a non-clinical student population exists.

College students and employment

College students often need to hold a part time job in order to support themselves during their education. The literature presents a mixed report on whether having a part time job while in college has a negative or positive effect on academic performance. Some research presents a negative effect of having a part time job on academic performance (Singh, 1998; Oettinger, 1999). Alternative research found that grades improve with low work hours and fall with long work hours (Schill, McCartin & Meyer, 1985; Quirk, Keith & Quirk, 2001). It is also reported that excessive working hours lead to less available time to complete college work and reduced energy (DeSimone, 2008). Contrasting research suggests that there is no relationship between the two

(Schoenhals, Tienda & Schneider, 1998; Warren, LePore & Mare, 2001). Dustmann and Van Soest (2006) found that part-time work has a small negative effect on exam performance in males. One potential mechanism suggested by Kalenkoski and Pabilonia (2012) is that work reduces students' homework time or sleep and thus negatively affects their grades. Investigation of how employment effects sleep quality may yield beneficial data to why such vast amounts of college students report poor sleep quality.

Research aims

The main aim of the current study is to assess the attention levels of a non-clinical college student population. An investigation into the factors that are potentially associated with attention will also be conducted. Substantial research of attention in college students strictly with ADHD (Barkley, Fischer, Smallish & Fletcher, 2006; Biederman et al., 2006) exists but a lack of assessment on students without ADHD warrants fair rationale for exploration of this area.

Review of the literature identified five factors, sleep quality, daytime sleepiness, chronotype, impulsivity, and employment all of which are potentially associated with attention. The data produced in the present research can be used to indicate what factors are associated with decreased attention so that these factors can be targeted while trying to improve attention levels.

In sum, to investigate the desired factors for the current research five specific questions answered by eight hypotheses have been formulated. First, do gender differences exist in attention between males and females? In order to assess this question we assessed both males and females levels of attention using a Continuous Performance Task (CPT). We hypothesised that no difference would be found between males and females on attention (H1). On the basis of a meta-analysis conducted not finding and gender differences with regards ADHD (Guab & Carlson, 1997).

The second question of our study was to determine if a significant association existed between sleep quality and daytime sleepiness compared with attention. A self-reported measure of both sleep quality and daytime sleepiness with performance levels on an attention task were

assessed. Two hypotheses were developed to tackle this research question. The first hypothesis states, sleep quality will have a positive relationship with attention (H2). Research suggests that it is rationale to assume a relationship between sleep quality and attention (Niu et al., 2011; Gobin, Banks, Fins & Tartar, 2015). The second hypothesis states, daytime sleepiness will have a negative relationship with CPT (H3).

The third research question aimed to assess aspects of chronotype and its association with attention levels. Self-reported measures of chronotype and social jetlag were used. Attention levels were also indicated by CPT performance which is consistent through this study. In addition, sleep duration was split into high and low sleep durations so comparisons could be made on attention levels between the groups. Three hypotheses were established to explore the research question. The first hypothesis states, chronotype will have a significant relationship with attention levels (H4). The second hypothesis states, participants with increased social jetlag will have decreased performance on CPT (H5). A final hypothesis predicts, individuals with high sleep duration will have increased performance on CPT (H6).

The objective of the next research question was to explore if impulsiveness is associated with attention levels in the non-clinical student population. Self reported impulsivity measures and performance on CPT were used for the current question. It was hypothesised that an increase in impulsiveness will lead to more errors on the CPT (H7). On the basis that research suggests a significant amount of crossover between impulsivity and attention (Miller, Derefinko, Lynam, Milich & Fillmore, 2009; Toplak et al., 2009).

The final research question investigates employment and its association with attention. Self reported hours of work per week and performance on CPT were used. One hypothesis was formulated to examine the current research. We predicted that increased employment hours will be associated with reduce performance on CPT (H8).

Methods

Participants

Participants were recruited from the student body of National College of Ireland. The sample contained 37 students, (N=37) 21 males (56.8%) and 16 females (43.2%) all of which completed all aspects of the study. The method of sampling employed was convenience sampling. The mean age of participants in the study was 21.27 (SD= 1.407).

Design

The design of the current study is both cross-sectional and experimental. Between groups and within group measures were also required to assess the different research questions. H1 and H6 both required between groups design, all other hypothesis utilised within group design. The main variable of the research was attention all other variables were used to compare with attention.

The between groups design of H1 and H6 resulted in the necessary use of t-tests. The independent variable for H1 was gender while the dependent variable was errors on the CPT. The independent variable for H6 was sleep duration divided into high and low while the dependent variable was errors on CPT. The other hypotheses were within groups and used correlation analysis which does not require identification of Independent and dependent variables. When analysing and testing the remaining six hypotheses the variables correlated with attention were sleep quality, daytime sleepiness, chronotype, social jetlag, impulsiveness, and weekly hours of employment.

