The postmaterialist perfectionist, the pragmatic hedonist, and the materialist maximalist.

Understanding high school students’ profile choices towards or away from mathematics, science and technology (MST) fields in the Netherlands

Abstract:
Despite our knowledge of various determinants of gendered study choice patterns in MST fields, operating at different levels, we still don’t understand how they work together. In this study we focus on the role of cultural values on Dutch high school students’ profile choices using a mixed-methods approach. We focus on students’ profile choices and the choice for or against a Nature and Technology profile (hereafter NT profile) in particular because it regulates which fields students can enter in higher tertiary education. Based on Schreiner and Sjøberg (2005) and Charles and Bradley (2009), we expect that both female students and students with a native Dutch background feel less positively towards a NT profile than male students and students of a migrant origin because a NT profile does not correspond with postmaterialist values and self-identities (Relevance of Science Education [ROSE], 2004; Schreiner, 2006). The quantitative part of our study shows that being female is negatively correlated with the choice for a NT profile, irrespective of high grade averages for mathematics, chemistry and physics. It also shows that students’ ethnic origin does not have a significant effect on the choice for a NT profile. The qualitative part of our study reveals that students’ choice processes towards or away from a NT profile can be categorized in three ideal types. The three types are: the postmaterialist perfectionist, the hedonistic pragmatist and the materialist maximalist. Each of these types corresponds with a particular group of students. Although ethnic origin did not prove to be significant for students choices towards or away from a NT in our quantitative analysis, our qualitative analysis suggest that ethnic origin is a proxy for social class. Further analysis shows that gender differences are more pervasive across these types than differences based on ethnic origin.

Keywords: gender, secondary education, mathematics, science, technology, the Netherlands
1. Introduction

In the Netherlands, as in many other countries around the world, more than half of all students in higher tertiary education are female. Yet, the share of women in mathematics, science, and technology (MST) studies remains low. This lack of female participation in MST fields is a worldwide phenomenon of concern to many (European Commission, 2007, 2008, 2009a, 2009b, 2010a, 2010b, 2012; Organisation for Economic Co-operation and Development [OECD], 2006a). It is also the main topic of this research article.

Different types of explanations exist for the gender imbalance in MST in the research literature. Explanations at the level of the individual refer to individual student characteristics. Girls’ mathematics self-efficacy beliefs, that is, the confidence in their mathematics abilities and skills, for example, tends to be lower than boys’, which would explain why they less often opt for MST (Bandura, 1978, 1986; Bussey & Bandura, 1999; Lent et al., 1994). Explanations on the institutional level relate gender differences in MST choice to education and school contexts. In countries with educational systems in which students are given more freedom to choose between alternative trajectories, for example, gender differences in study-choice are larger than in countries where students have less freedom of choice (Abbiss 2009; Van Langen et al., 2008; Van de Werfhorst, Sullivan, & Cheung, 2003). Explanations at the cultural level focus on gender roles and more general cultural values. Gender role theory attributes the gendered patterns in MST participation to differential cultural socialization of men and women. An example is the idea that MST fields are associated with masculinity and are therefore less attractive to women (Charles & Bradley, 2009; Scantlebury & Baker, 2007; Schreiner & Sjøberg, 2005). Another cultural explanation, as we will explain presently, relates gendered study patterns to the level of economic development of a society and to concepts of materialism and postmaterialism (Schreiner and Sjøberg (2005).ii

