The major-interest congruence of Dutch first year students, and the influence of parents and peers

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Abstract

In this study the influence of parents and peers on the college major choice process is examined. Using the RIASEC questionnaire, interest profiles were determined and linked to whether congruence exists between student interest profile and their choice of major. The article will look at whether or not influence of parents and peers can be linked to a higher or lower level of major-interest congruence. Participants consisted of 72 students enrolled in first year classes at the Social Sciences faculty of Utrecht University. The results showed no significant correlations for the hypotheses. Parental steering and peer influences had a low negative correlation with major-interest congruence. In contrast to the second hypothesis parental encouragement and support also had a low negative correlation with major-interest congruence.

Keywords: RIASEC, major-interest congruence, parental encouragement, parental steering, peer influences.

Introduction

College major choice is something that concerns all future students. In 2010, 17.2 percent of students at universities of applied sciences in the Netherlands failed their first year. At universities, 8.3 percent of first years failed. After four years 34.4 percent of the students studying at universities of applied sciences attained a bachelor's degree in 2006, and 25.5 percent after three years of university followed by 45.9 percent of students after four years (Inspectie van het onderwijs, 2011).

There are different factors that predict college major choice such as gender, culture, race, socioeconomic status, parental influence, peer influences, private or public high school, grades, job potential and potential salary (Porter & Umbach, 2006; Malgwi, Howe & Burnaby, 2005).

Gender is related to college major choice in multiple ways. Research argues that gender differences in major choice are results of socialization in traditional gender roles, and choosing a certain major is related to gender role orientation. In addition, if the college major has a small proportion of women, they will be likely to feel out of place (Lackland, 2001; Umbach & Porter, 2006). In later research, undergraduate students were surveyed on the difference between genders. No big differences between genders were found when looking at the influence of interest on major choice. Both sexes also noted interest as their main factor on which they based their choice.

Counselling and parental influence were also an equal factor for both males and females. Men found factors such as potential job opportunities, potential job advancement and potential salary more important than women, and they were less influenced by their aptitude on the subject compared to women (Malgwi, Howe & Burnaby, 2005).

Ethnic minorities are less likely to choose a certain major where few minorities are present, and if they do so, attrition is likely to occur (Porter & Umbach, 2006). In the United States Asian students tend to choose science majors more often, black students are more likely to choose interdisciplinary studies, while Hispanics are more likely to choose arts & humanities or social sciences (Dickson, 2010).

Socioeconomic status and educational attainment are closely related to how much parents encourage a student to go to college (Porter & Umbach, 2006). Students from lower SES families tend to be more likely to choose a major in technical-, business-, and life/health fields which generate better job opportunities and higher economic returns (Ma, 2009).

In this study, college major choice will be linked to interest profiles of students and the influence of parents and peers on how this choice will be made. Interest major congruence was positively related to cumulative GPA, higher rates of satisfaction with their academic program, and students being more likely to graduate in a timely fashion (Allen & Robbins 2010; Tracey & Robbins, 2006). Peers are found to have a big influence on the major choice process (Hallinan & Williams, 1990; Russel, 1980). Furthermore, parents also play an important role according to several researches (Leach & Zepke, 2005; Sgage & Hossler, 1989). Since there are a lot of positive outcomes linked to major-interest congruence, the aim of this study is to try to find out whether there are positive or negative effects when influences of social environment play a bigger role. In this article the influences of peers and parents will be taken into account as the influence of social environment. The other main factor of this article is major-interest congruence.

Influence of social environment

The process of choosing a major is influenced by various factors. Leach and Zepke (2005) summarized these factors in a model, where in all stages of the model parental influence is found important. Leach and Zepke claim that parental influence includes parental disposition, preference, expectations, support and encouragement. The dichotomy in these influences show that parental

influence can have two effects on the child, the first of which is a supporting effect. This includes parents' support towards the child to explore his or her interest, or providing general information about higher education. The second effect is a more negative effect where parents have a steering influence on the student's choice. Examples of this are parents who are motivating their children to take over the family business, motivating them to apply for a college major where the chance of getting a well-paid job is high, or students who are following their parents' footsteps (Simpson, 2001). Students from lower SES families are more likely to choose a major in technical, business, and life/health fields, which generate better job opportunities and higher economic returns (Ma, 2009). Students with a lower commitment towards studying are often coerced by their parents into STEM (science, technical, economic or mathematical) studies (Perez, Cromley & Kaplan, 2014). If this is the case, chances of interest major congruence are lower, and in the case of coercion towards a STEM study, it might cause an incongruence between college major choice and interest profile.