Apparatus

The use of a laboratory was necessary to create a controlled environment without distracting stimuli while conducting the CPT attention test. A laptop was required for participants to complete the CPT, the same laptop was used for all participants. The software program PEBL containing the CPT was used to run experiment. A questionnaire containing demographic questions, PSQI, ESS, MCTQ, and BIS were provided for participants along with a pen.

Measures

Demographics

Initial questions were administered to participants to assess both gender and age of the sample. In addition participants were asked how many weekly days of paid employment and how many weekly hours of paid employment they were currently taking on. The purpose of these questions was to gain information on employment in the sample.

Continuous Performance Task

The Continuous Performance Task (CPT) developed by Rosvold, Mirsky, Sarason, Bransome and Beck (1956) is a test of participant's ability to sustain attention. Participants are presented with one letter on screen at a time and have to elicit or withhold a button press response depending on the letter. Participants were instructed to elicit a button press response for every letter except X. The duration of the test was approximately 14 minutes and contained a total of 36 X's. A withheld button press response in the presence of the letter X is counted a correct foil. The amount of correct foils is used to quantify attention levels in participants. Commission errors (CE) defined the amount of times the letter X was shown and the button press was withheld. The current research used commission errors (CE) for valuation of attention. In the current research the CPT was administered using the PEBL software program.

Preliminary analysis of the internal validity yielded a Cronbach's alpha $\alpha = .85$, which shows the test is reliable. The CPT is a widely used method of measuring attention so re-test reliability information exists in bulk. Several papers support re-test reliability of CPT as a measure of attention (Soreni, Crosbie, Ickowicz & Schachar, 2009; Raz, Bar-Haim, Sadeh & Dan, 2012).

Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) devised by Buysse, Reynolds, Monk, Berman & Kupfer, (1989) is a questionnaire that assesses sleep quality of individuals. The PSQI contains 19 self-report questions that which produce seven components; sleep latency, sleep disturbances,

habitual sleep deficiency, daytime dysfunction, sleep duration, and subjective sleep quality all of which amount to global sleep quality. Each component is scored from 0-3 which provides a global score out of 21. High scores indicate poor sleep quality while low scores indicate good sleep quality.

Preliminary analysis of the internal validity yielded a Cronbach's alpha $\alpha = .61$. The PSQI is a widely used measure of sleep quality in many different populations. One study of patients with insomnia assessed the group twice and test-retest reliability was .87 which is a strong reliability (Backhaus, Junghanns, Broocks, Riemann & Hohagen, 2002).

Epworth sleepiness scale

The Epworth sleepiness scale (ESS) is a questionnaire that measures daytime sleepiness produced by Dr Murray Johns (1991). The questionnaire requires respondents to indicate from 0-3 the chance of dozing off in 8 different situations. 0 indicates that the respondent would never doze while 3 indicates high chance of dozing. The eight situations added together create a total score in a range of 0-24. A score of range 0-9 is reported to be normal, a score of range 10-24 it is suggested that participant acquires expert advice.

Preliminary analysis on the internal validity of the current study found a Cronbach's alpha $\alpha = .63$ which is slightly lower than desired $\alpha = .7$. Although, other research reported a Cronbach's alpha $\alpha = .88$ displaying strong validity (Johns, 1992). A systematic review of research using ESS reports moderate test-retest reliability (Kendzerska, Smith, Brignardello-Petersen, Leung & Tomlinson, 2014).

Munich ChronoType Questionnaire

The Munich Chronotype Questionnaire (MCTQ) measures chronotype and additional related aspects of sleep. The MCTQ was developed by Roenneberg, Wirz-Justice and Mellow, (2003) and

asks participants seven questions about workday sleep-wake habits and seven questions about free day sleep-wake habits. The midpoint of sleep on free days is used as an indicator of chronotype. Social jetlag is also assessed through the MCTQ by calculating the difference in the midpoint of sleep on workdays and the midpoint of sleep on free days. Social jetlag identifies the difference in a participant's circadian clock and social clock. Data on sleep duration is also collected in the MCTQ which was required for the present research.

The MCTQ is one of the most commonly used measures of chronotype in the literature (Fabbian et al., 2016; Jankowski, 2015). Although investigations of across different pieces of research for re-test reliability is limited.

Barratt Impulsivity Scale

The Barrett Impulsivity Scale (BIS) was original developed in 1959 but since has been revised by Patton, Stanford, and Barratt (1995). The BIS is compiled of 30 statements that are assessed using a likert scale answer system. The responses range from 1-4, 1 indicating a response of rarely/never and 4 indicating almost always/always. The BIS can be broken down into six different aspects if required. For the purpose of the current study only the total scale measure of impulsivity was required.

Preliminary analysis of the internal validity reported a Cronbach's alpha $\alpha = .59$. In contrast while conducting an update and review paper on the BIS Stanford and colleagues (2009) report a Cronbach's alpha of $\alpha = .83$. In addition a Spearman's Rho test was conducted to assess test-retest reliability which was reported at .83.