Given the vast scientific evidence available, it is now evident that individual, institutional and cultural factors all play a role in explaining study choice, but up till now very little is known about the way these factors come together in the actual choices students make. In this article we report on a study of choice processes of individual students in upper secondary education in the Netherlands towards or away from MST fields. We focus on high school student’s profile choices because high school students’ profile choices regulate which fields they can enter in higher tertiary education. In the Netherlands, students in upper secondary school are obliged to choose at least one in four profiles at the end of grade 9 (age 14/15). The four profiles are: Nature and Technology (NT), Nature and Health (NH),
Economics and Society (ES), and Culture and Society (CS). In an effort to gain a better understanding of gendered patterns of choice in MST this study focusses on high schools students’ choice for or against a NT profile. The Netherlands is chosen as a case study for several reasons. First, the gender imbalance in MST fields is relatively large in comparison to other countries in EU and OECD context and it has been so for the decade. Recent figures by Eurostat for example show that 22.6% of all students in mathematics, science and computing fields in the Netherlands were female as opposed to 37.3% in the EU (28 countries) (Eurostat, 2015). Second, the Netherlands scores relatively high on gender equality in education but also in economic and political participation according to the most recent Global Gender Gap Index, ranking number 14 of least gender in-equal countries of 142 countries in total (World Economic Forum, 2014). Thirdly, in comparison to female students in other OECD countries, Dutch female students score relatively high in mathematics skills as measured in PISA 2012 (OECD, 2014). Moreover the gender gap in achievement scores is relatively small in the Netherlands in comparison to other OECD countries, making the study on gendered patterns in MST choices even more interesting (OECD; 2014). Finally, in the Netherlands there are many students with a migrant origin from non-Western countries that are socio-culturally and socio-economically different from the Netherlands and who are currently making educational choices in upper secondary school, which makes it possible to compare choice patterns of native ethnic Dutch students with the choice patterns of students with a non-Western migrant origin. We will now first discuss the theory underlying our study and present our central research question, next we explain the design of the study, present the results and we end with a conclusion and debate of our findings.

2. Theory

Where in the past the unequal representation of female students in MST used to be explained as a result of a lesser aptitude of women for these subjects, it is obvious now from a vast body of research literature that this explanation does not hold (see for an overview Yazilitas et al. 2013). Still, girls more often than boys believe that they have no talent for MST (see, for an overview, Singh, Allen, Scheckler, & Darlington, 2007). Furthermore, it is found that girls more often than boys prefer other subjects over MST and this is reflected in their expectations with regard to future fields of study and occupations (Nagy, Trautwein, Baumert, Köller, & Garrett, 2006; Christidou, 2011; Rommes, Van Gorp, Delwel & Emons, 2010; Baram-Tsabari, Sethi, Bry & Yarden, 2006, 2009; Jenkins & Pell, 2006). Girls are confirmed
in these convictions by their parents as parents generally support the cultural stereotype that mathematics is more natural for boys (Eccles, Freedman-Doan, Frome, Jacobs, & Yoon, 2000; Furnham, Reeves, & Budhani, 2002; Herbert & Stipek, 2005; Li, 1999).

Cross-national studies have also shown that the institutional school contexts in which children are educated have a strong influence on values, norms, and beliefs that are associated with study choice (Anderson, Lin, Treagust, Ross, & Yore, 2007; Crul & Heering, 2008; Eccles, 2005; Levels, Dronkers, & Kraaykamp, 2008; OECD, 2006b, 2007). School systems which are highly differentiated tend to produce more gender inequality than countries with less differentiated systems (Bradley & Charles, 2004; Charles, 2011; Van Elk, Van der Steeg & Webbink, 2009, 2011; Van Langen, 2007; Van Langen, Rekers-Mombarg & Dekker, 2006, 2008; Wößmann, 2009). Related to this is the effect of freedom of choice. In countries where pupils are given more freedom to choose between alternative trajectories, patterns of educational choice are found to be more gendered (Van de Werfhorst, Sullivan & Cheung, 2009; Van Langen, 2005; Van Langen & Dekkers, 2005; Van Langen et al., 2008; Abiss, 2009).

Inspired by Inglehart’s modernization theory and theory on postmaterialism, Schreiner and Sjøberg (2005) relate sex specific study choice to economic development. In economically more developed or postmaterialist societies, an individual’s identity is no longer perceived as something that is given, but rather as something that one has to choose and develop (Inglehart, 1977;….; Giddens, 1991). Materialism thus refers to a value system in which material security and the desire to fulfil material needs stand central, whereas postmaterialism refers to a value system which emphasizes the desire and fulfilment of other type of needs, including intellectual fulfilment, autonomy and self-expression. Postmaterialists attach much value to living in accordance with their own values. They prefer jobs which are intrinsically fulfilling rather than jobs that just provide material security and stability. In this context, students in postmaterialist societies are believed to make fundamentally different educational choices than students in traditional and materialist societies (Illeris, 2003; Illeris, Katznelson, Simonsen, & Ulriksen, 2002; Schreiner & Sjøberg, 2005).