Multiple studies have looked at the five factors noted by Leach and Zepke and have tried to find out which are most influential. Cabrera & La Nasa and Harker (2000), Slader and Harker (2001) reported that parents' encouragement and support is the primary factor in the college choice process. Stage & Hossler (1989) on the other hand, found that parental expectation was the best predictor for students on whether or not they will attend higher education. Students from well-educated families for example, felt obligated to continue into higher education (Holmegaard, 2015). The students in this study explained how their parents implicitly expect them to choose certain prominent higher education programs. On the other hand, the same students from these well-educated families can also use their social network in order to provide them with insider information about studies and career paths. This can be an advantage to help the students base their decision on better information. In contrast, students from families who are less educated did not feel like they had to choose a higher education program. They revealed that their focus is on choosing a study leading to a prestigious and high-status career rather than a prominent study program. Payne (2003) reported that parents' role was the most important factor in the college major choice process. This role however, is not always a positive role. Yorke (1999) found a negative consequence of parental involvement, finding that many students went to university as a result of parental pressure and often made wrong college major choices.

In order to find out in what way the parents influenced the college major choice, this study distinguishes two types of influences by parents. The first type is the supporting influence, and the second is the steering influence (Leach & Zepke, 2005; Simpson, 2001).

Besides the influence of the parents, peers or friends also play a big role in the process of college major choice. A case study performed by Chapman and Johnson (1979) shows that first year college students report the comments and college choices of their friends as the most important influence on their own college decision. A study performed by Russell (1980) surveyed 13.000 high school students, and he reported that the post-secondary aspirations of friends were cited as one of the most influential factors in determining students' postsecondary plans. In a study performed by Hallinan and Williams (1990), the results showed that students are asked about their college plans regularly throughout high school by friends and family. This results the students to be very vulnerable for information provided by friends and family about colleges. Since the students want to give a good response to these questions, they try to form an opinion with the little information they have. In addition, students who are finishing high school are dependent on information to make a decision. Peers, parents and teachers are all easily available for counselling, and good sources for information (Hallinan & Williams, 1990). Chapman and Johnson (1979) also state that in case of students' close friends, the college that those friends attend will become more appealing. Moreover the comments those close friends make about certain colleges, shapes the student's expectations about that particular college.

College major-interest congruence

In this study, college major-interest congruence is perceived as the congruence between college major choice and interest profiles. Recent research suggests that an environmental fit between students and their academic environment is critical to successful student outcomes (Porter & Umbach, 2006). With measurement using the Holland types based on the vocational interest of a student, college major choice can be predicted. Interest scores that are in line with a student's choice of major have a positive effect on college performance. In other words, these students had higher GPA's (Tracey & Robbins 2006). Besides higher GPA's, students with college major-interest congruence had higher rates of satisfaction with their academic program, and these

students are more likely to graduate in a timely fashion (Schmit, Oswald, Friede Imus, & Merrit, 2008; Allen & Robbins,2010).

This supports the importance of effective educational and career planning. Based on these findings, it is assumed that a higher congruence between interest and college major choice will be beneficial for students in choosing a major.

RIASEC

To decide to what degree a student has college major-interest congruence, Holland's theory was used. The primary focus of Holland's theory is to help people select a job based on different vocational interest profiles. Holland's theory refers to vocational choices and how they relate to certain interest profiles that can be found making the RIASEC test (Holland, 1997). Applying Holland's theory,research suggests that students choose an academic environment that is compatible with their own personality type. Subsequently, this academic environment will better suit student's abilities and interests (Smart, Feldman & Ethington, 2000). Using Holland's *Zelfonderzoek*, the vocational profile resulting from the test can be linked to a list of majors, which are also linked to those different profiles (Van Eijk, Uterwijk & Plateel, 2014). Furthermore, Holland's theory and the RIASEC questionnaire are relevant in Europe, and in this day and age (Bullock, Andrews, Braud & Reardon, 2009).