Procedure

The current research firstly obtained ethical approval from the National College of Ireland board of ethics. In order to recruit participants, students were accessed before lectures, briefly informed of the aim of the research and invited to take part.

Participants who volunteered for the study were instructed all aspects of the research would take 20-25 minutes to complete. Coupled with the necessity of a laboratory for the CPT which had

to be booked on campus at the National College of Ireland meant participants were scheduled into timeslots. Each participant received a timeslot that was possible for them to attend.

Upon arrival of participants to the laboratory they were given an information sheet with the aim of the study and consent form. Once complete, participants were seated at the laptop displaying the CPT on the PEBL program which provides instructions for the task on screen. The participants were also verbally told that they must press the space bar for every letter on screen except the letter X. Participants were instructed to not begin the test until the researcher had left and fully closed the door of the laboratory. This measure was deemed necessary to eliminate any distraction that may be caused by the research leaving the laboratory.

After completion of the CPT the researcher re-entered the laboratory and presented the participant with the questionnaire containing demographic questions, PSQI, ESS, MCTQ, and BIS. Participants were instructed to complete all aspects of the questionnaire as accurately as possible. After collection of both the CPT data and Questionnaire data participants were provided with a debriefing sheet.

The PEBL program automatically recorded data for each participant into save file. The completed questionnaires for each participant were all transcribed into SPSS and saved. Original paper copies of questionnaires were also stored until data analysis was complete to allow data to be rechecked if necessary.

Data analysis

The present study used quantitative measures for assessing all hypotheses. H1 aimed to assess a categorical variable gender and a continuous variable CPT errors representing attention. The identified test to deal with these variables in the hypothesis was a t-test. H2-H5, additionally H6 and H7 all assessed the association of attention and one other continuous variable. The appropriate test identified to evaluate the associations present in these hypotheses was a correlation test. The final hypothesis H6 aimed to assess high sleep duration group and low sleep duration group on their levels of attention. T-test were chosen as the correct test to assess the previously mentioned between groups investigation.

Results

Descriptive statistics

The analysis of gender found that the sample showed a slightly higher percentage of males. The figures for both gender and sleep duration groups were identical although no there is no intended association. The detailed analysis are displayed and can be observed in the below Table 1.

Table 1 (for displaying information regarding categorical variables)

Frequencies for the current sample of college students on each demographic variable (N = 37)

Variable	Frequency	Valid Percentage
Gender		
Male	21	56.8
Female	16	43.2
Sleep Duration		
High duration	21	56.8
Low duration	16	43.2

The descriptive statistics were conducted to investigate all continuous variables. The reported frequencies were mean, standard error mean, median, standard deviation and range. The range of errors on the CPT displayed a large range among the population. Another notable range was age showing the population could be considered as you adults. A large standard deviation can also be observed in impulsivity Frequencies for all variables can be seen in below Table 2.

Table 2 (Presenting descriptive statistics for continuous variables)

Descriptive statistics of all continuous variables

	Mean (95% Confidence Intervals)	Std. Error Mean	Median	SD	Range
Age	21.27 (20.80-21.74)	.23	21	1.41	18-25
CPT errors	16.76 (14.83-18.68)	.95	17	5.76	7-30
Sleep quality	8.19 (7.16-9.22)	.51	8	3.09	2-16
Daytime sleepiness	8.46 (7.37-9.55)	.54	8	2.86	2-18
Chronotype	5.45 (5.02-5.87)	.21	5.32	1.28	2.49-9
Social jetlag	1.18 (.57-1.80)	.30	1.25	1.84	-3.75-4.62
Sleep duration FD	8.60 (8.18-9.02)	.21	8.5	1.26	5.67-11.50
Impulsiveness	68.14 (65.81-70.47)	1.15	67	6.99	55-92
Employment hours	7.59 (6.72-8.47)	.43	8	2.62	0-12

Tests of normality were conducted on all continuous variables to identify appropriate inferential statistic measures for each hypothesis. Normally distributed data was found in six of the nine continuous variables. The normally distributed variables were PSQI scores, Daytime sleepiness, chronotype, social jetlag, sleep duration, and CPT errors. The remaining four variables age, impulsivity, and hours of employment all showed none normal data. H1 and H6 required the use of t-tests, due to the normal distribution of CPT Commission errors independent samples t-tests were required. The variables used in H2-H5 displayed normally distributed data so Pearson's correlation was used. H7 and H8 involved correlating impulsivity and employment hours both of which non-normally distributed with CPT errors. The non-normal distribution meant that Spearman's Rho correlations were required.

Inferential statistics**Table 3(for displaying correlations between variables)**

Correlations between attention and all continuous variables.