Following this cultural explanation, women in postmaterialist societies, when offered the choice between different alternatives in higher education, will tend to choose typically female fields of study, that are more connected with their core identity, which is assumed to be heavily influenced by gender roles. Women in less developed societies are less concerned with these issues and more often choose to study in non-traditional fields, including MST,
because their choices are more driven by materialist values, like a concern for material security and stability. Although the same explanatory mechanism also applies to men and their educational choices, Schreiner and Sjøberg argue that the difference in academic choices in different societies is nonetheless smaller, because men’s core identities and gender roles are much less contested in other academic fields than women’s in MST. Research by Charles and Bradley (2009) on sex segregation by field of study in higher education across 44 societies, including both developed, developing, and transitional countries, shows that sex typing of MST is indeed stronger in more economically developed contexts. We may expect therefore that not only male and female students make different choices, but also that students whose families originate from economically less developed societies, i.e. students with an immigrant background, will choose differently from native students in more developed country contexts.\textsuperscript{vi}

Despite our knowledge of various determinants operating at different levels, we still don’t understand how they work together leading to gendered study choice patterns in MST. In this study we aim to shed more light on how individual, institutional and cultural factors interact in shaping high school students choices towards or away from MST fields. We focus in particular on cultural factors, i.e. students ideas about the choice for or against a NT profile in relation to their self-identity and values. It is for this reason that we compare the study choices of students of male and female students of native Dutch and non-Western migrant origin. We have chosen a mixed-method approach, combining quantitative and qualitative data. In order to allow an inductive exploration of interview material, we have chosen a research question that is deliberately open. Based on Schreiner and Sjoberg, we expect students with a native Dutch background to feel less positively towards MST choice options, and especially the girls more than students of migrant origin because it does not correspond with postmaterialist values and identities. In addition, by including ethnicity alongside gender in the comparison, we also take into account possible interaction effects that might occur between gender and ethnic origin.

Our general research question then is:
How does the choice for a NT profile relate to high school students’ identity and values? And to what extent do male and female students of native Dutch and non-Western origin differ in their choice patterns?
3. Research design

We collected quantitative and qualitative data on the choice patterns of a group of high school students in the Netherlands. As our aim was to understand how individual, institutional and cultural factors combine, we decided to interview high school students and to ask them to explain how their actual profile choice had come about. The quantitative component provided us with the necessary background information about the general choice patterns within the schools that the students attended.

3.1 Research group

VWO or pre university education\textsuperscript{vii} is the most common route from secondary education to the higher tertiary level in the Netherlands. The study focuses on profile choice of VWO students. At the end of grade 9 these students are required to choose at least one out of four profiles: Nature and Technology (NT), Nature and Health (NH), Economics and Society (ES) or Culture and Society (CS). Each of the profiles consists of three parts: (1) a common part (‘gemeenschappelijk deel’), (2) profile part (‘profiel deel’), (3) a free choice part (‘vrij deel’). The second part, the profile part, is generally considered to form the core of the profile. In practice, students can easily merge profiles by combining core profile subjects with free choice subjects of another profile. For example when students take physics as a free choice subject in a NH profile, given that they have chosen the optional advanced mathematics B over mathematics A, they often automatically also qualify for a NT profile.

We searched for VWO schools with a student population that was mixed in gender and ethnicity. We found two schools in a medium-sized city in the Randstad who were willing to participate in the study. The Randstad is a conurbation or agglomeration in the North-West of the Netherlands (CBS, 2015; OECD, 2007).\textsuperscript{viii} The city in question has been anonymized for the protection of students privacy.