The RIASEC test can be used to identify or characterize personal profiles that relate to six different interest and work environments. Based on Porter and Umbach (2006) the following definitions can be created. Realistic environments put their focus on practical and concrete activities often with use of tools and machines. Disciplines related with realistic environment are mechanical engineering, electrical engineering and military science. Investigative environments put emphasis on the creation and use of knowledge. Acquiring knowledge is the goal of this environment using investigation and problem solving. Disciplines considered to belong to the investigative environment are mathematics, sociology, biology, civil engineering and economics. Social environments focus on teaching and healing. Emphasis is on acquisition of interpersonal competencies. Disciplines associated are political science, nursing, education, history and philosophy. Enterprising environments have an orientation towards organizational and personal goal attainment through manipulation or leadership. Leadership development is important and they

reward popularity, aggressiveness and self-confidence. Disciplines include journalism, business, communications and computer science. Artistic environments put emphasis on creative activity. These environments encourage the acquisition of innovative and creative competencies. Arts, architecture, music and theatre are examples of artistic disciplines.

Holland's theory suggests that students will perform better academically if their major environment is congruent with their interests; it is also suggested that they will finish their degree's sooner (Allen & Robbins 2010).

Research questions

The main question that will be answered in this article is: what is the major-interest congruence of first year students, and what is the influence of parents and peers thereon? This study will look at whether the college major choice the student made, matches the Holland Code, extracted from the questionnaire. Comparable research has been done already, however, not in the Netherlands, and in addition, little research distinguishes multiple types of influence by parents. Students entering the process of deciding what college major to choose had preconceptions on what they should study based on pressure of their parental and peer group beliefs (Hemsley-Brown, 1999). In this study, the supposition is made that if these preconceptions play a bigger role than the interest profile, a larger chance of major-interest incongruence is the result. Multiple hypotheses are constructed about what the influences of parents and peers may cause in the process of choosing a college major.

Hypothesis 1: A large steering role of parents (pushing the student in a certain direction) on college major choice can result in a lower major-interest congruence.

This hypothesis is supported by the findings of Yorke (1999). Coercion by parents to choose a major based on potential job opportunities and economic returns of a certain type of major also enlarge the chance of major-interest incongruence (Perez, Cromley & Kaplan, 2014; Yang, 2013). Ma (2009) states this is mostly the case in families with lower SES where job opportunity and economic return are considered more important than studying something that fits with someone's personal interests.

Hypothesis 2: A supporting and encouraging role of parents on college major choice has a positive effect on the major-interest congruence.

Parental coercion can result in major-interest incongruence if students are coerced to choose a major that does not fit their profile (Perez, Cromley & Kaplan, 2014; Yang, 2013). If this is the case, it is interesting to find out what effect support and encouragement have opposed to coercion.

Hypothesis 3: A *big influence of peers on college major choice may result in a lower major-interest congruence.*

Since peer group beliefs and preconceptions play an important role, it can be assumed that if their influence is high and a student feels obliged to give into that pressure, a higher chance of major-interest incongruence can be the result (Hemsley-Brown, 1999).

Method

Participants

In contrast with the original idea of this study, the participants no longer are high school seniors, but instead the group consists of students in first year courses in the social sciences of Utrecht University. They were asked to fill in the questionnaire at the end of lectures or workgroups. The group consists of n=72 (27 male, 45 female), with an age of M = 20.03, SD = 1.74.

The reason for this switch was that at the moment of data collection, the high school seniors no longer had classes, only preparations for the final exams. Therefore they were unapproachable for this study and schools were not able to help out. The switch to students enrolled in first year courses was made since they are closest in time to the choice process itself.

Instruments

The questionnaire (see appendix) used to collect the data from the students consisted of multiple components, the first being the RIASEC questionnaire. The Dutch translation, called the AIST-R (Bergmann, F. Eder, 2005) is a revised version of the original AIST (1992, 1999), which is a test based on the model of Holland. The questionnaire consists of 60 activities. Students had to indicate to what extend they are interested in doing these activities on a 5-point Likert scale. The questions successively represent the different personality types; realistic, investigative, artistic

etc. For every personality type there are ten questions. Based on the ten questions, which can range from one to five, a conclusive score of 10-50 can be calculated of each of the six types. The three highest scores together form the final code extracted from the RIASEC questionnaire.

Bergmann and Eder (2005) found internal consistency between α = .82 and α = .87; the stability coefficient with a sample of n = 2.496 with ages varying between 14 and 28. Good discrimination between factors was found of the different interest profiles. In table 1 examples can be found of the RIASEC questionnaire.

Table 1.

