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The uncritical commute:
The impact of students' living situations
while at university

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Abstract

Within the population of students who attend university, there are several sub-populations who can be categorised based on their choice of living. Previous research has suggested that students' living situations while at university can impact them both cognitively and socially. Due to the importance which is placed on critical thinking ability both in and outside of an academic environment, and considering the impact of living situation on social aspects, the current study sought to investigate the impact of students' living situations on their critical thinking ability and general wellbeing, primarily examining how students who live at home and commute to university are affected. Participants completed an online questionnaire lasting 50 minutes during which they were administered the Affectometer-2 to measure their wellbeing and the Ennis-Weir Critical Thinking Essay Test which measured their critical thinking ability. It was found that critical thinking was lower in students who lived off-campus with their parents and in those who did not live with friends. Other factors which affected critical thinking were found to be poorer socio-economic backgrounds, lower educated familial background, and year of study. Overall wellbeing did not differ among the participants though students who did not live with friends had lower optimism, self-esteem and energy. These results are discussed in line with their impact on a student's overall academic experience, along with the reassessment that university and governmental policy may need as a result.

Introduction

For many individuals, the enrolment process for university is the first time in their life they experience independence, in particular living separately, and often, a great distance away from their parents. In Scotland around 55% of students leave their parental home when they start university (Scottish Government, 2008). However, this leaves a significant proportion of students still remaining in their parental home throughout their university career. We can speculate that the reasons for these choices may be motivated by financial burdens, an aversion to debt or even a lack of maturity or confidence to begin a self-managing life, but students who choose to remain at home throughout their university career and therefore commute to university (commuter students) often miss out on experiences and opportunities that their on-campus peers (on-campus students) do not. On-campus students have obvious academic advantages over commuter students, such as being quicker to class with none of their time spent on a commute, and being close to the library. It is also possible that on-campus students have additional advantages over commuter students such as being

able to participate more fully in university life, as well as stay out late with friends and have no concern regarding parental control or the times of a train or bus home. It is also unlikely that they would suffer the distractions that may be brought about by family conflict or life in general.

It is important also to consider both cultural and political motivations behind a student's choice to stay at home. In Scotland there is a particularly strong underlying financial motivation for why a student may make the choice – Scottish students are able to earn a degree with very little expense over their four years (or in some cases, five). Unlike in many other countries, universities in Scotland do not stipulate that students must live on-campus, and some universities across Scotland intentionally discriminate against undergraduate students who live within a “commutable” distance in their accommodation applications (e.g. Edinburgh Napier University, 2013; University of Edinburgh, 2013; “University of Strathclyde”, 2014; “Glasgow Caledonian University”, 2014). This is in stark contrast with a common practice of some universities outside of Scotland which mandate that students in their first year live in student accommodation (e.g. “Duke University”, 2014; “The Ohio State University”, 2014; “Michigan State University”, 2014; “The University of Vermont”, 2014). Other universities have implemented an “opt-out” system where first years are guaranteed and strongly encouraged to live in accommodation and allocated space unless they choose to opt out (e.g. “Durham University”, 2014). Overall there appears to be a cultural shift regarding the attitudes to whether students should be living on or off campus – Scotland's 55% of students living on-campus is modest in comparison with the USA where universities report up to 98% of their undergraduates living in students accommodation (e.g. “University of Michigan”, 2014; “Columbia University”, 2014).

Theoretical Stance on the Impact of Living Situation

The current study's idea of a difference in students' living situations being influential on a their academic life finds its inspiration in Tinto's theory of student retention and dropout (1975). Insofar as this model was primarily aimed at tackling student retention, its approach can be applied in understanding the effects of a student's choice of living situation and their development as a student thereafter.

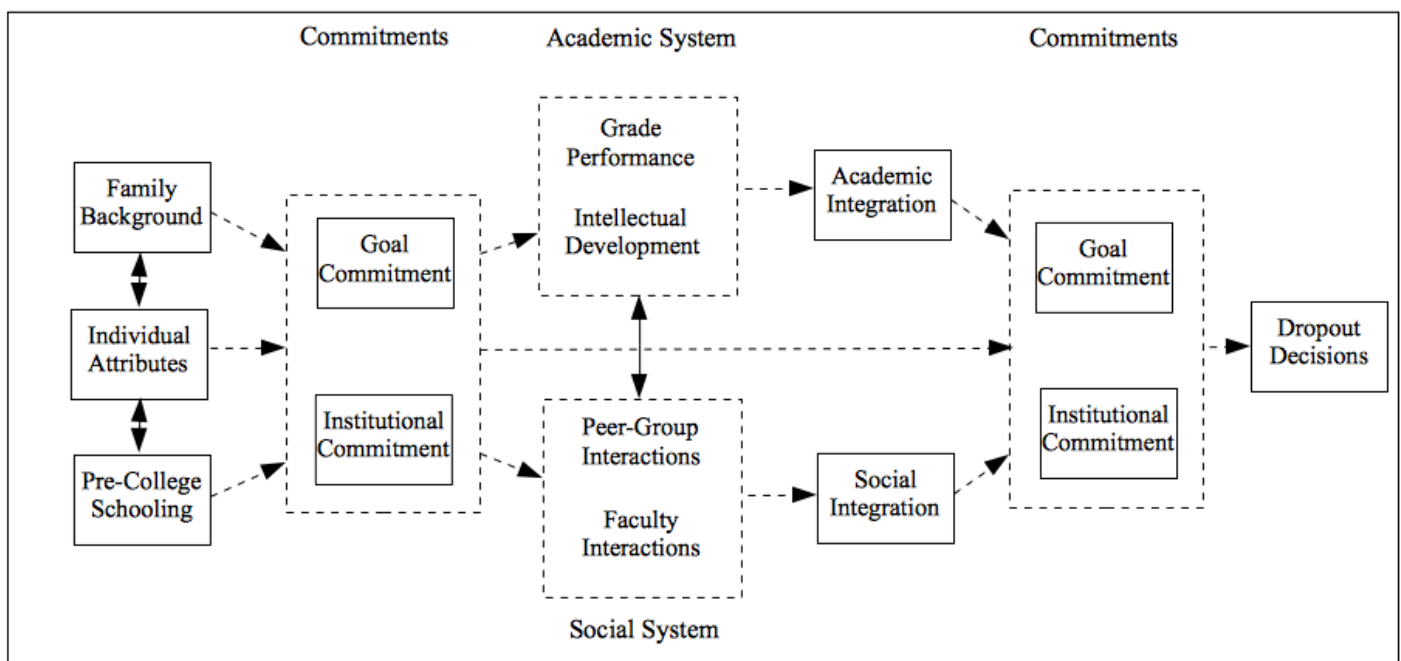


Figure 1 – A Conceptual Schema for Dropout from College. Redrawn from “Dropout from Higher Education: A Theoretical Synthesis of Recent Research”, by V. Tinto, 1975, *Review of Educational Research*, 45(1) p. 95. Copyright 1975 by the American Educational Research Association. Redrawn with permission from author.

The model infers that dropout decisions are eventually influenced by a student's “Goal Commitment”, which Tinto views as their expectation and persistence regarding their overall aim (e.g. 2 year degree vs. 4 year degree) and their “Institutional Commitment”, which he views as the underlying reasons for the choice of a particular institution. A student's choice of living situation influences the model in the initial factors of Goal and Institutional Commitments which are “Family Background”, “Individual Attributes”, and “Pre-College Schooling”. These are relatively simple factors in that they will all influence a student's choice of living in an obvious manner, e.g. coming from a poor family might hold as much influence over a student's decision to stay at home and save money, as would having a group of high school friends all moving out together. When the decision regarding living situation is made, an understanding can then be taken from the model regarding a student's academic development. The model's secondary set of factors are “Grade Performance” and “Intellectual Development” leading to an overall factor of “Academic Integration”, and, “Peer-Group Interactions” and “Faculty Interactions” leading to an overall factor of “Social Integration”. Tinto does denote a connection between the secondary set of factors. It is clear where students' choices of living situation may impact on their overall “Social Integration”. However, the link to “Academic Integration” is more ambiguous.