3.2 Data collection and analysis

The data collection took place in the period January to April 2012. Quantitative data on 9 variables were collected among 259 students in grade nine and grade twelve of VWO. The data concerned students grade averages for Dutch, English, mathematics, physics and chemistry at the end of the third year-class (grade nine), and profile choice, origin, gender and zip code. In both schools data were collected with help from the central administration.
offices. In accordance with the CBS [Statistics Netherlands] definitions, students were classified as having a native Dutch, a Western migrant origin or a non-Western migrant origin (see endnote iv). A non-Western migrant origin meant that at least one of both parents was born in a non-Western country. When information on the birth place of student or parents was unclear or absent, information on the nationality of parents or the student was taken into consideration. If that too was missing or unclear, the first and family names of parents and students were used as a guideline. Students were classified as native Dutch when both parents were born in the Netherlands (irrespective of their own birthplace) and of Western migrant origin if at least one of both parents was born in a Western country. Of the 259 students, 169 students (65%) were of native Dutch origin, 57 students of non-Western migrant origin (22%) and 34 students of Western migrant origin (13%).

During the second phase of the data collection qualitative data were collected through semi-structured interviews with students in grade ten (age groups 14/15) and twelve (age group 17/18). The main criteria for selecting students to interview was that students had to be able to choose a NT profile on the basis of their grade averages in grade nine (schools typically set a lower limit for those grades, especially in relation to physics and advanced mathematics B, below which a student is not allowed to choose a NT profile). In total 44 interviews were held in this initial stage with students who fulfilled this criterion. In doing so we tried to balance the number of male and female students as much as possible. However the total number of interviews was not decided beforehand and the main researcher continued to do interviews until the saturation point was reached where additional interviews did not provide new information or insights (Glaser and Strauss, 1967). Another 6 interviews with students from two schools in another middle-sized city were added to the main analysis because there were, unlike we expected, not enough students with a non-Western migrant origin in the original sample to justify a comparison between the two groups. In total we interviewed 32 female students (64%) and 18 male students (36%). Of these students, 33 were of native Dutch origin (66%), whereas 17 students had a non-Western migrant origin (34%). Prospective interviewees were identified through study counsellors at the two schools and through acquaintances in the case of the interviews held in the second city. Interviews were conducted in various settings, often at the interviewee’s school and in some cases at a café and recorded on audio after consent from the interviewee.

Interviews followed a semi-structured scheme for which a topic list and questions were compiled based on an earlier literature study (Yazilitas, et al. 2013) (see annex 2 for the topic list). The interviewer started with a short explanation about the research and her role as a
researcher. This was followed by asking what profile interviewee had chosen at the end of grade nine and why. Next, questions relating to self-efficacy beliefs and role models followed, including asking the interviewees about the opinions of their parents, siblings, peers, teacher and school mentors and their influence on their choice. Interviewees were also asked about the timing of the choice and their expectations with regard to future fields of study and occupations. If students did not mention a NT profile or MST fields as possible fields of study, the interviewer explicitly asked how they thought about this profile and fields and why they did not choose it.

The interviews were first transcribed. We then read through the first couple of interviews and searched for themes related to the topic list and research question. We first searched for self-efficacy beliefs in relation to subjects such as mathematics and physics; for subjective task values and the influence of significant others; and for self-realization values, material security values and future expectations on educational and occupational pathways. At the same time we performed open coding when new themes emerged from the material and also wrote extensive memos in an effort to interpret the data more thoroughly (cf. Glaser & Strauss, 1967 and Erlandsson, Harris, Skipper & Allen 1993). In order to secure that the codes were transparent and well-defined, the authors independently coded the interviews in order to check for inconsistencies. We then re-read the interviews in relation to one another and regrouped the codes and themes by creating new codes, themes and memo’s or combining them when they seem to overlap. We repeated these steps several times by adding new interviews to the analysis (cf. Glaser & Strauss, 1967 on ‘constant comparison’ and Strauss & Corbin on ‘axial coding’). After the first 15 interviews we tried to make a first analysis by writing down overarching themes and discussing them with one another. We then added more interviews and repeated this last step several times, going back and forth between the interviews, codes, memos and themes. After having analysed all 35 interviews, themes were linked together and three clear patterns were emerging from the analysis. During the analysis, we did not group the interviews along gender and ethnic lines. The groups that eventually emerged are reflective of the patterns we discovered when analysing the interviews.