Examples of items on RIASEC questionnaire

Proven personality type	Example item
Realistic	Working with machines or technical equipment
Investigative	Performing an experiment in a laboratory
Artistic	Writing stories or reports
Social	Guiding or educating someone else
Enterprising	Leading a team
Conventional	Writing a formal letter

In addition to the RIASEC questionnaire, questions about the influence of parents and peers will also be included. The questions consist of statements with a 5-point Likert scale rating attached to every statement. Since most previous research about influence of parents on college major choice did not distinguish different types of influence, this study will distinguish two categories. The first category consists of questions that prove a steering influence when students agree with the question. The second category proves a supporting influence when agreed with. The different categories are mixed up in the questionnaire; all the odd numbered questions are related to the first category, and all the even numbered ones related to the second category. The questions about steering parental influences are based on literature that states that parents make a plan about the future for their child, and then try to steer it in that direction (Ceja, 2006; Flint, 1992; Cabrera & La Nasa, 2000). These plans, for instance, can include a minimal salary their children should earn, the prestige that goes along with the profession, or the desire, from the parents, that their children

will follow in their footsteps and take over the family business. The questions that were formulated in the questionnaire all add up to parents having influence on the direction of college major the student chose. The other questions related to parental influence prove that parents can support the child in the process of choosing a major. Parental advice about how to gain information about different majors, for instance, is a way in which parents can support their children in a positive way. Parents can initiate a child's thinking process, motivate it to look into majors that matches his or her interest, and point out the child's qualities and talents (Cabrera & La Nasa, 2000; Brooks, 2003; Holmegaard, 2015).

The theory on which the questions about peer influences are based, found that peers are mainly used as a source of information, or seen as a role model (Hallinan & Williams, 1990). Students have to make a big life decision, which their peers have to make as well. Subsequently, all information peers gather is also relevant to the student itself. Moreover, peers can express their opinion about options the student considers, which can be taken into consideration while making the final decision (Brooks, 2003; Chapman, & Johnson, 1979). Finally, peers can also influence the choice process by the choices they make, since many friends like to stay close to one another. (Chapman, & Johnson, 1979)

Two final components are added to the questionnaire to complete it. The first one is the informed consent. This is an agreement that states that the student is well informed prior to participating in the study, and has every right to stop whenever he or she desires. It also states that the information will be handled with care, and will not be used for any other purpose than this study. The final question that is added to the questionnaire is: What major did you choose (college major and educational institution)? This question is needed in order to link the interests to the college major choice.

Another instrument that is used in this study is Holland's *Zelfonderzoek* (Van Eijk et al., 2014). This is the official Dutch translation of the Self-Directed Search of Holland (1994), which is a self-testing method interests, and contains a list of all possible college major choices in The Netherlands with their corresponding RIASEC codes. This is used to look up the RIASEC code corresponding with the college major choice made by the student. In table 2 examples of the different forms of social influence can be found.

Table 2.

Examples of items on social influence

Social influence	Example item
Steering parental influence	My parents/guardians have expressed doubts about college majors I suggested
Encouraging parental influence	My parents/guardians pointed me at my talents and qualities during my college major choice process
Peer influence	Together with a friend, I looked at college majors that would interest us both

A small pilot test has been conducted in order to find out if all questions were clear, and whether no misconceptions would arise among the participants. 10 adolescents, aged between 19 and 23, were asked to complete the entire test. Feedback that was retrieved from this pilot was subsequently implemented in the questionnaire.

After all data was collected a factor analysis was performed on the RIASEC questionnaire and on the questionnaire about peer and parental influences. The Cronbach's Alpha of the RIASEC was $\alpha = .86$ this is between the reliabilities found for the AIST-R (Bergmann, F. Eder, 2005). A confirmatory factor analysis checked the validity of the six factors of the RIASEC and has an explained variance was 54.07%, which is good according to the COTAN criteria (Evers, Sijtsma, Lucassen & Meijer, 2010).

For the test about social influences an exploratory factor analysis was conducted and based on the scree-plot four factors were found. Since this is more than the three factors that were intended, some questions were removed. After looking at the component matrix questions that didn't score high on the first three factors were looked into. These questions: question 1 and 14 for parental influence and question 1, 3 and 4 for peer influence, were multi interpretable and therefore removed.

After this another exploratory factor analysis was conducted and looking at the scree-plot three factors were found with an explained variance of 48.71% was found which is sufficient according to COTAN criteria (Evers, Sijtsma, Lucassen & Meijer, 2010).