Another of Tinto's models regarding learning communities also speaks of “Intellectual Development” (Tinto, 1997; 1998) and this is where a broader theory regarding the development of

the student as influenced by their living situation can be understood on a general level. Tinto proposes that students will develop intellectually when they are working with other students in a small capacity as this fosters discussion and encourages thoughtful learning outside of the teaching environment. Secondly he proposes that the learning communities create more “involving” environments which, in turn, lead to greater social connectivity and ability. Learning communities, according to Tinto, lead to greater social and academic integration. If a student is living at home with their parents it is unlikely then that they feel part of a “learning community”. While Tinto primarily alludes to these being small groups, the perception of being away from the campus and other students is likely to lead to feelings of isolation and therefore prevent integration, which, by Tinto's theory could lead to a decision surrounding dropping out. It is also worth considering the practical implications for commuter students who might not be able to physically join a learning community due to time constraints, a lack of flexibility, or simply not perceiving the need to extend their network at university due to having friends in their hometown.

Cognitive Impact of Living Situation

Along with Tinto's theories (1975; 1997; 1998) the current study was inspired by a study investigating the cognitive impact of students' living situations (Pascarella et al., 1993). Pascarella and colleagues' (1993) study was motivated by a drive to understand not only why on-campus students were more heavily involved at university but also how their greater exposure to a diverse set of differing beliefs, values and ideas impacted them cognitively as compared to commuter students. The study found differences between on-campus students and commuter students in the form of a gain in students' critical thinking scores over first year if they lived on-campus. Interestingly, there has been almost no other research concerning the effects of being a commuter student on critical thinking ability since, despite critical thinking being such an important part of a student's intellectual and examinable ability. Despite the two decade gap between it and the current study, its findings regarding commuter students remain relevant and important today. For this reason the current study aims to further investigate the cognitive impact of students' living situations while at university in order to determine what specific factors within these two groups of students (e.g. distance to campus, whom one lives with) may be responsible for the differences in critical thinking that Pascarella and colleagues (1993) found.

Measuring Intellectual Ability

One of the biggest considerations in light of Pascarella and colleagues' (1993) study was whether critical thinking is the most reflective and important variable to examine within a student population. When measuring intellectual ability it is worthwhile to consider how to do so without bias – does such a variable exist? Grade point average (GPA) was initially considered as the ideal measure due to the frequency of its use in university progress (e.g. Caie, 2010) and international student applications (e.g. “University of Glasgow”, 2014); however, there were a variety of factors which made critical thinking ability the optimum reflector of intellectual ability. Firstly, unlike in other countries, the education system in Scotland does not concern itself with GPAs but instead with degree classifications, and at the high school level, with A-C level passes (e.g. Scottish Qualifications Authority, 2014). Students at a Scottish university may not even be aware of their GPA. Another concern was that between disciplines there may not be coherence between grading, and considering that a student's performance in a secondary subject will not impact on their degree classification, students may exert more effort and achieve a higher grade in their primary subject of study despite their GPA being affected by their overall performance. Empirical evidence which has compared GPA and critical thinking has shown GPA to be somewhat fallible. Royalty (1994) compared the proportion of variability that GPA and the American College Test (ACT) could account for in a students' critical thinking ability. GPA accounted for a very small proportion of the differences in students' overall critical thinking scores (.09) whereas the ACT, which is a standardised measure, accounted for a reasonable proportion of the differences in scores (.32).

The literature's opinion regarding GPA and student living situation is also mixed. One study reported that in most institutions, African-American students living on-campus had significantly higher GPAs than African-American commuter students (Turley and Wodtke, 2010). The authors did not find this result in general, though on-campus students at liberal arts colleges in particular, had significantly higher GPAs than commuter students. Another study reported no significant difference between the groups of students for GPA (Alfano and Eduljee, 2013). Based on this inconsistent evidence, it was decided that intellectual ability in the current study would be measured using critical thinking as opposed to GPA.

The use of critical thinking is widespread both inside and outside of academia. It is argued to be a vital evaluation skill on which our lives depend due to the fact that our everyday decisions are based on the facts and arguments we choose to believe and accept as true (Dwyer, Hogan and Stewart,

2014; González-González, Gallardo-Gallardo, and Jiménez-Zarco, 2014). Within education, the same logic is applied in attitudes to critical thinking skills. It has been argued that traditional attitudes of teaching students *what* to think rather than *how* to think does not prepare them for life outside university (Paul, 1995). A report found that 99.6% of university faculty across America view critical thinking as an indispensable skill (Wyer, 2009). This report also commented on how a majority of academics see the ability as one which students need both to write effectively and to evaluate the quality and reliability of the material they engage with. Some have also argued it is the best way measure both the best a student can do and the most they will likely do (Lamb and Reynolds, 2011).

Critical thinking has been found to be an applicable concept across disciplines in education through various implementations. Some examples of recent findings present a case for its appropriateness in testing across various disciplines. In the field of economics, an adoption of critical thinking based instruction in teaching led to improved results (Heijltjes, Van Gog, Leppink, and Paas, 2014). Jenicek, Croskerry, and Hitchcock (2011) argued a case for critical thinking to become a mandatory aspect of medical curriculums by using examples of abilities within medical practise which critical thinking underlies. This argument is also made in other studies stating that since critical thinking is “central to the function” of healthcare professionals, it should be included in their education (Huang, Newman, and Schwartzstein, 2014, p. 95). For students studying physics, the use of critical thinking approaches in teaching was found to improve students' understanding of specific concepts (Gould, 2013). Within psychology, the American Psychological Association (APA), in their most recent guidelines, state that critical thinking is one of the most important skills to attain at an undergraduate level (APA, 2013). Based on these studies, it appears that even out with subjects which traditionally involve critical thinking (e.g. philosophy), critical thinking skills are not only useful in learning but can also be cultivated in a broader range of disciplines.

Critical thinking also has direct implications for students' career prospects. Even within popular culture, the skill is heralded as one that is needed to acquire a good job. Forbes listed it as the number one skill that individuals should use and exhibit in their job applications, and that nine of the ten most in-demand jobs require it (Casserly, 2012). A study examining the expectations of graduate employers found that critical thinking is a skill expected by employers (Lowden, Hall, Elliot and Lewin, 2011). Taking this all into account, the current study focussed on this as a generally applicable and worthwhile measure of a student's intellectual ability.

Empirical Considerations

Commuter students have been investigated for almost a century in the literature (e.g. Rich, 1929; Coryell, 1941; Stark, 1965). Initial research considered how they are influenced by variety of different university factors, though in recent times its pursuit in academia has been lacking. Tinto's work and the accompanying connections regarding on-campus students and commuter students is mostly theoretical though there has been a moderately sized contribution of empirical research over the past several decades to examine what differences, if any, exist between these two groups of students in terms of their intellectual ability and social satisfaction. While Pascarella and colleagues' (1993) study influences the current study's aim to examine differences in critical thinking ability, many factors within education have drastically changed over the past 20 years which require the current study to investigate more closely the impact of a student's living situation.