4. Findings of the quantitative research

Regarding the distribution of male and female students over the different profiles we found that 59% of male and 42% of female students have a NT component in their profile,
consisting of either a NT profile or a combined NT/NH profile (table 1). The table also shows that female students choose NT almost exclusively in combination with a NH profile. Only 3% of female students choose a NT profile without NH, against 21% of the male students. For the remainder of the article, a NT profile is defined as to include both a (exclusive) NT as well as a combined NT/NH profile unless specified otherwise. The share of male and female students differs significantly by profile choice in our sample of students: $\chi^2(5, N = 259) = 21.89, p = .001$. This is also the case in relation to a NT profile choice: $\chi^2(1, N = 259) = 7.80, p = .005$. Being male thus increases the likelihood on choosing a NT profile.

Table 1: distribution of male and female students as a percentage of within gender

<table>
<thead>
<tr>
<th>Profile choice</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS</td>
<td>7</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>5,3%</td>
<td>8,7%</td>
<td>6,9%</td>
</tr>
<tr>
<td>ES</td>
<td>14</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>10,6%</td>
<td>11,0%</td>
<td>10,8%</td>
</tr>
<tr>
<td>ES/CS</td>
<td>14</td>
<td>26</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>10,6%</td>
<td>20,5%</td>
<td>15,4%</td>
</tr>
<tr>
<td>NH</td>
<td>19</td>
<td>23</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>14,4%</td>
<td>18,1%</td>
<td>16,2%</td>
</tr>
<tr>
<td>NT</td>
<td>27</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>20,5%</td>
<td>3,1%</td>
<td>12,0%</td>
</tr>
<tr>
<td>NT/NH</td>
<td>51</td>
<td>49</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>38,6%</td>
<td>38,6%</td>
<td>38,6%</td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>127</td>
<td>259</td>
</tr>
<tr>
<td></td>
<td>100,0%</td>
<td>100,0%</td>
<td>100,0%</td>
</tr>
</tbody>
</table>

Regarding achievement we looked at the correlations between the combined grade average for typical alpha and beta-subjects, the choice for a profile with a NT-component and gender. Typical alpha subjects include Dutch and English. Typical beta-subjects include physics, mathematics and chemistry. We found a strong significant main effect of the combined grade average for beta-subjects, indicated as betascore, on students’ profile choice: $F(5, 253) = 15.93, p = .00$. We also found a significant main effect of the combined grade average for the alpha-subjects, indicated as alphascore, on students’ profile choice, although this was
much smaller in effect size: $F(5, 253) = 2.40, p = .04$. The choice for a NT-profile in is also strongly correlated with students’ betascore, $t(257) = -7.91, p < .000$, with students with a NT profile receiving higher scores than students without a NT profile. The effect of alphascore is also significant on a NT-component, although this effect is much smaller, $t(257) = -2.40, p < .017$, with students with a NT profile receiving higher scores than students without a NT profile. A high betascore and alphascore thus increases the likelihood on choosing a NT component in your profile. Students who have a NT component in their profile also have a higher grade average for both types of subjects. The average betascore of students with a NT profile was 7.51 points (SD=0.77) as opposed to 6.70 points (SD=0.87) out of 10 points for students without a NT profile. The average alphascore of students with a NT profile was 7.04 points (SD=0.76) as opposed to 6.82 points (SD=0.69) out of 10 points for students without a NT profile. In our sample, we also see that girls on average have a slightly lower betascore than boys. Girls score on average 7.02 points (SD=0.95), whereas boys score 7.20 points (SD=0.88). However this difference is not significant, $t(257) = 1.58, p < .115$. We may not interpret this correlation as one-directional, let alone causal. It may very well be that the lower combined grade average is caused by an earlier decision not to opt for NT component before actually having to make the choice.