When the items were removed the test on social influence had reliability of α= .75. The factors separately had a reliability of: parental encouragement .78, parental steering .85 and peer influences .68. These factors are reliable enough to continue the analysis.

Design and procedure

Participants were asked to complete pen-and-paper questionnaires at the end of either a lecture or working group. For some courses there was also a link on Blackboard to the questionnaire which gave a low response. Before handing out the questionnaires students were briefed in terms of research purposes as well as anonymity of the results and ethical considerations. Pen-and paper is preferred over an online questionnaire because higher response rates are expected and in case of unclear items answers can be given right away.

No individual results are reported back to students, since the information about whether or not their college major choice is in line with their interest might discourage them to pursue that major. The final findings, however, will be reported back to the participants that took part in the study if they desire so. The survey has an optional field to include an e-mail address in order to send the results to students.

As for the last question of the questionnaire, students were asked to fill in the first major choice they made, immediately after finishing high school, since the parental and peer influences are biggest at this stage.

To guarantee the validity of the questionnaire a confirmatory factor analysis was done on the RIASEC and an exploratory factor analysis on the questionnaire about social influences. This to ensure each factor loads on the good construct. Reliability has been tested using Cronbach's Alpha.

Analysis

The first step after finishing the RIASEC questionnaires is to determine to what extent the major-interest congruence exists between college major choice and interest profile. The dependent variable is to what extent a student has a major-interest congruence. The independent variables are the influence of parents and the influence of peers. Using these variables pearson correlations were conducted.

Major-interest congruence is determined in the following way: there will be two RIASEC codes, the first of which will be extracted from the questionnaire, and the second of which will be of the chosen college major. This code will be determined using Holland's *Zelfonderzoek* (Van Eijk et al., 2014), in which all college major choices are listed with the corresponding RIASEC code. The amount of major-interest congruence will be expressed in a value ranging from 0 to 14. This is because for the first, second and third letter of the code extracted from the questionnaire will respectively make a factor of three two and one. These factors will be applied to the scores of the college major code. These scores are three, two and one, also respectively the first, second and third letter of the code. The calculation starts with the first letter of the code extracted from the questionnaire. If this letter is also present in the college major code, the amount of points of its position in the college major choice code is multiplied by 3, since this is the calculation of the first letter. The second letter is calculated in the exact same way, but will be multiplied by 2, and for the third and final letter of the questionnaire code, the factor will be 1. In case of identical codes, the score will be 14 (3*3 + 2*2 + 1*1). To explain this method further, table 1 will be an example of a student that had RIS as his code, extracted from the questionnaire.

Table 3.

RIASEC codes calculated in major-interest congruence examples.

Questionnaire code	College major	College major code	Calculation	Major-interest congruence (0-14)
RIS	Security Technology	RCO	3*3 + 2*0 + 1*0	9
RIS	Chemistry	CRI	3*2 + 2*1 + 1*0	8
RIS	Life sciences	IRC	3*2 + 2*3 + 1*0	12

The best major-interest congruence for this student would be Life Sciences, with a score of 12 out of 14.

The three independent variables, parental support, parental steering and peer influences, are scored in a similar way. For every variable there are nine questions, with a 5-point Likert scale. These five points, ranging from totally disagree to totally agree, will have points assigned to them. The first option, totally disagree, will be assigned one point, and the other one, totally agree, five points. Ultimately, this will result in a score ranging from 6 to 30 for peers. 8 to 40 for parental steering and encouragement. Where a score of 18 for peers means the influence of this factor was neutral and a score of 24 for parental influences. With these scores, the influence of the different variables will be comparable to each other and to the interest college major-interest congruence.

Since there are three different hypotheses, multiple tests are conducted, all of which are Pearson correlations. The dependent variable is interest college major-interest congruence in every one of these tests, and the independent variables are respectively parental support, parental steering and steering by peers. The correlations give an insight in whether or not the independent variables have an impact on the dependent variable.

Results

The descriptive statistics are shown in table 4. For parental influences question one and fourteen were removed and for peer influences one, three and four were removed. They had component loadings that were to low and removing them resulted in three different factors as expected.

Table 4.

Descriptive statistics of the variables

Variable	*M*	*SD*	Range
Amount of major-interest congruence	8.36	3.00	0 – 14
Parental steering influence	20.10	6.14	8 – 40
Parental supporting encouraging influence	29.11	5.18	8 – 40
Peer influence	15.93	4.23	6 – 30

Hypothesis 1: A large steering role of parents (pushing the student in a certain direction) on college major choice can result in a lower major-interest congruence.