Over two decades have passed since Pascarella et al. (1993) reported a significant difference between commuter and on-campus students for critical thinking ability. In those two decades the face of education has changed drastically. In 1975 in the USA, around 51% of high school graduates enrolled in college compared to 66.2% in 2013 (U.S. Department of Education, National Center for Education Statistics, 2013). In the 1990s in the UK, 77,163 students obtained a degree but in 2011 that figure was 350,800, an increase of over 300%. (Bolton, 2012). Not only have admission figures changed but the very nature of students' interaction with their learning and those around them has changed. The internet now allows students to interact instantly with their material, granting access to journal articles and almost any information they might need for their course at the click of a button. The implications of this unlimited and instantaneous access and communication could challenge the very essence of Tinto's theories (1975; 1997; 1998) and gives even greater cause to the current study's investigative aim of discerning a critical thinking difference between those in one of Tinto's "learning communities" and those outside of them. The question that is asked then is whether online materials and resources can be used to critically challenge students without any face-to-face interaction with other students. There has been an increasing trend of research over the past six years that has investigated the use of internet based critical thinking development, and the results have suggested that critical thinking ability can be improved with the use of online resources (Guiller, Durndell and Ross, 2008; Şendağa and Odabaşı, 2009; Mendenhall and Johnson, 2010; Petchtone, Puangtong, Chaijaroen, and Sumalee, 2012). With this considered it is important, not necessarily to challenge past findings, but to reevaluate the situation to gain a deeper and more importantly, current understanding of undergraduates' critical thinking use and ability.

The Potential Role of Wellbeing

It is generally accepted that on-campus students make more friends than commuter students (Hays and Oxley, 1986) and while such a finding would be expected, it is interesting that the same study, when examining friendship networks, found that 84% of on-campus students' friendship networks were made up of other students compared to only 48% for commuter students. Though not investigated in recent years, it seems to be the case in the past decade that on-campus students made more than two times the amount of friends that commuter students did (Buote et al., 2007). This study also found a positive relationship between the quality of new friendships and students' adjustment to university life, a relationship which was stronger for on-campus students. Buote et al. (2007) also discussed the implications of the high school friendship network and how on-campus students deconstruct it to a much greater extent than commuter students do, though their argument is that all first year students must replenish and make new friendships. It is worth considering though that the increased friend making found for on-campus students may solely be due to need rather than an advantage or skill in friend making over commuter students, as in some instances commuters may not see any need to make new friends. Adjustment to university and general wellbeing are of concern due to their impact on retention and general academic performance. The current study will investigate wellbeing variables as a result of these considerations, though it should be noted that research in the past has reported that wellbeing, while lower in commuter students, is not linked to examination performance (Halamandaris and Power, 1997; 1999).

Socio-Economic Variance

Since socio-economic factors may influence students' decision to stay at home, it was considered worthwhile to include this factor in the current study to determine what role this may have played with regards to wellbeing and critical thinking. Despite very little Scottish-based research in this area, something which has been researched in the past decade is the impact of part-time working on undergraduates' academic performance and general health. One study found that a significantly larger proportion of commuter students worked part-time jobs than on-campus students (68% - 35% respectively) (Carney, McNeish and McColl, 2005). Carney et al. (2005) reported that students who held part-time jobs displayed lower levels of social functioning, mental health and tended to perceive their job as a negative factor on their academic performance. More recently, Torres, Gross and Dadashova (2010) reported that working generally had poor effects on student studying. It should be considered that if around 70% of commuter students work part-time while they are

studying, there could be some considerable implications for their academic performance and general social wellbeing.

It is also worth considering the potential variance within parental influence on students' critical thinking based on socio-economic factors. The current study considers the impact of occupation requirement and the presence of discussions – if a student's parental occupation requires a university degree then is it more likely that the student will be a better critical thinker? Ideas such as this are important considering the influence of discussions on critical thinking (Totten, Sills, Digby and Russ, 1991).

As mentioned above, there may be financial implications for why students choose to commute or live on-campus such as an aversion to debt or simply the notion of gaining a degree with low monetary expense. Past research has indicated that even the initial decision regarding going to university varies across socio-economic statuses. For example, within those from advantaged socio-economic backgrounds the choice is assumed with little to no decision-making involved (Ball, Davies, Davies and Reay, 2002). Bourdieu (1976) argued that families indirectly pass onto their children a deeply rooted cultural capital and ethos which then influences and defines the attitudes they might hold towards university. If this is true, then it may be apparent that students with parents who have an academic background may be more interested in becoming socially and academically integrated, which, in line the arguments proposed surrounding Tinto's (1975) model may increase critical thinking and wellbeing.

Bourdieu's (1976) argument seems to play a role in students' perceptions and enjoyment of their university experience. This has particularly been shown in qualitative work in the area with students from lower socio-economic backgrounds being ashamed of going to university because of the “out group” in which it automatically places them. Additionally when they do reach university they report finding it very hard to trust other students as they perceive any interactions as superficial (Patiniotis and Holdsworth, 2005). Students who do make the choice to commute, which Patiniotis and Holdsworth (2005) found to be overwhelmingly motivated by finances, find that even in the initial stage of university social situations there is an out-group of commuters due to the students who live together in halls of residence being already familiar and friendly with each other (Holdsworth, 2006). Examining such evidence does create a profile of a student who has nowhere to belong.

The Current Study

With past research and theories discussed, and the distinct lack of recent research for the variables of critical thinking and wellbeing considered, there is a need for a 21st century investigation into the differences between on-campus and commuter students. It was hypothesised that commuter students, on average, will exhibit poorer critical thinking abilities and wellbeing than on-campus students. It was also hypothesised that students who are in their fourth year at university, regardless of their living arrangement, will exhibit better critical thinking abilities, on average, than students who are in their first year. It was additionally hypothesised that students who report taking part in discussions will, on average, exhibit better critical thinking abilities than students who do not report taking part in discussions. Other factors will also be considered such as socioeconomic variables and employment status.

Method

Participants

Participants were recruited through the online participant recruitment website of the University of Glasgow's Institute of Neuroscience and Psychology and through advertisements to student groups through social media. Participation was entirely voluntary and participants did not receive any payment or incentives for their participation. First year students in the School of Psychology were entitled to receive four of their obligatory experimental credits for their participation.

Due to time constraints with the current study it was considered whether including first years in the sample was worthwhile as whether or not a gain could be seen within a short amount of time (testing began in November 2013, the academic year begins in September 2013). The decision was eventually reached to include them in the sample after considering results from de Jager (2012) who found first years' critical thinking ability increasing over the course of three months' studying.

A total of 105 participants consented to take part in the study. The study was separated into 3 sections: demographic information, the wellbeing measure, and the critical-thinking measure. All of the 105 participants completed the first two sections (demographic information and wellbeing measure) though only 46 continued on to complete the third section (critical thinking measure). Participants were between the ages of 17 and 42 and were from 22 different nationalities though

over 55% of the sample was British. In regard to year of study, the sample was made up of 35.2% of students in their first year, 21.9% of students in their second year, 12.4% of students in their third year, and 30.5% of students in their fourth year.

Pascarella et al. (1993 p. 216) defined commuter students as ones who “live off-campus and commute to the university” which impacts the design of the current study. It was felt that their definition of a commuter student was too vague within a British sample, so in order to fully understand differences in the data, students were asked with whom they live and how long it takes them to get to class. A breakdown of participants by this criteria is shown in Table 1.

Table 1

Breakdown of sample based on living arrangement and journey time to class.

Living Arrangement	% of Sample	Journey Time To Class	% of Sample
With Parents/Family	29.5	0-10 Minutes	21.9
With Students (Friends)	48.6	11-20 Minutes	22.9
With Students (Non-friends)	7.6	21-30 Minutes	21.0
With Non-students (Friends)	4.8	31-60 Minutes	21.0
With Non-students (Non-friends)	1.9	More than an hour	12.4
Lives Alone	7.6		
With Friends	53.3		
With Non-friends	9.5		

To address the concerns regarding the factor of academic discipline, participants were also asked for what they study at university. This breakdown is shown in Table 2.