Having a non-Western migrant origin has no significant effect on the students profile choice: $\chi^2(5, N = 259) = 5.19, p = .402$, or on students’ choice for a NT profile: $\chi^2(1, N = 259) =1.70, p = .192$. Students with a native and non-Western migrant origin in our sample thus have similar choice patterns, although the latter slightly more prefer a NT-component than native students (56.1% of the students with a non-Western migrant origin have a NT profile as opposed to 49% of native Dutch students).

We also looked at possible interaction effects between the various independent variables and the choice for a profile with at least a NT component. The logistic regression analysis (table 2) discloses that being a female negatively influences the likelihood of choosing for a NT component, independent of the other variables, including the betascore. Also, we can see that a higher overall betascore is positively linked to the likelihood of choosing for a NT component. From this we have to conclude that the female’s choice not to opt for a NT component is only partially explained by their betascore.
<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
<th>Model 3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>S.E.</td>
<td>Exp(B)</td>
<td>B</td>
<td>S.E.</td>
<td>Exp(B)</td>
<td>B</td>
<td>S.E.</td>
<td>Exp(B)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.36</td>
<td>0.22</td>
<td>2.26</td>
<td>-5.48</td>
<td>1.76</td>
<td>1.00</td>
<td>-5.41</td>
<td>1.86</td>
<td>0.00</td>
</tr>
<tr>
<td>Female</td>
<td>-2.07</td>
<td>0.55</td>
<td>1.13</td>
<td>-2.03</td>
<td>0.56</td>
<td>0.13</td>
<td>-2.13</td>
<td>1.07</td>
<td>0.12</td>
</tr>
<tr>
<td>Betascore</td>
<td>.56</td>
<td>0.24</td>
<td>1.76</td>
<td>.55</td>
<td>0.25</td>
<td>1.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Betascore-female-7-plus</td>
<td>.15</td>
<td>1.24</td>
<td>1.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The main findings of our quantitative analysis are summarised in figure 1. It shows clearly that given a similar betascore between male and female students, fewer female students choose a NT profile than male students and that this difference tends to become smaller at a grade average of 7 points and then increases again after a 7.5 average.

Figure 1: percentage of male and female VWO students who chose a NT profile given a averaged betascore on their report card at the end of grade 8 (n=259)

These results raise several questions, including:

1. How can we explain that female students almost exclusively (38.6% of 42%) choose NT in combination with NG, whereas male students (38.6 of 59%) do not?
2. How can we explain the low enrolment figures for women in MST studies in higher education, given the finding that many female VWO-students actually opt for a (combined) NT profile?

3. Contrary to our expectations, having a non-Western migrant background seems to have no effect on the choice for a NT profile. Does ethnicity play no role in students’ study choice?

To answer these questions a more in-depth understanding of individual choice processes is necessary. We therefore asked students to explain their choices in more detail during semi-structured interviews.

5. The qualitative results: three ideal-types

After having thoroughly analysed our interviews we were able to distinguish three main ideal-types of students: the postmaterialist perfectionist, the pragmatic hedonist and the materialist maximalist. Each of these ideal-types represents the choice processes of a particular group of students: female, male and a mixed group, existing of male and female students with a migrant origin and Dutch origin. Of course not all students fit fully in one single category since each category concerns an ideal-type and thus an abstraction and condensation of reality. Based on the characteristics of each ideal-type we categorized students according to the ideal type they matched most closely. Table 3 presents an overview of the interviewees by ideal-type, gender and ethnic origin. Female students are clearly overrepresented in type I in comparison to male students (94.4% of the total number of students within this type are female and 5.6% male) whereas within the second type, the gender balance is in the favour or men (60% of the total number of students within this type are male and 40% female). Within the third type the gender balance is slightly in favour of female although it is more even than in the other two types (41.7% of the total number of students within this type are male and 58.3% of female students). In relation to origin, native students are overrepresented within the first (72.2% of the total number of students within this type are native Dutch and 27.8% have a non-Western migrant origin). This applies even more so the second type (85% of the total number of students within this type are native and 15% have a non-Western migrant origin). However, the latter are overrepresented in third type, where 25% of the total number of students are native Dutch and 75% have a non-Western migrant origin. Next we will describe the three ideal-types that we found by focusing on three case histories individual students,
each one exemplifying one type most closely. In addition to these three cases histories, we also included quotes from other cases to support these histories and present a more fleshed out or completed story.