Variables	CPT errors (attention)
1.CPT errors (attention)	1
2. Sleep quality	-.16
3. Daytime sleepiness	.17
4. Chronotype	.01
5. Social Jetlag	-.13
6. Impulsivity	.07
7. Employment hours	-.09

Note. Statistical significance: * $p < .05$; ** $p < .01$; *** $p < .001$

The relationship between attention and sleep quality was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a weak, negative correlation between the two variables ($r = -.16$ [95% CI = $-.44 - .11$], $n = 37$, $p > .05$). This indicates that the two variables share approximately 2.5% of variance in common. Results indicate that higher levels of attention are not associated with lower levels of sleep quality.

The relationship between attention and daytime sleepiness was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a weak, positive correlation between the two variables ($r = .17$ [95% CI = $-.16-.43$], $n = 37$, $p > .05$). This indicates that the two variables share approximately 2.9% of variance in common. Results indicate that higher levels of attention are not associated with higher levels of daytime sleepiness.

The relationship between attention and sleep chronotype was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no

violation of the assumptions of normality, linearity and homoscedasticity. There was a weak, positive correlation between the two variables ($r = .01$ [95% CI = $-.31-.26$], $n = 37$, $p > .05$). This indicates that the two variables share approximately 0% of variance in common. Results indicate that higher levels of attention are not associated with higher levels chronotype (eveningness).

The relationship between attention and social jetlag was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a weak, negative correlation between the two variables ($r = -.13$ [95% CI = $-.43-.15$], $n = 37$, $p > .05$). This indicates that the two variables share approximately 1.7% of variance in common. Results indicate that higher levels of attention are not associated with higher levels of social jetlag.

The relationship between attention and impulsivity was investigated using Spearman Rho correlation coefficient. Preliminary analyses found a violation of the assumption of normality requiring non-parametric measures. There was a weak, positive correlation between the two variables ($r = .07$ [95% CI = $-.31-.43$], $n = 37$, $p > .05$). This indicates that the two variables share approximately 0.4% of variance in common. Results indicate that higher levels of attention are not associated with higher levels of impulsivity.

The relationship between attention and weekly hours of employment was investigated using Spearman Rho correlation coefficient. Preliminary analyses found a violation of the assumption of normality requiring non-parametric measures. There was a weak, negative correlation between the two variables ($r = -.13$ [95% CI = $-.43-.15$], $n = 37$, $p > .05$). This indicates that the two variables share approximately 1.7% of variance in common. Results indicate that higher levels of attention are not associated with lower weekly hours of employment.

An independent samples t-test was conducted to compare levels of attention between males and females. There was no significant difference in scores ($t(35) = 1.72$, $p = .09$) with males ($M = 18.14$, $SD = 5.98$) scoring higher than females ($M = 14.94$, $SD = 5.08$). The magnitude of the differences in the means (mean difference = 3.21 , 95% CI: $-.57 - 6.98$) was medium (Cohen's $d = .58$).

An independent samples t-test was conducted to compare levels of attention between high sleep durations and low sleep durations. There was no significant difference in scores ($t(35) = .69$, $p = .49$) with high sleep durations ($M = 17.33$, $SD = 5.78$) scoring higher than low sleep durations ($M = 16.00$, $SD = 5.83$). The magnitude of the differences in the means (mean difference = 1.33, 95% CI: -2.57 – 5.24) was medium (Cohen's $d = .23$).

In addition to the tests run to prove all stated hypotheses in the research aims, two ANOVA tests were conducted to explore the variables more deeply. A two-way between groups analysis of variance was conducted to explore for: (1) differences in sleep quality, and impulsivity, on levels of hit accuracy in the CPT, and (2) to examine if the effect of sleep quality on levels of hit accuracy depends upon the impulsivity type.

Initial findings indicated a violation of the assumption of homogeneity of variance ($p = .1$) therefore a new alpha level of .01 was selected to determine statistically significant effects.

The interaction effect between sleep and impulsivity was not statistically significant, $F(2, 33) = .12$, $p = .73$. The main effect for sleep quality was not significant and of a small magnitude ($F(2, 33) = .12$, $p = .73$, $\eta^2 = .01$). The main effect for impulsivity was not significant based on the newly selected alpha level and the effect was of a small ($F(2, 33) = .64$, $p = .43$, $\eta^2 = .02$).

A two-way between groups analysis of variance was conducted to explore for: (1) differences in sleep quality and impulsivity, on reaction time in the CPT, and (2) to examine if the effect of sleep quality on reaction time depends upon the impulsivity type.

Initial findings indicated a violation of the assumption of homogeneity of variance ($p = .1$) therefore a new alpha level of .01 was selected to determine statistically significant effects.

The interaction effect between sleep and impulsivity was not statistically significant, $F(2, 33) = .32$, $p = .58$. The main effect for sleep quality was not significant and of a small magnitude ($F(2, 33) = .26$, $p = .61$, $\eta^2 = .01$). The main effect for impulsivity was not significant based on the newly selected alpha level and the effect was of a small ($F(2, 33) = .17$, $p = .68$, $\eta^2 = .01$).