Table 2***Breakdown of sample based on academic discipline.***

Academic Discipline	% of Wellbeing Sample	% of Critical Thinking Sample	Academic Discipline	% of Wellbeing Sample	% of Critical Thinking Sample
Biology	1.0%	0.0%	Medicine	1.0%	0.0%
Business	1.0%	2.2%	Neuroscience	1.0%	2.2%
Classics	1.0%	2.2%	Pharmacology	1.0%	0.0%
Computing	11.4%	2.2%	Philosophy	1.0%	0.0%
Economics	1.0%	2.2%	Physics	8.6%	6.5%
Education	1.0%	0.0%	Politics	1.0%	0.0%
Engineering	1.0%	2.2%	Psychology	53.3%	76.1%
English Literature	1.9%	2.2%	Public Policy	1.0%	0.0%
Genetics	1.0%	0.0%	Sociology	1.0%	0.0%
History	1.0%	2.2%	Sports Science	1.0%	0.0%
Languages	2.9%	0.0%	Statistics	1.0%	0.0%
Mathematics	4.8%	0.0%	Theatre Studies	1.0%	0.0%

Materials

Two measures were employed in the study to test wellbeing and critical thinking. The Affectometer-2 (Kammann and Flett, 1983) was employed to measure participants' wellbeing and the Ennis-Weir Critical Thinking Essay Test (Ennis and Weir, 1985) was employed to measure participants' critical thinking ability.

Affectometer-2 (Kamman and Flett, 1983)

The Affectometer-2 (see Appendix 1) was primarily chosen for the current study due to its relevant questions and applicability to a university student population. The measure is comprised of a 40 item inventory which measures an individual's sense of wellbeing by asking them to consider recent experience and reflect on positive and negative feelings. Participants are presented with 20 statements and 20 qualities of wellbeing. The Affectometer-2 takes five minutes to complete and questions participants based on how often they have felt a variety of wellbeing-related emotions. The individual qualities of happiness which the measure tests were Confluence (Co), Optimism (O), Self-Esteem (SE), Self-Efficacy (SF), Social Support (SS), Social Interest (SI), Freedom (F), Energy (E), Cheerfulness (Ch) and, Thought Clarity (TC). It should be noted that participants could

score between -80 (highest) and 80 (lowest) overall, and between -8 (highest) and 8 (lowest) for individual components. The measure has been tested and found to have high reliability and validity with a UK population (Tennant, Joseph, Stewart-Brown, 2007).

Ennis-Weir Critical Thinking Essay Test (Ennis and Weir, 1985)

The Ennis-Weir Critical Thinking Essay Test (see Appendix 2) was chosen for a number of reasons. Considering the evidence discussed, and due to the wide variety of differences in students' disciplines who would be completing the study, it was decided that a neutral topic would be the most effective and fair way to test students' abilities. The notion of responding to a newspaper letter was also of great appeal as it is deemed likely that most participants would be familiar with the concept and able to relate as such. The test requires the participant to read a fictional letter, entitled The Moorburg Letter, which makes eight arguments and asks them to respond in the style of a letter composed of nine numbered paragraphs, responding to each argument before giving an overall evaluation. The test takes 40 minutes to complete. As it was being administered online and to ensure anonymity, certain aspects of the test had to be adapted – the original directions ask the participant to “Sign your name to your letter” – this was omitted to ensure anonymity. The test would normally be administered via pen and paper and subjects would be expected to split their letter up into paragraphs by their own accord. This was adapted to allow for character limits in the text boxes and to clarify to the participants the structure of their response. Participants could score between -9 (lowest) and 29 (highest). The test is said to be appropriate for, and had been found reliable for, use with university-level students (Ennis and Weir, 1985).

Procedure

A questionnaire which encompassed three separate sections was designed and set up online at SurveyMonkey.com. Participants were presented with a screen detailing information about the study and a consent form detailing the assurances made to them. They were then asked whether or not they consented to participate. Upon consent, a screening page was set up to ensure that only undergraduate students could participate and any participant who selected the option “4th+/Postgraduate” was redirected to a screen which thanked them for their time and informed them of their ineligibility to take part. Eligible participants were then asked various demographic questions alongside questions regarding their living situation, the time it takes them to get to class, and, their involvement in discussion with other students. After completing this task they then

completed the Affectometer-2 and the Ennis-Weir Critical Thinking Essay Test. The Affectometer-2 required participants to respond to 40 items on a graded response scale which asked them to consider their feelings over the past few weeks. The Ennis-Weir Critical Thinking Essay Test asked participants to spend 10 minutes reading and thinking about “The Moorburg Letter” before spending a maximum of 30 minutes responding to it in nine numbered paragraphs, allocating three minutes to each paragraph. Participants were instructed to think about their response as a concerned local resident when writing it. Upon completion of the Ennis-Weir Critical Thinking Essay Test, participants were presented with a screen thanking them for their participation along with debriefing information.

Results

It was hypothesised that (1) commuter students would, on average, exhibit poorer critical thinking scores than on-campus students; (2) commuter students would, on average, exhibit poorer wellbeing scores than on-campus students; (3) students who were in their fourth year at university, regardless of their living arrangement, would exhibit better critical thinking abilities, on average, than students who were in their first year; and (4) students who report taking part in discussions would, on average, exhibit better critical thinking abilities than students who do not report taking part in discussions. Other factors such as socioeconomic and employment status were included in the analysis.

Due to the nature of both the critical thinking scores and wellbeing data, it was necessary to run non-parametric tests. Critical thinking scores were found to be significantly non-normal ($D(46) = 0.17, p < .05$) and wellbeing scores were ordinal data therefore there was a requirement to run non-parametric tests on both sets of data. Kruskal-Wallis tests were used to investigate whether differences existed between the groups and Mann-Whitney tests were employed to indicate the location of any differences found.

Critical thinking scores were calculated based on the instructions provided by Ennis and Weir (1985). Two raters independently marked the 46 individual essay tests and an average was calculated from both raters' scores. Inter-rater agreement was extremely high (Spearman's $\rho(46) = .967, p < .001$).

Results are presented under their respective hypothesis with additional results examined afterwards.

Tables 2, 3, 4, 5, and 6 display the descriptive data for each group with regards to their critical thinking and wellbeing scores. Both median and mean scores were included for critical thinking scores to clearly indicate any differences in the data. Due to the skewed nature of the scores, the median was the best measure of central tendency though for interval data such as this, the mean can also be used as a guide. As the wellbeing scores were ordinal data, a median was the best measure of central tendency. Due to the complexity of the wellbeing scores' negative and positive nature, in regard to reading tables and reported results, they have been inverted to fit a more logical flow. Wellbeing/component scores above zero in the current study reflect positive wellbeing, and scores below zero reflect negative wellbeing.

Hypothesis 1: Commuter students will exhibit poorer critical thinking abilities, on average, than on-campus students.

Table 3

Critical thinking scores by living arrangement and journey time to class (sorted by median critical thinking).

Living Arrangement	N	Median Critical Thinking	Range	Mean Critical Thinking	SD
<i>Non-students (Friends)</i>	2	24.5	0	24.5	0
<i>Non-students (Non-friends)</i>	1	24.5	0	24.5	0
<i>Alone</i>	4	21.8	20.5	18.3	9.67
<i>Students (Friends)^a</i>	20	20.0	24.5	20.1	6.37
<i>Parents/Family^{abc}</i>	14	18.8	19.5	16.5	6.10
<i>Students (Non-friends)^b</i>	5	13.5	17.5	11.0	7.04
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<i>Friends^{cd}</i>	22	21.3	24.5	20.6	6.19
<i>Non-friends^d</i>	6	14.5	24.0	13.3	8.37
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<i>0-10 Minutes</i>	9	25.0	19.0	21.1	6.57
<i>More than an hour</i>	6	21.5	23.0	18.8	8.42
<i>31-60 Minutes</i>	11	19.5	24.5	17.6	7.26
<i>21-30 Minutes</i>	13	19.0	24.5	17.8	6.59
<i>11-20 Minutes</i>	6	18.3	19.5	16.8	7.08

Note. Paired letters ^{a b c d} indicate a significant difference between the factors beside which they are listed.