Table 3: overview of interviewees by ideal-type, gender and origin

<table>
<thead>
<tr>
<th>Ideal-type</th>
<th>Ethnic origin</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Native Dutch</td>
<td>Non-Western migrant origin</td>
<td></td>
</tr>
<tr>
<td>type I - postmaterialist perfectionist</td>
<td>male</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>sub-total</td>
<td></td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>type II - pragmatic hedonist</td>
<td>male</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>sub-total</td>
<td></td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>type III - materialist maximalist</td>
<td>male</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>sub-total</td>
<td></td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>male</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>female</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>total</td>
<td></td>
<td>33</td>
<td>17</td>
</tr>
</tbody>
</table>

5.1 The postmaterialist perfectionist

The postmaterialist perfectionist is typically a female student who is somewhat obsessed with making the ‘right’ choices. One important result of this obsession is that she is in constant doubt about both past as well as future choices. The postmaterialist perfectionist will try to choose as broadly as possible in order to keep her options open. She is typically also someone who is not easily satisfied with less than ‘perfect’ grades and spends a lot of time on homework and worries a lot about being not good enough at school.

Sarah is 16-year-old student with an NT and NH combination profile, economics as her free-choice subject and management & organization as an additional extracurricular subject (‘verbredingsvak’) in grade 10 (sophomore) of gymnasium. Sarah’s father works as a financial administrator and her mother works in a laboratory. She has one brother who is two years older and who studies ICT-administration at vocational higher education level.

Asked about why she chose this particular combination of profiles and subjects, Sarah answers that this is mainly because at the time of her choice she wanted to study pharmaceutics but was also considering becoming a register
accountant. She hesitated for a long time between the different profiles. The choice she eventually made covers almost three profiles. So Sarah actually chose not to choose by combining three out of four profiles available to her. This seems to go against the concept of profile choice in the Dutch education system, but looking closer at Sarah’s beliefs and expectations, it appears to be a strategic move to limit the risk of making a wrong choice. The same idea echo’s in Jessica’s account of her profile choice: ‘Well, I didn’t exactly know what I wanted to do, I thought maybe something in the direction of economics or so but I liked medicine, that sort of things I also liked, something with technology or with health. So, yes, I didn’t know yet, so I thought I would take the broadest profile. With this one you can choose everything as a future field of study, so that’s why I think. […] Every time I change my mind’. Jessica adds that this is related to wanting to avoid the situation that when she wants ‘to do something else later on’ she can’t because she ‘chose the wrong profile’. She exemplifies by saying that with her profile choice, she is still able to enter the fields of economics, whereas the reverse would not be true if she had chosen another profile.