Discussion

As we predicted, the results from the current study indicated that no significant difference existed in attention between males and females. A study testing the gender differences in boys and girls on the CPT also failed to find the presence of any significant discrepancies in attention (Hasson & Fine, 2012). Contradictory findings suggest that women make less CPT errors thus indicating higher attention levels, although their response times were significantly lower (Burton et al., 2010). Concluding information on the gender differences on attention not specific to ADHD research is not hugely focused on by the literature. It may be the case that in-depth research on this topic is not necessary.

The research question of whether both sleep quality and daytime sleepiness were associated with attention did not return the expected results. In the case of sleep quality there was no association found with attention levels contradictory to literature (Niu et al., 2011; Gobin, Banks, Fins & Tartar, 2015). Furthermore, Sadeh, Gruber, and Raviv (2002) found that poor sleep quality had a relationship with omission errors and commission errors on the CPT. Omission errors which were participants eliciting a button press when required and commission errors which were withholding button press when required. Similarly, there was no association found between daytime sleepiness and attention. Other research finds that this is not the case and an association is present. Golan, Shahar, Ravid and Pillar (2004) showed that children with attention deficits reported more daytime sleepiness. It is suspected that the small sample size of 37 restricted the present research in producing significant associations. Taking this into consideration, Golan and colleagues (2004) found a significant association with a sample of 34 participants.

The investigation of the third research question aimed to assess chronotype, social jetlag, and sleep duration all of which are components of the MCTQ. The correlation assessments of both chronotype and social jetlag showed no significant association with attention. Again, it should be considered that sample size may have reduced the ability to find any significant association. Investigations of chronotype and attention produce inconsistent results in the literature (Killgore & Killgore, 2007). Matchock and Mordkoff, (2008) conducted a study of attention by examining

three separate components alerting, orienting and executive functioning. Comparing these three separate elements of attention with chronotype showed no difference in morning type and evening type with the exception of alerting which morning types favoured slightly. The present study presents similar findings as no association between chronotype and attention is in essence the same as no difference between morning and evening types on attention. In regards to social jet lag some research has found that significant small magnitude associations have been found with ADHD symptoms. Although ADHD and attention levels are not exactly interchangeable so comparisons should be drawn with caution.

The final prediction tied to the chronotype research question found high duration sleepers and low duration sleepers did not have a statistical difference on levels of attention. Sleep duration tends to be regarded as secondary in the literature to sleep quality and daytime sleepiness. Dewald, Meijer, Oort, Kerkhof and Bögels (2010) found stronger relationships of both sleep quality and daytime sleepiness with academic performance than sleep duration. It could be of interest to assess these relationships directly to attention to provide a better comparison. Examination of which has the strongest relationship with attention would help clarify if sleep quality, daytime sleepiness or sleep duration should gain focus in order to improve attention.

The link between impulsivity and attention is a prevalent one throughout the research (Carmona et al., 2009; Day et al., 2007). The research question formulated in the current study did not find a significant association between the impulsivity and attention. Considering that one of the main characteristics of ADHD is impulsiveness (Miller, Derefinko, Lynam, Milich & Fillmore, 2009; Toplak et al., 2009). It provided valid rationality to predict that an association would exist between impulsivity and attention. The inability to find a significant association with impulsivity and attention is especially surprising due to how related the concepts are in the literature.

Finally we predicted that increased hours of weekly employment would be associated with lower levels of attention. The correlation returned a non-significant association contradicting the current hypothesis. A number of factors could have caused the unexpected non-significant result. For instance, the relatively small sample size of the research could potentially be making it hard to

find a significant association. Research suggests that grades improve with low work hours and fall with long work hours. Considering that academic performance is linked with attention in the literature, it could be predicted that attention improves with low work hours and falls with high work hours (Schill, McCartin & Meyer, 1985; Quirk, Keith & Quirk, 2001). Although literature is somewhat inconsistent as other research suggests a negative relationship on holding a part-time job and academic performance (Singh, 1998; Oettinger, 1999). There may also potentially be a relationship between sleep quality, daytime sleepiness, sleep duration and weekly work hours. Investigations may find that longer work hours may lead to less time available for sleep and subsequently reduce sleep duration, sleep quality and increase daytime sleepiness all of which have been associated with decreased attention.

Two further ANOVA tests were run to explore differences in sleep quality and impulsiveness on hit accuracy and reaction time of CPT results. The results found that no effect between sleep and impulsivity on hit accuracy or reaction time was present.

In sum, only one of the eight initially stated hypotheses we predicted was true. The other seven all returned non-significant results from testing which in all cases were conflicting of what we predicted based on the review of the literature prior to investigation.