The correlation found show there is a low correlation between steering role of the parents and major interest congruence. A correlation of r= -.181, n=72 , p=.129 was found. This result is insignificant and does not support the hypothesis.

Hypothesis 2: A supporting and encouraging role of parents has a positive effect on the major-interest congruence.

In contrast with the expectations, the results of the correlation analysis shows that there is a small negative correlation between parental encouragement and college major interest congruence. The correlation is insignificant; r= -.147, n=72 , p=.216. There is no support for the hypothesis.

Hypothesis 3: A *big influence of peers on college major choice may result in a lower major-interest congruence.*

The correlation found show there is a low correlation between steering role of the parents and major interest congruence. A correlation of r= -.100, n=72 , p=.404 was found. This result is insignificant and does not support the hypothesis.

Discussion

This study examined the relationship between the steering or encouraging role of parents, the influence of peers in relation to major-interest congruence. There are no significant results in the correlations between social influence and major-interest congruence. Overall parental support-scored higher compared to a steering influence. Hypothesis one about a large steering role of parents in relation to interest-major congruence was not the supported. The correlation was negative as expected but not statistically significant.

The second hypothesis is also not supported. In contrast to expectation the encouraging role of parents opposed to coercion gave a small negative correlation. Encouragement by parents plays a big role (Porter & Umbach, 2006). Since parental encouragement plays a big role and results were in contrast of the second hypothesis this might be something for further research. If it

is the case that parental encouragement has a negative influence on the major-interest congruence further research might be able to give indications why this is the case. It can be argued that every kind of influence on the choice process even if it is encouraging has a negative effect. If this is the case encouraging or steering may result in a lower interest-major congruence.

The third hypothesis concerning influence of peers on college major choice resulting in a lower major-interest congruence was not supported. There is a low negative correlation as predicted but the result found was not significant.

General limitations and suggestions for further research

In this research there are some limitations. These might have played a role in finding proof for the relationship as described in the research questions. An important question for this research is the correctness of validity. After removing a few questions we found three factors as predicted but did the questionnaire really measure the three constructs as perceived.

Question 1 and 14 for parental influence were removed. This was because question 1 was not necessarily a form of steering and question 14 was removed since it multi interpretable and could be also be interpreted as neglect. Question 1 of peer influence was removed since this is more an internal desire to become successful rather than peer influence.

Question 3 and 4 might not prove an influence of peers but rather the need or will of a student to stay with their friends rather than being pushed to join them.

Another limitation was the group of respondents was not as originally planned. In contrast to the first idea of high school seniors, students in first year social sciences courses were asked. These RIASEC is also suitable for thus group of participants since the test also measures vocational interests. High school seniors were in the middle of their choice process and for the first year students this was harder to remember lowering the chance of getting the correct answers. Since the majority of these students followed a major in the social sciences the group was more homogenous compared to a group of high school seniors with a wider range of major choices. If the group would have been bigger and more diverse there could have been enough students in the field of STEM studies. Perez, Cromley and Kaplan (2014) research suggests students choose a STEM major in case of coercion. Arguing that parents coerce students into STEM studies which gives a higher

chance of major-interest incongruence. If there really is a case of coercion and major-interest incongruence what will the implications be concerning dropout rates and student satisfaction rates.

The group of respondents changed to students enrolled in first year courses. Because these students already progressed through most of the year test results could also have been taken into account. Research suggests that college-major congruence has a good effect on academic performance (Schmit, Oswald, Friede Imus, & Merrit, 2008; Allen & Robbins,2010). If grades were taken into account, this research could have given an insight to what extent parental encouragement, parental steering and peer influences might have played a role.

Another problem encountered during the research was deciding to what extent a student has major-interest congruence. The RIASEC questionnaire gives a score ranging from 10-50 on every different aspect of the interest profile. This gives a three letter code that is in line with a major found in Holland's *Zelfonderzoek* (Van Eijk et al., 2014). But since Holland's *Zelfonderzoek* does only give the three letter code and no scores another method was designed in this research to decide a degree of congruence, with scores ranging from 0-14. For further research it might be interesting to either design a guide with different majors giving the exact scores ranging from 10-50 on each letter for the specific letters or to use the scores between 0-14 as used in this article to decide congruence.