The nature of this hypothesis required two variables to be examined. As discussed, the “commuter” student in the current study was not simply an individual who is required to commute each day but also someone who lives in their parental home. For this reason the two variables tested were who the participant lives with and how long, on average, it takes the participant to get to class. This distinction can be visualised in the results in Table 3.

For living arrangement, participants were separated into the following groups based on who they live with – *Parents/Family*, *Students (Friends)*, *Students (Non-friends)*, *Non-students (Friends)*, *Non-students (Non-friends)*, and *Alone*. The groups were significantly different for critical thinking test scores ($H(5) = 12.724, p = .026$). Follow up tests using a Bonferroni correction found the *Parents/Family* group to have significantly lower critical thinking test scores than the *Students (Friends)* group ($U = 84.0, p = .025, r = -.34$) and the *Students (Non-friends)* group to have marginally significant lower critical thinking test scores than the *Parents/Family* group ($U = 14.5, p = .029, r = -.44$).

When the groups were categorised based on whether the participants lived with *Parents/Family*, *Friends*, or *Non-friends* a significant difference between the groups was found ($H(2) = 8.267, p = .016$). The *Friends* group had significantly higher critical thinking scores than both the *Parents/Family* group ($U = 84.0, p = .023, r = -.38$) and the *Non-friends* group ($U = 26.5, p = .024, r = -.42$).

For journey time to class, participants were separated into the following groups – *0-10 Minutes*, *11-20 Minutes*, *21-30 Minutes*, *31-60 Minutes*, and *More than an hour*. There were no significant differences found between the groups ($H(4) = 4.382, p = .357$).

Hypothesis 2: Commuter students will exhibit lower wellbeing, on average, than on-campus students.

Table 4

Wellbeing scores by living arrangement and journey time to class (sorted by median wellbeing scores).

Group	N	Median Wellbeing	Range
<i>Students (Friends)</i>	51	31.0	114.0
<i>Non-students (Friends)</i>	5	31.0	29.0
<i>Alone</i>	8	25.0	54.0
<i>Parents/Family</i>	31	22.0	92.0
<i>Students (Non-friends)</i>	8	8.0	75.0
<i>Non-students (Non-friends)</i>	2	7.5	59.0
<hr/>			
<i>Friends</i>	56	31.0	114.0
<i>Non-friends</i>	10	8.0	75.0
<hr/>			
<i>0-10 Minutes</i>	23	35.0	99.0
<i>More than an hour</i>	13	27.0	56.0
<i>21-30 Minutes</i>	22	25.5	99.0
<i>31-60 Minutes</i>	22	24.5	99.0
<i>11-20 Minutes</i>	24	14.5	82.0

There were no significant differences found between the participants based on living arrangement for overall wellbeing scores ($H(5) = 7.045, p = .217$). For the individual components of the wellbeing scores, a significant difference was found between the groups for *Optimism* ($H(5) = 11.137, p = .049$). Follow up tests found that the *Parents/Family* group significantly differed from the *Non-students (Friends)* group with the *Parents/Family* group having lower *Optimism* scores ($U = 25.0, p = .014, r = -.41$).

When the groups were categorised based on whether the participants lived with *Parents/Family*, *Friends*, or *Non-friends*, a significant difference was found for *Optimism* ($H(2) = 6.745, p = .034$), *Self-Esteem* ($H(2) = 6.059, p = .048$) and marginally for *Energy* ($H(2) = 5.665, p = .059$). The *Friends* group had significantly higher scores for *Optimism* ($U = 150, p = .019, r = -.29$) for *Self-Esteem* ($U = 147, p = .017, r = -.29$), and for *Energy* ($U = 166, p = .04, r = -.25$) than the *Non-*

friends group.

There were no significant differences for wellbeing between participants based on journey time to class ($H(4) = 2.508, p = .643$). For the individual components a marginal significant difference was found on the *Social Interest* scale which was that the *0-10 Minutes* group had marginally significant higher *Social Interest* scores than the *11-20 Minutes* group ($U = 187, p = .056, r = -.28$).

The breakdown of median overall wellbeing scores for each group can be seen in Table 4 and each group's median scores for *Optimism*, *Self-Esteem*, and *Energy* are displayed in Table 5.

Table 5

Individual wellbeing components by living arrangement and journey time to class.

Group	<i>N</i>	Median Optimism	Range	Median Self-Esteem	Range	Median Social Interest	Range	Median Energy	Range
<i>Parents/Family*</i>	31	3.0 ^a	9	3.0	13	3.0	11	2.0	12
<i>Students (Friends)</i>	51	3.0	13	3.0	15	4.0	12	3.0	13
<i>Students (Non-friends)</i>	8	0	9	-1.0	7	0	9	0	11
<i>Non-students (Friends)</i>	5	6.0	2	4.00	4	5.0	2	5.0	2
<i>Non-students (Non-friends)*</i>	2	1.5 ^a	7	0	8	2.5	5	-.5	5
<i>Alone</i>	8	3.5	8	4.0	9	3.0	7	1.5	5
<hr/>									
<i>Friends**</i>	56	4.0 ^b	13.0	3.5 ^c	15.0	4.0	12.0	3.0 ^d	13.0
<i>Non-friends**</i>	10	0 ^b	9.0	-1.0 ^c	9.0	1.0	9.0	0 ^d	11.0
<hr/>									
<i>0-10 Minutes***</i>	23	4.0	7.0	3.0	11.0	5.0 ^e	11.0	2.0	10.0
<i>11-20 Minutes***</i>	24	2.0	9.0	2.0	12.0	3.0 ^e	10.0	1.0	12.0
<i>21-30 Minutes</i>	22	3.5	13.0	2.0	14.0	3.0	9.0	2.5	13.0
<i>31-60 Minutes</i>	22	3.5	9.0	4.0	13.0	2.5	10.0	2.0	11.0
<i>More than an hour</i>	13	3.0	8.0	4.0	9.0	5.0	7.0	3.0	9.0

Note. No. of * indicates a significant difference between the factors beside which they are listed.

Paired letters ^{a b c d e} indicate a significant difference between the factors beside which they are listed.

Hypothesis 3: Students who are in their fourth year at university, regardless of their living arrangement, will exhibit better critical thinking abilities on average than students who are in their first year.

It was found that students in their fourth year have significantly higher critical thinking scores than students in their first year ($U = 105, p = .036, r = -.34$).

No other significant differences were found between the groups based on year of study ($H(3) = 6.253, p = .100$). Median critical thinking scores by year of study are displayed in Table 6.

Table 6

Critical thinking scores by year of study (sorted by year of study).

Group	N	Median Critical Thinking	Range	Mean Critical Thinking	SD
1 st Year ^a	22	18.5	25.5	15.7	8.36
2 nd Year	6	19.8	18.5	19.9	6.2
3 rd Year	2	15.8	.5	15.8	.35
4 th Year ^a	16	21.3	13.0	21.2	4.14

Note. Paired letters ^a indicate a significant difference between the factors beside which they are listed.

Hypothesis 4: Students who report taking part in discussions will exhibit better critical thinking abilities than students who do not report taking part in discussions.

Participants were grouped by the amount of time they reported taking part in discussions each week, both about their course and about ideas in general. They were separated into groups based on the length of time they report taking part in discussions each week. These groups were *Less than 1 hour, 1 hour, 2 hours, 3 hours, 4 hours, and More than 5 hours*.