The main limitation of the current study was the relatively small sample size of 37. Data collection required the use of a laboratory in the National College of Ireland. Due to a large number of researchers conducting separate experiments the use of the laboratory had to be booked and was not always freely available. Coupled with the 25 minute duration of the test restricted the ability to reach a desired sample size of 50 or higher. It has been acknowledged that sample size may have influenced the fact that seven out of eight hypotheses failed to show any significant results. Future research would be beneficial to replicate this study but with a larger sample size and reassess these hypotheses.

Attention is an extensively researched topic although a vast majority of the research can be seen as using ADHD samples. It is understandable that the focus of research should be gauged

towards providing data on the populations that have difficulties with normal functioning so therapies and interventions can be developed. Although, sometimes larger social difficulties can occur when a large group of individuals have moderate psychological problems as oppose to a few individuals with extreme psychological problems. In the case of this research we identified that ADHD samples flood the literature which represent extreme end of attention so there is a need for assessment of moderate attention levels. The present research employed a non-clinical sample as a representation of moderate attention difficulties in the population. Unfortunately, participants with ADHD were not screened for and it cannot be presumed that the sample was strictly non-clinical. Future research or replications of this study would benefit greatly from screening against this limitation.

The difficulty of drawing comparisons with the present research and the literature was hard to distinguish due to most studies using ADHD samples. A suggested area for future research would be to clearly identify if ADHD directly represents attention levels or do differences exist as ADHD is a mental disorder and contains more dimensions that just attention. For example, it is heavily attributed to impulsiveness which is also considered highly associated with attention but not the same.

In conclusion the research assessed eight hypotheses built around three research questions. The main findings reported that no there was no difference between males and females on attention. Sleep quality and daytime sleepiness did not present any association with attention. A suspected association between chronotype and attention was not presented. Similarly, an association of social jetlag and attention could not be found contradictory to the literature. High social jetlag has been associated with chronic sleep loss which is related to sleep quality and daytime sleepiness (Roenneberg et al., 2007; Wittmann, Dinich, Meroow & Roenneberg, 2006). The present study supports previously mentioned statement by showing sleep quality, daytime sleepiness, social jetlag were all not associated with attention. If results reported an association

with sleep quality and daytime sleepiness on attention but not social jetlag and attention, the results would be contradictory. The assessment of sleep duration which split the sample into high and low sleep durations did not find any difference in attention between the groups. The investigation of Impulsiveness did not find any association with attention. Furthermore, when split into high impulsivity and low impulsivity groups no difference was found on attention levels between the groups. The final variable assessed was hours of weekly employment and if an association existed it attention levels. The results concluded that hours of weekly employment were not associated with attention.

The results produced were all contradictory to what was predicted in the research aims with the exception of gender differences. A replication of the current study with much larger sample may provide more significant results that support the predictions as oppose to contradict them. It is widely supported that poor sleep quality, daytime sleepiness, and other sleep problems affect the attention levels in college students. Information on college students highly prevalent levels of poor sleep quality due to varying sleep schedules and how this decreases attention can provide valuable data. The construction of interventions or plans that students can use to help improve their attention would benefit greatly from such research. Improved attention levels in college students could potentially then lead to better academic performance and overall educational success.

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Appendices

Appendix 1 (Form of Consent)

Form of consent to research

I, the undersigned, confirm that (please tick box as appropriate):

1.	I have read and understood the information about the project, as provided in the Information Sheet dated _____.	<input type="checkbox"/>
2.	I have been given the opportunity to ask questions about the project and my participation.	<input type="checkbox"/>
3.	I voluntarily agree to participate in the project.	<input type="checkbox"/>
4.	I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	<input type="checkbox"/>
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, pseudonyms, anonymisation of data, etc.) to me.	<input type="checkbox"/>
6.	The use of the data in research, publications, sharing and archiving has been explained to me.	<input type="checkbox"/>
7.	I understand that other researchers will have access to this data only if they agree to preserve the confidentiality of the data and if they agree to the terms I have specified in this form.	<input type="checkbox"/>
8.	I, along with the Researcher, agree to sign and date this informed consent form.	<input type="checkbox"/>

Participant:

Name of Participant Signature Date

Researcher:

Name of Researcher Signature Date

PARTICIPANT INFORMATION SHEET**PROJECT TITLE**

An Investigation of Attention, Sleep, Impulsivity, and Employment in College students.

INVITATION

I would like to invite you to take part in a research study on the sleep patterns and work habits of college students affects their academic performance, more specifically attention. I am a psychology student in the National College of Ireland. As part of my undergraduate research, I am required to research a particular topic of interest. The proposed research has gained ethically approval through the ethics committee of psychological research within the National College of Ireland.

WHAT WILL HAPPEN

In this study, you are required to complete a Pittsburgh Sleep Quality Index, Epworth Sleepiness Scale, Munich Chronotype Questionnaire, Barratt Impulsivity Scale, and Continuous Performance Test. These measure date on sleep quality, daytime sleepiness, chronotype, Impulsivity, and attention. In addition, information on how many hours of part-time employment you hold will be required. The data provide by all participants will be kept confidential throughout all stages of the research. At any point that a participant feels uncomfortable or does not want to continue, they may withdraw from the study and all data relevant to them.