Subsequently, a problem with Holland's *Zelfonderzoek* is that some majors give more three letter codes (Van Eijk et al., 2014). This is because in some majors students can choose different tracks that fit a different code. In this article the choice was made to choose the codes with the highest rate of congruence. But since this measure of congruence is not necessarily the case this is something which can be devised in a different way.

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Appendix A: questionnaire

Universiteit Utrecht

Beste student,
Allereerst hartelijk dank voor je deelname. Onderstaande vragen gaan over jouw interesses en de invloed die ouders en vrienden/leeftijdsgenoten (peers) op het proces van studiekeuze hebben gehad. De antwoorden die je hier geeft blijven anoniem en worden alléén gebruikt voor dit specifieke onderzoek.

- Ik verklaar op een voor mij duidelijke wijze te zijn ingelicht over de aard, methode en het doel van het onderzoek. Ik weet dat de gegevens en resultaten van het onderzoek alleen anoniem en vertrouwelijk aan derden bekend gemaakt zullen worden. Mijn vragen zijn naar tevredenheid beantwoord. Ik stem geheel vrijwillig in met deelname aan dit onderzoek. Ik behoud me daarbij het recht voor om op elk moment zonder opgaaf van redenen mijn deelname aan dit onderzoek te beëindigen.

Leeftijd in jaren: _____

Sekse: Man / Vrouw

Email adres * _____

* Optioneel, hiermee zullen wij de resultaten terugkoppelen aan het einde van het onderzoek als u daarin geïnteresseerd bent.

Deze vragenlijst bestaat uit een lijst van verschillende activiteiten. Geef bij iedere activiteit aan in hoeverre deze je interesseert of zou kunnen interesseren.

Nr.	Activiteit	Helemaal niet	Weinig	Een beetje	Best wel	Heel erg
1	Met machines of technische apparatuur werken					
2	In een laboratorium experimenten uitvoeren					
3	Iets creatiefs doen					
4	Andere personen begeleiden of verplegen					
5	Leiding geven aan een team					
6	Boekhouding (financiële administratie) doen					
7	Onderzoeken hoe iets werkt					
8	Wetenschappelijk artikelen lezen					
9	Verhalen of verslagen schrijven					
10	Iemand begeleiden/onderwijzen					
11	Een bedrijf of onderneming leiden					
12	Met een schrijfprogramma (bijv.: Word) werken					
13	Metaal/hout bewerken of iets maken van metaal/hout					
14	Met vernieuwende dingen bezig zijn					
15	Gedichten en literatuur lezen en duiden					
16	Andere mensen adviseren					
17	Een discussie leiden					
18	Zakelijke brieven schrijven					
19	Fysiek (lichamelijk) werk doen					
20	Iets nauwkeurig bekijken en analyseren					
21	Dingen doen waar creativiteit/fantasie voor nodig is					
22	Luisteren naar andermans problemen					
23	Ergens reclame voor maken					
24	Een taak doen waarvoor je heel precies en hard moet werken					
25	Nieuwe computer onderdelen installeren					
26	Het gedrag van dieren of planten onderzoeken					
27	Zich met oude culturen bezighouden					
28	Mensen bedienen of voor mensen zorgen					
29	Een evenement organiseren					
30	Prijsvoorstellen opvragen en vergelijken					
31	Technische ontwerpen tekenen					
32	Lange tijd aan de oplossing van een probleem werken					
33	Dingen mooi maken (bijv.: versieren)					
34	Zich inzetten voor de belangen van anderen					
35	Toezicht houden op of controleren van anderen					

36	Een databestand maken en data verwerken					
37	Bouwen van elektrische apparatuur of elektriciteit aanleggen					
38	Chemische, fysische of biologische proeven doen					
39	Een vreemde taal leren					
40	Netwerken, met mensen in contact komen					
41	Zich in het openbaar inzetten voor een bepaalde zaak					
42	Ergens aantekeningen of een lijstje van maken					
43	Op een bouwplaats werken					
44	Een computerprogramma ontwikkelen					
45	Spelen in een toneel- of muziekgroep					
46	Zorgen voor hulpbehoevende kinderen of volwassenen					
47	Anderen ergens van overtuigen of voor motiveren					
48	Dingen verzamelen, ordenen of beheren					
49	Diensten verlenen (reinigen, onderhouden, repareren)					
50	De oorzaak van een probleem verkennen					
51	Schilderen of tekenen					
52	Zieken of gewonden verzorgen					
53	Met mensen onderhandelen					
54	Toezien op het naleven van regels					
55	Iets maken volgens een tekening of plan					
56	Uitzoeken wat een computerprogramma allemaal kan					
57	Iets creatiefs met taal doen					
58	Zich inleven in de situatie van anderen					
59	Het woord nemen in een groep					
60	Een rekening controleren					