There was no significant difference found between participants based on their reported weekly amount of course discussion ($H(5) = 2.049, p = .842$) nor between participants based on their reported weekly amount of idea discussion ($H(5) = 3.292, p = .655$). Individual median critical thinking scores sorted by amount of weekly course discussion and by amount of weekly idea discussion are displayed in Table 7.

Table 7***Critical thinking scores by reported amount of weekly discussion.***

Weekly amount of course discussion	<i>N</i>	Median Critical Thinking	Range	Mean Critical Thinking	SD
Weekly amount of idea discussion					
<i>Less than 1 hour</i>	4	21.8	12.5	21.8	5.42
	4	16.0	21.5	14.9	10.3
<i>1 hour</i>	12	18.3	21.5	15.7	8.67
	5	7.5	20.0	12.7	8.76
<i>2 hours</i>	12	19.0	25.5	19.0	7.12
	10	19.0	21.5	18.3	6.26
<i>3 hours</i>	10	19.0	21.5	17.8	5.95
	8	20.0	22.5	19.7	7.19
<i>4 hours</i>	1	21.5	0	21.5	0
	5	18.5	9.0	20.7	4.22
<i>More than 5 hours</i>	7	20.0	20.0	19.1	6.95
	14	20.0	26.0	19.2	6.56

It should also be noted that no significance was reached when the categories were narrowed further than the 6 outlined in Table 6 (e.g. *1 hour and less, 2-3 hours, and More than 4 hours*).

Additional findings

Other analyses were carried out to further investigate what factors impacted students' critical thinking and wellbeing abilities. There were additional significant results found which are reported below.

In order to further investigate the significant differences found for critical thinking between the *Parents/Family* and the *Students (Friends)* groups, further comparisons were run based on parental occupation. Occupations were examined, and groups were separated based on whether the participants' current parental occupations required parents to have a university degree. Participants' whose parental occupation required a degree had significantly higher critical thinking scores than those whose parental occupation did not ($U = 66.0, p = 0.005, r = -.41$). There was no significant difference found between whether both parents' occupations required a degree and whether only one parents' occupation required a degree ($U = 159, p = .987, r = -.01$).

Additionally, a difference nearing significance was found for critical thinking scores based on parental income ($H(3) = 7.469, p = .058$). Further tests using the Bonferroni correction found that participants whose parental income was more than £125,000 had significantly higher critical thinking scores than participants whose parental income was £0-24,999 ($U = 8.00, p = .026, r = -.58$). Also participants whose parental income was between £50,000 and £124,999 had marginally significant higher critical thinking scores than participants whose parental income was £0-24,999 ($U = 29.5, p = .051, r = -.41$).

It should also be noted that, contrary to previous findings, the current study found no significant difference between participants for critical thinking score based on their own employment status.

Summary of Findings

The current findings provide evidence for differences between students based on their living arrangement, year of study, socio-economic background, and degree requirement for parental occupation. A summary of these statistically significant differences is presented in Table 8. Median scores for each variable are provided for comparison.

Table 8**Summary of Results**

Critical Thinking			p	Median Scores	
<i>Students (Friends)</i>	>	<i>Parents/Family</i>	.026	20.0	18.8
<i>Parents/Family</i>	>	<i>Students (Non-friends)</i>	.029	18.8	13.5
<i>Friends</i>	>	<i>Parents/Family</i>	.023	21.3	18.8
<i>Friends</i>	>	<i>Non-friends</i>	.024	21.3	14.5
<i>4th Year Student</i>	>	<i>1st Year Student</i>	.036	21.3	18.5
<i>Parent with Degree</i>	>	<i>No Parent with Degree</i>	.005	20.0	7.5
<i>Parental Income More than £125,000</i>	>	<i>Parental Income £0-24,999</i>	.026	25.25	15.5
<i>Parental Income Between £50,000 and £124,999</i>	>	<i>Parental Income £0-24,999</i>	.051	19.5	15.5
Optimism					
<i>Non-students (Friends)</i>	>	<i>Parents/Family</i>	.014	6.0	3.0
<i>Friends</i>	>	<i>Non-friends</i>	.019	4.0	0.0
Self-Esteem					
<i>Friends</i>	>	<i>Non-friends</i>	.017	3.5	-1.0
Social Interest					
<i>Journey Time – 0-10 Minutes</i>	>	<i>Journey Time – 11-20 Minutes</i>	.056	5.0	3.0
Energy					
<i>Friends</i>	>	<i>Non-friends</i>	.04	3.0	0.0

Note. > – Depicts the direction of the difference.

Discussion

The current study found that living with parents had a negative effect on critical thinking, as these students scored lower than students who lived with friends. Students who did not live with friends had even lower critical thinking scores than students that live with their parents. In contrast, there were no differences found between students' critical thinking scores based on their average journey time to class. As predicted, students in their 4th year had higher critical thinking scores than students in their 1st year. Contrary to expectation, no such differences were found based on how often students reported taking part in discussions about their courses or about ideas in general. In addition to these findings, it was found that if students have a parent with a degree their critical thinking scores were higher than students whose parents do not. Similarly, critical thinking scores were also higher for students whose parental income was greater than £50,000. Wellbeing was not found to be impacted by students' living arrangements or journey times to class, though students living with friends had higher optimism, self-esteem and energy than students living with non-friends.

What stands out from these findings is that it appears to be primarily with *whom* one lives that disadvantages a student rather than *where* one lives. Hypothesis (1) stated that commuter students would have lower critical thinking scores than on-campus students. This hypothesis was inspired by the findings of Pascarella et al. (1993) who found that students who lived on campus showed higher gains in critical thinking scores over one year than students who commuted to university. The broad definition applied to a commuter student in Pascarella and colleagues' (1993) study prompted the current study to test the two-sides of the definition, the literal commute, which translated into journey time, and the social commute, which translated into with whom students were living.

The findings supported, in part, Pascarella and colleagues' (1993) results in that students who lived off campus with their parents had lower critical thinking scores. However, two findings in the current study are in contrast with Pascarella and colleagues' (1993) findings. Firstly, the students who lived off campus did not have the lowest critical thinking scores, and secondly, journey time did not impact critical thinking scores. Both of these contrasts could be explained in regard to the definitional problem which is outlined, though they nonetheless raise a considerable amount of discussion points. It is informative that the group of students who lived with non-friends had the lowest critical thinking ability. Considering this in light of Tinto's (1975; 1997; 1998) theories, the link between “peer-group interactions” and “intellectual development”, and indeed learning communities, could explain why it has been found. These theories formed part of hypothesis (1): the lack of critical interaction with other students and being removed from the campus environment would hinder critical thinking. By this logic then the finding is indeed parsimonious.

It is the finding that length of commute did not influence critical thinking that complicates the broader image. This highlights the fact that splitting the definition of a commuter student into two facets was the correct decision. This factor was also initially tested to examine if there was tangible evidence to the argument that a student might lack a sense of belonging to university if they live a substantial distance away from its campus. It was assumed, in line with Tinto's (1975) model, that the social integration produced by the higher levels of exposure to peer-group and faculty interactions that students living on-campus experience would produce differences in critical thinking. What is interesting about this finding is that it gives evidence that learning communities may be malleable. If there are critical thinking ability differences between students based on with whom they live but not where they live, then it could be that the effectiveness of learning communities is not dependent on their location, but on whom they are composed of. Overall, what

these findings also indicate is that there may exist a mediating factor for students who live with their parents which is that they live with individuals with whom they will most likely have daily interactions. The same cannot be said for students who live with non-friends, meaning that while each group may be disadvantaged, the non-friends group may be slightly more so due to that lack of interaction.