TIME COMMITMENT

The study typically takes 25 minutes to complete.

PARTICIPANTS' RIGHTS

You may decide to stop being a part of the research study at any time without explanation. You have the right to ask that any data you have supplied to that point be withdrawn/destroyed.

You have the right to omit or refuse to answer or respond to any question that is asked of you.

You have the right to have your questions about the procedures answered. If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

RISKS

There is no substantial risk to taking part in this study. The only recommendation is that if you are significantly distressed in test situations that you do not volunteer.

Your participation in this study is voluntary.

CONFIDENTIALITY/ANONYMITY

The data we collect do not contain any personal information about you. The only form that will contain any personal information is the consent form that requires the participant's signature.

Consent forms will not be identifiable to participant's data upholding the confidentiality of the study.

Appendix 3 (Debriefing Sheet)

DEBRIEFING SHEET

An Investigation of Sleep, Impulsivity, employment, and attention.

Thanks and appreciation for your participation in this current study.

The study is trying to assess sleep habits and work routines of college students and how that affects their ability to maintain attention. The way in which your data will be assessed is by taking your scores from the Pittsburgh sleep Quality Index, Epworth sleepiness scale, Munich Chronotype Questionnaire and amount of hours spent working a week and how this may affect your performance in the Continuous Performance Task.

All data will be stored anonymously and will be unidentifiable. Due to the unidentifiable nature of the data you will be unable to withdraw your data down the line.

Your participation is greatly appreciated.

In addition if you may have any additional queries following this research contact information is provided below.

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Appendix 4 (demographic questions)

An exploration of the factors affecting attention in college students

The following is questions regarding demographics and employment.

Q1) Gender

Male Female

Q2) Age

Q3) On average how many days of paid employment do you work weekly.

Q4) On average how many hours of paid employment do you work daily.

Appendix 5 (Pittsburgh Sleep Quality Index)

The Pittsburgh Sleep Quality Index

Name _____

Date _____

Instructions:

The following questions relate to your usual sleep habits during the past month *only*. Your answers should indicate the most accurate reply for the *majority* of days and nights in the past month. Please answer all the questions.

1. During the past month, when have you usually gone to bed at night?

usual bed time _____

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

number of minutes _____

3. During the past month, when have you usually got up in the morning?

usual getting up time _____

4. During the past month, how many hours of *actual* sleep did you get at night? (This may be different than the number of hours you spend in bed).

hours of sleep per night _____

For each of the remaining questions, check the one best response. Please answer *all* questions.

5. During the past month, how often have you had trouble sleeping because you.....

- (a) Cannot get to sleep within 30 minutes

Not during the past month _____ Less than once a week _____ Once or twice a week _____ three or more times a week _____

- (b) Wake up in the middle of the night or early morning

Not during the past month _____ Less than once a week _____ Once or twice a week _____ Three or more times a week _____

- (c) Have to get up to use the bathroom

Not during the past month _____ Less than once a week _____ Once or twice a week _____ three or more times a week _____

- (d) Cannot breathe comfortably

Not during the past month _____ Less than once a week _____ Once or twice a week _____ three or more times a week _____

- (e) Cough or snore loudly

Not during the past month _____ Less than once a week _____ Once or twice a week _____ three or more times a week _____

past month____ once a week____ twice a week____ times a week ____

(f) Feel too cold

Not during the past month____ Less than once a week____ Once or twice a week____ three or more times a week ____

(g) Feel too hot

Not during the past month____ Less than once a week____ Once or twice a week____ three or more times a week ____

(h) Had bad dreams

Not during the past month____ Less than once a week____ Once or twice a week____ three or more times a week ____

(i) Have pain

Not during the past month____ Less than once a week____ Once or twice a week____ three or more times a week ____

(j) Other reason(s), please describe_____

How often during the past month have you had trouble sleeping because of this?

Not during the past month____ Less than once a week____ Once or twice a week____ three or more times a week ____

6. During the past month, how would you rate your sleep quality overall?

Very good _____
 Fairly good _____
 Fairly bad _____
 Very bad _____

7. During the past month, how often have you taken medicine (prescribed or “ over the counter”) to help you sleep?

Not during the past month____ Less than once a week____ Once or twice a week____ three or more times a week ____

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month____ Less than once a week____ Once or twice a week____ three or more times a week ____

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

- No problem at all _____
- Only a very slight problem _____
- Somewhat of a problem _____
- A very big problem _____

10. Do you have a bed partner or roommate?

- No bed partner or roommate _____
- Partner/roommate in other room _____
- Partner in same room, but not same bed _____
- Partner in same bed _____