Om de invloed te bepalen van jouw ouders/verzorgers op jouw studiekeuzeproces is er een aantal stellingen opgesteld. Geef bij deze stellingen aan in welke mate jij het er mee eens bent.

Nr.	Stelling	Zeer mee oneens	Mee oneens	Neutraal	Mee eens	Zeer mee eens
1	De studierichting van (één van) mijn ouders/verzorgers ligt in lijn met de mijne					
2	Mijn ouders/verzorgers motiveerden mij na te denken over wat ik wilde studeren					
3	Mijn ouders/verzorgers wilden dat ik een studie ga doen met een hoge banenkans					
4	Mijn ouders/verzorgers boden mij informatie aan over verschillende studies					
5	Mijn ouders/verzorgers verwachtten dat ik een vervolgstudie zou kiezen					
6	Mijn ouders/verzorgers deelden hun eigen ervaringen over hun studie/hoger onderwijs					
7	Mijn ouders/verzorgers hadden al een beeld over mijn toekomst zonder dat hier over had nagedacht (of met hen had gedeeld)					
8	Mijn ouders/verzorgers spoorden mij aan om naar open dagen te gaan					
9	Mijn ouders/verzorgers wilden dat ik een studie ging doen waar ik veel geld mee kan verdienen					
10	Mijn ouders/verzorgers gingen met mij mee naar open dagen					
11	Mijn ouders/verzorgers hebben hun twijfels uitgesproken over studies die ik suggereerde te willen volgen					
12	De studie suggesties die mijn ouders/verzorgers maakten waren gebaseerd op mijn interesses					
13	Mijn ouders/verzorgers hebben mij ontmoedigd om voor een bepaalde studie, die mij interessant leek, te kiezen					
14	Mijn ouders/verzorgers gaven mij de vrijheid voor elke studie te kiezen die ik maar wilde					
15	De mening van mijn ouders/verzorgers over de studie is voor mij van grote invloed geweest op de studiekeuze					
16	Mijn ouders/verzorgers hebben (met mij) naar antwoorden gezocht op vragen waar ik in mijn studiekeuze proces tegenaan liep					
17	Mijn ouders/verzorgers wilden dat ik een studie ging doen, waarmee ik later een baan met veel aanzien kon krijgen					
18	Mijn ouders/verzorgers hebben mij gewezen op mijn talenten en kwaliteiten tijdens mijn studiekeuze proces					

Om de invloed te bepalen van jouw vrienden/leeftijdsgenoten (peers) op jouw studiekeuzeproces is er een aantal stellingen opgesteld. Geef bij deze stellingen aan in welke mate jij het er mee eens bent.

Nr.	Stelling	Zeer mee oneens	Mee oneens	Neutraal	Mee eens	Zeer mee eens
1	Ik heb mijn banenkans van mijn studie zwaar laten meewegen, omdat ik niet minder succesvol wil worden dan mijn vrienden					
2	Ik heb samen met mijn vrienden gekeken naar studies die ons allebei zouden interesseren					
3	Op de studie die ik wil gaan volgen, zitten veel vrienden van mij (of gaan volgend jaar veel vrienden van mij ook beginnen)					
4	De stad waar ik ga studeren heb ik gekozen omdat mijn vrienden daar ook gaan studeren					
5	Mijn vrienden hebben hun eigen mening/ervaringen gedeeld over studies die ik overwoog te doen					
6	Mijn vrienden hebben hun twijfels uitgesproken over studies die ik voorstelde te willen volgen					
7	Mijn vrienden hebben mij aangezet tot het oriënteren op studies					
8	Mijn vrienden hebben mij informatie gegeven over studies, waar ik mijn studiekeuze op heb gebaseerd					
9	Mijn vrienden hebben mij gewezen op mijn talenten en kwaliteiten tijdens mijn studiekeuze proces					

Welke studiekeuze heb je gemaakt? (Onderwijsinstelling en studierichting)

_____