Hypothesis (2) stated that commuter students would have lower wellbeing than on-campus students. Commuter students were only found to be different from on-campus students on one individual component of wellbeing: living with parents resulted in lower optimism than living with non-student friends. Since living with non-student friends does not constitute a learning community, this finding is difficult to explain within the context of this study and may be the result of variables not addressed.

Hypothesis (2) was the most exploratory of the four hypotheses and had the least empirical backing though the ideas and theories discussed did present a strong case for commuter students having lower wellbeing. A fuller picture emerged between those who lived with friends and those who lived with non-friends. It was found that students who lived with non-friends had lower optimism, self-esteem and energy than students who lived with friends. In regard to previously examined evidence, Buote et al. (2007) found that adjustment to university improved based on how many friends an individual makes. This link is also found in Tinto's (1975) model where peer interactions lead to social integration. Also considering the findings of Hays and Oxley (1986) and Buote et al. (2007), the finding of lower wellbeing components among students who lived with non-friends suggests that, contrary to their argument, it is exposure to fewer friendships in general that lowers wellbeing rather than their location. This result also questions the findings of Halamandaris and Power (1997; 1999) who found no link between wellbeing and academic performance as the non-student group were found lower on each of these.

In light of understanding and creating the profile of a commuter student, this result portrays a student who is well supported and whose wellbeing does not suffer due to their living situation, even if it is not with their peers. It should also be considered, that for the student not living with friends there are several confounding variables which could have led to their living situation which, in turn, could have had adverse effects on their optimism, self-esteem and energy. These might include a falling out with a group of friends, a breakup with a partner with whom they were previously living, or their application to halls of residence being denied. It would be necessary to

further examine students' motivations behind their choice of living situation to infer this fully. While some students' choice of living situation may be motivated entirely by finances, others by social norms, if any differences emerged between groups based on motivation it may indicate that there is a social pressure difference between the students overall rather than a direct relationship to whom they live with.

Hypothesis (3) links back to critical thinking and stated that students in 4th year would have greater critical thinking ability than students in 1st year, regardless of their living situation. This was unsurprisingly found to be the case. The analysis was included to further contribute to the overall picture of critical thinking in university students though what did not emerge were further significant differences between 1st and 2nd year students, and 2nd and 3rd year students. Though not significant, there was not even an overall increase from 1st to 4th year. The sample size in this instance was very likely a contributing factor as there were only six students from 2nd year, and two students from 3rd year who completed the critical thinking test. With this considered, it would be unseemly to examine this lack of finding any further. The comparison between 4th and 1st years however is informative in light of the role of a university. This finding supports those of Pascarella et al. (1993) who found increases in critical thinking over one year of university. However, the result of the current study suggests this effect is more broad and occurs across a student's entire university career. Overall, this difference proposes that the university environment, regardless of living situation, does indeed promote and teach critical thinking.

Hypothesis (4) stated that students who took part in discussions would have greater critical thinking ability than students who did not. In order to fully examine where the impact of discussions was occurring, the current study included questions both about course discussions and about the discussion of ideas in general. It was surprising therefore that no differences were found between students for either amount of course or idea discussion.

The fact that there was a difference found between students based on living arrangement implies a factor in the environment which is affecting their critical thinking. It was generally assumed that such a factor would be the quality and quantity of critical discussions. Interacting with other student friends will likely motivate a student to think for themselves in a manner that no interactions at all would. Additionally, it is worth considering the topics of discussion that students may have with one another and evaluate whether these would happen in the home or with non-friends e.g. intense political conversations, discussion of scientific theory or philosophical logic. In this instance it

could also be a misinterpretation of the overall question as some students may have inferred that the discussions had to be with other students. The specific wording of the questions were – “How much time each week do you spend discussing your course with others?” followed by “How much time each week do you spend discussing ideas with others?” so it is understandable why the thought process for responding to the course discussion question may continue on to the idea discussion question. It may also have been that participants had different notions of the definition of the word “discussion” causing discrepancies between them in regard to what constitutes a discussion over an everyday argument or conversation. Overall, there is no clear explanation for why a difference was not found.

Two additional findings which were not hypothesised yet proved influential on critical thinking were socio-economic background and parental education. Questions investigating each of these were asked in the current study as a result of the findings and subsequent discussion points surrounding Bourdieu's argument (1976). A linear relationship emerged based on parental income and there was an increase in critical thinking scores as income increased. Further to this, the finding that students' whose parents have occupations requiring a degree have better critical thinking skills supports the notion that deep-rooted values and attitudes towards university are passed down (Bourdieu, 1976). What was particularly noteworthy about the parental degree finding was that it appeared that only one degree was necessary for a significant impact. This was not expected and raises a host of questions regarding the strength of the influence of an individual parent. It also brings a genetic component into the current study which questions if a sample such as the current study's were on unequal footing from the offset. This is worth questioning since, out of all the differences found in the current study, the largest difference in medians was found between these groups. If indeed the students whose parents had a higher educational background have greater academic ability, then it may be the case that a genetically based intelligence difference separates the sample.

Overall, the particular challenges which these results bring forward raise questions surrounding university and governmental policy. If we consider the intentional discrimination which commuter students face in regard to halls of residence places at certain universities (e.g. Edinburgh Napier University, 2013; University of Edinburgh, 2013; “University of Strathclyde”, 2014; “Glasgow Caledonian University”, 2014) it is perhaps worth reassessing these in light of these findings. While these students are able to make their own living arrangements outside of halls of residence (i.e. they are still able to move out of their parental home), it is less likely that they will be exposed to as

broad a network of student peers as students in halls of residence will be.

Limitations

The current study's sample was relatively diverse though certain disciplines were more heavily represented than others. Psychology (53.3%), computing-related subjects (11.4%), and physics (8.6%) were the most represented in the wellbeing sample, and for critical thinking psychology students were overrepresented (76.1%). The unequal distribution of academic disciplines is particularly important in the current study due to the contested nature of whether critical thinking favours some disciplines over others. If this is the case, then it should be asked if an overrepresentation of psychology students in the sample makes the results generalisable to only a specific group of students.

The design was also quasi-experimental which raises problems with any causal inferences which have been made. This is due to the fact that participants either self-selected their group allocation (e.g. distance from campus, who lived with) or were allocated to a group by uncontrolled factors that may have been confounded with other uncontrolled influences within each group (e.g. parental income, year of study). Caution needs to be taken in regard to any causal inferences made with such a design. While the argument is made throughout the current study that the findings regarding wellbeing and critical thinking are both the result of living situation (and indeed the other factors), it is equally possible that a variety of other factors led to the result found, such as the directionality of the relationship being the opposite way (e.g. individuals with lower wellbeing deciding to live at home). It should be considered though that due to the nature of the current study it would have been extremely difficult to sample in any other way.

Additionally, a cohort effect may also have affected the results. For example, within the group of students who live with their parents, which is an entirely Scottish cohort, a very prominent political debate which would have been of direct interest to all Scottish nationals was taking place. Due to the unusual occurrence of this specific political debate, it may have been the case that critical engagement with others, and in general with media may have been at much higher levels than usual. As past studies have shown, critical thinking can be increased in as little as three months (de Jager, 2012). This is worth considering in light of the results found for critical thinking and students who live with their parents. It should be noted that there are an unlimited amount of uncontrolled potential cohort effects that only a replication of the current study in the future could remedy.

Future

While not practical due to its cost, in order to fully investigate and infer causality in light of these findings, a future study could randomly sample a selection of students who have made the choice to stay in their parental home and commute to university and provide the funding necessary for a year of living on-campus with other students. If critical thinking was tested before and after, and in comparison with their likeminded peers who stayed at home, a causal relationship could be investigated with greater validity. Additional longitudinal studies into critical thinking gains for each of these groups would also benefit the literature in regard to firm causal effects.