11. How often do you feel tired during the following times during the day?

Morning:

- | | | | |
|-----------|-------|--------------|-------|
| 0 | 1 | 2 | 3 |
| most days | often | occasionally | never |

Afternoon:

- | | | | |
|-----------|-------|--------------|-------|
| 0 | 1 | 2 | 3 |
| most days | often | occasionally | never |

Evening:

- | | | | |
|-----------|-------|--------------|-------|
| 0 | 1 | 2 | 3 |
| most days | often | occasionally | never |

Appendix 6 (Epworth Sleepiness Scale)**The Epworth Sleepiness Scale**

Initials: _____

Date: _____

Date of Birth: _____

Gender: Male/ Female (delete as appropriate)

How likely are you to doze off or fall asleep in the following situations, in contrast to just feeling tired? This refers to your usual way of life in recent times. Even if you have not done some of these things recently, try to work out how they would have affected you.

Use the following Scale to choose the most appropriate number for each situation:

- 0 - would never doze
- 1 - slight chance of dozing
- 2 - moderate chance of dozing
- 3 - high chance of dozing

Situation Chance of Dozing

Sitting and reading _____

Watching TV _____

Sitting, inactive in a public place (e.g. Cinema) _____

As a passenger in a car for an hour with out a break _____

Lying down to rest in the afternoon when given a chance _____

Sitting and talking to someone _____

Sitting quietly after lunch with out alcohol _____

In a car, while stopped for a few minutes in traffic _____

Office Use Only: **Score** _____

Appendix 7 (Munich Chronotype Questionnaire)

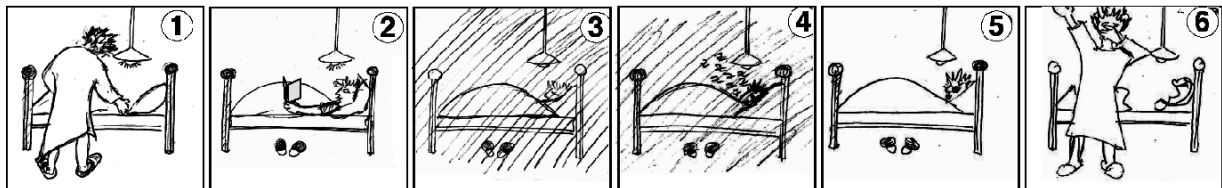
Munich ChronoType Questionnaire (MCTQ)

In this questionnaire, you report on your typical sleep behaviour over the past 4 weeks. We ask about work days and work-free days separately. Please respond to the questions according to your perception of a standard week that includes your usual work days and work-free days.

I have a regular work schedule (this includes being, for example, a housewife or househusband):

Yes I work on 1 2 3 4 5 6 7 days per week. No _ _

Is your answer "Yes, on 7 days" or "No", please consider if your sleep times may nonetheless differ between regular 'workdays' and 'weekend days' and fill out the MCTQ in this respect.



Please use 24-hour time scale (e.g. 23:00 instead of 11:00 pm)!

Workdays

Image 1: I go to bed at _____ o'clock.

Image 2: Note that some people stay awake for some time when in bed!

Image 3: I actually get ready to fall asleep at _____ o'clock.

Image 4: I need _____ minutes to fall asleep.

Image 5: I wake up at _____ o'clock.

Image 6: After _____ minutes I get up.

I use an alarm clock on workdays: Yes No

If "Yes": I regularly wake up BEFORE the alarm rings: Yes No

Free Days

Image 1: I go to bed at _____ o'clock.

Image 2: Note that some people stay awake for some time when in bed!

Image 3: I actually get ready to fall asleep at _____ o'clock.

Image 4: I need _____ minutes to fall asleep.

Image 5: I wake up at _____ o'clock.

Image 6: After _____ minutes I get up.

My wake-up time (Image 5) is due to the use of an alarm clock: Yes No

There are particular reasons why I cannot freely choose my sleep times on free days:

Yes If "Yes": Child(ren)/pet(s) Hobbies Others , for example: _____

No

Barratt Impulsivity Scale	Never	Rarely	Almost Always	Always
1. I plan tasks carefully	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I do things without thinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I make-up my mind quickly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I am happy-go-lucky.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I don't pay attention.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I have 'racing' thoughts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I plan trips well ahead of time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I am self-controlled.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I concentrate easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I save regularly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. I 'squirm' at plays or lectures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I am a careful thinker.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I plan for job security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I say things without thinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I like to think about complex problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I change jobs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. I act on impulse.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. I get easily bored when solving thought problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. I act on the spur of the moment.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. I am a steady thinker.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. I change residences.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. I buy things on impulse.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. I can only think about one thing at a time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. I change hobbies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. I spend or charge more than I earn.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. I often have extraneous thoughts when thinking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. I am more interested in the present than the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

28. I am restless at the theater or lectures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. I like puzzles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. I am future oriented.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>