The use of critical thinking has been discussed throughout. However, implications which affect university and governmental policy would be better inferred from students' examination performances due to the fact that this is what defines their degree classification and general financial factors (e.g. an academic repeat year). While in Scotland there is no requirement to maintain a certain GPA and an academic repeat year is funded ("Scottish Awards Agency For Scotland", 2014), in some other countries students who have to carry additional classes or repeat a year have to independently fund the additional finances this would bring. Even within the European Union where many students do not pay university fees, certain countries mandate that student must maintain a certain GPA to receive their funding (e.g. Gobierno de España, 2013). To this effect, future studies could additionally obtain students' examination results in order to gain a valid estimation of the financial implications of any differences found.

Conclusion

The results of the current study have shown that students within two living situations (with parents and with non-friends) are lower in critical thinking skills than other students. In light of the importance that employers put on this ability along with the expectation that graduates have this ability, these findings present implications for students in regard to their choice of living situation while at university. In addition, the finding that aspects of wellbeing are lower within students who live with non-friends reflects further the impact that one's living situation can have on various aspects of their life. While the current study found that the amount of discussions that students engage in did not impact their critical thinking, years of studying at university appeared to do so in a positive manner. The additional findings that familial factors impact critical thinking infer that there may be social and genetic factors involved in the academic and social integration of students.

Overall, the current study has reexamined an area which has not been given attention in over two decades and has found that a factor reasonably within students' control could be adjusted for greater intellectual development and ability.

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Appendix 1 – Affectometer-2 (Kamman and Flett, 1983)

Over the last few weeks I have felt that:

(CO+) 1. My life is on the right track.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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(CO-) 2. I wish I could change some part of my life.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
-----------------	-------------------	-----------------------	------------	----------------------

(O+) 3. My future looks good.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
-----------------	-------------------	-----------------------	------------	----------------------

(O-) 4. I feel as though the best years of my life are over.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
-----------------	-------------------	-----------------------	------------	----------------------

(SE+) 5. I like myself.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
-----------------	-------------------	-----------------------	------------	----------------------

(SE-) 6. I feel there must be something wrong with me.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
-----------------	-------------------	-----------------------	------------	----------------------

(SF+) 7. I can handle any problems that come up.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
-----------------	-------------------	-----------------------	------------	----------------------

(SF-) 8. I feel like a failure.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
-----------------	-------------------	-----------------------	------------	----------------------

(SS+) 9. I feel loved and trusted.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
-----------------	-------------------	-----------------------	------------	----------------------

(SS-) 10. I seem to be left alone when I don't want to be.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
-----------------	-------------------	-----------------------	------------	----------------------

(SI+) 11. I feel close to people around me.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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(SI-) 12. I have lost interest in other people and don't care about them.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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(F+) 13. I feel I can do whatever I want to.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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(F-) 14. My life seems stuck in a rut.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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(E+) 15. I have energy to spare.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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(E-) 16. I can't be bothered doing anything.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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(Ch+) 17. I smile and laugh a lot.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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(Ch-) 18. Nothing seems very much fun anymore.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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(TC+) 19. I think clearly and creatively.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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(TC-) 20. My thoughts go around in useless circles.

Not at All 1	Occasionally 2	Some of the Time 3	Often 4	All of the Time 5
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Adjectives*

	Positive	Negative
(CO)	21. Satisfied	31. Disconnected
(O)	22. Optimistic	32. Hopeless
(SE)	23. Useful	33. Insignificant
(SF)	24. Confident	34. Helpless
(SS)	25. Understood	35. Lonely
(SI)	26. Loving	36. Withdrawn
(F)	27. Free-and-easy	37. Tense
(E)	28. Enthusiastic	38. Depressed
(Ch)	29. Good-natured	39. Impatient
(TC)	30. Clear-headed	40. Confused

*Presented with the same response options as sentences 1-20.

+/- indicate positive and negative affect items.

(CO) – confluence	(SI) – social interest
(O) – optimism	(F) – freedom
(SF) – self-esteem	(E) – energy
(SE) – self-efficacy	(Ch) – cheerfulness
(SS) – social-support	(TC) – thought clarity

It should be noted that the individual components of the Affectometer-2 have been added in parenthesis beside each question for the reader's information. These were not present on the test presented to participants.

Appendix 2 – Ennis-Weir Critical Thinking Essay Test (Ennis and Weir, 1985)

Directions (Please Read Carefully)

Read the letter to the editor of the Moorburg newspaper. Consider it paragraph by paragraph and as a total argument. Then write a letter to the editor in response to this one. For each paragraph in the letter you are about to read, write a paragraph in reply telling whether you believe the thinking good or bad. Also write a closing paragraph about the total argument. Defend your judgments with reasons.

Your answer should have nine numbered paragraphs. Numbers one through eight should give your reactions to paragraphs one through eight in the letter. Your paragraph number nine should give your overall evaluation of the letter considered as one total argument. Each paragraph, including the last, should contain your reason(s).

Spend about 10 minutes reading the letter and thinking about it. Then write for not more than 30 minutes (about three minutes for each of your short paragraphs). The maximum total time for the test is 40 minutes.

Do not forget to give your reasons in each paragraph. Please write clearly. You are a local citizen, and this topic concerns you. Remember, write nine numbered paragraphs and give reasons.

“Moorburg Letter

230 Sycamore Street
Moorburg

April 10

Dear Editor:

Overnight parking on all streets in Moorburg should be eliminated. To achieve this goal, parking should be prohibited from 2 a.m. to 6 a.m. There are a number of reasons why any intelligent citizen should agree.

1. For one thing, to park overnight is to have a garage in the streets. Now it is illegal for anyone to have a garage in the city streets. Clearly, then, it should be against the law to park overnight in the streets.
2. Three important streets, Lincoln Avenue, Marquand Avenue, and West Main Street, are very narrow. With cars parked on the streets, there really isn't room for the heavy traffic that passes over them in the afternoon rush hour. When driving home in the afternoon after work, it takes me thirty five minutes to make a trip that takes ten minutes during the uncrowded time. If there were no cars parked on the side of these streets, they could handle considerably more traffic.
3. Traffic on some streets is also bad in the morning when factory workers are on their way to the 6 a.m. shift. If there were no cars parked on these streets between 2 a.m. and 6 a.m., then there would be more room for this traffic.
4. Furthermore, there can be no doubt that, in general, overnight parking on the streets is undesirable. It is definitely bad and should be opposed.
5. If parking is prohibited from 2 a.m. to 6 a.m., then accidents between parked and moving vehicles will be nearly eliminated during this period. All intelligent citizens would regard the near elimination of accidents in any period as highly desirable. So, we should be in favor of prohibiting parking from 2 a.m. to 6 a.m.
6. Last month, the Chief of Police, Burgess Jones, ran an experiment which proves that parking should be prohibited from 2 a.m. to 6 a.m. On one of our busiest streets, Marquand Avenue, he placed experimental signs for one day. The signs prohibited parking from 2 a.m. to 6 a.m. During the four-hour period, there was not one accident on Marquand. Everyone knows, of course, that there have been over four hundred accidents on Marquand during the past year.
7. The opponents of my suggestions have said that conditions are safe enough now. These people don't know what "safe" really means. Conditions are not safe if there's even the slightest possible chance for an accident. That's what "safe" means. So, conditions are not safe the way they are now.
8. Finally, let me point out that the Director of the National Traffic Safety Council, Kenneth O. Taylor, has strongly recommended that overnight street parking be prevented on busy streets in cities the size of Moorburg. The National Association of Police Chiefs has made the same recommendation. Both suggest that prohibiting parking from 2 a.m. to 6 a.m. is the best way to prevent overnight parking.

I invite those who disagree, as well as those who agree with me, to react to my letter through the editor of this paper. Let's get this issue out in the open.

Sincerely,

Robert R. Raywift”

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