Both Sarah and Jessica thus try to avoid making mistakes by putting off choices as long as possible. This also becomes clear when we ask Sarah for how long she has been considering to study pharmaceutics or accountancy: ‘Ever since I attended secondary school. In the first year I was more into medicine in general and as of the second year more into pharmaceutics because I like chemistry. […] And I still switch back and forth’. According to Sarah this switching back and forth is related to her desire of ‘always wanting a back-up’ for ‘just in case’. This is not so much because she is afraid that if she makes the wrong choice she will not find a job, but because she is anxious to choose a job that will make her happy. About her goal in life she says: ‘Sometimes you see people being very happy with their choice and that’s also what I strive towards, being happy with my own choice’. But then she has to know what choice makes her happy. Important to her is that she has to enjoy a subject and therefore she needs to ‘really have to try to know for sure whether or not I like a subject’ before making a final choice. Yet, this created an extra difficulty to her profile choice: ‘[…] because you had so many subjects, you couldn’t really investigate your interest in a subject’. Given her desire not to close off any options it comes as no surprise when she says: ‘I want to achieve as high as possible grades’. Sarah mentions that on a daily basis she spends ‘four, maybe five hours per day on doing her homework’. She adds to this: ‘[…] but I am also a little bit perfectionistic’. Similar
personal traits are expressed by other students in this type. Marian for example says that she ‘is only content with a grade when it is 8/10’ and that she is ‘very strict for herself’ in safeguarding this threshold. Like Sarah, she relates this to ‘perhaps being extremely perfectionist’ and ‘her way of thinking’. Or as Emma, yet another student puts it: ‘I am just somebody who wants to do everything’. This attitude towards homework is for Sarah also linked to the expectations of teachers: ‘Some teachers, for example, still expect you to get a high grade [even though you sometimes have a hard time with a subject]. For instance, in Latin last year that was the case but… okay, [I admit] I also always strive towards being the best in Latin. So, I always wanted a grade average above 9 points [out of 10]’. Other students confirm that teachers have high expectations of them. Charlotte for example says that teachers expect students ‘to put a lot of effort into schoolwork’ and obtain ‘straight A’s’. Interestingly, for Charlotte this is not more than normal since ‘after all, [students] don’t attend gymnasium for no reason at all’. These remarks show how sensitive students can be to the opinions and expectations of teachers. It also becomes clear in Emma story of her teacher’s reaction to her profile choice: ‘Well, take Mark for example, he teaches natural science subjects here, he said something like: “A nature and technology-profile really fits you well, you are really a N-student”. He always talks about N-students; they have to have something extra. I think that is such nonsense. N-profiles are... That is how it is here at school, a Nature and Technology-profile is considered to be the highest profile, and then comes Nature and Health, followed by Economics and Society and then comes Culture and Society. When actually that is not the case at all. It’s not that they will literally tell you and teachers don’t all think like that but they will tell you... the idea is really that, if you can, why not choose an N-profile. While, a girlfriend of myself - Laura - she is really good in history and geography and also good in the natural science subjects but she choose to do Culture and Society, then they all say to her: “Why did you do that, with Nature and Technology you can do much more”, although that is what she likes more personally’.

Sarah also admits that she finds it hard to navigate between her own expectations and those of others. Her parents want her to choose ‘a field in which there will be a lot of jobs available in the future’ and to some extent she agrees with them but she also want to choose a field that she finds interesting and can enjoy. Moreover, Sarah expects to be married and have children when she is about 30. Therefore it must also be a job she can combine with family life, that offers enough free time and regular
working hours. While Sarah is an excellent student, school life is for her fraught with anxiety and stress.

For young women like Sarah their post-materialistic outlook is a troubled one. The many choices they are offered are a burden to them. They are not just eager, but anxious to make a choice that fits with their personality. While they believe that their choices are reflective of their individual personality, these are clearly also informed by what others and in particular their parents expect of them and by their own expectation that they will become mothers. The importance of choosing an education and career that fit with their personality is experienced as a heavy duty to make the right choice and leads to a strategy of keeping options open by choosing as wide as possible and obtaining high grades.

5.2 The pragmatic hedonist

The pragmatic hedonist is typically a male student who is very practical about his choices. He wants what is the most interesting and which at the same time offers good financial prospects. As a strategy, he will choose those options which he thinks combine the best of these two worlds. In comparison to the postmaterialist perfectionist he is less worried about expectations of others and less concerned with keeping options open.

Jasper is a 16-year-old male student in grade 10 (sophomore) of gymnasium. He has a combination of a NT and ES profile. He has one older brother who is attending the same school in grade twelve with a ES profile. Jasper’s father works as a civil servant at a municipality. His mother works at the tax office also as a civil servant. Jasper’s approach to homework is pragmatic. He does what is needed to get good grades: ‘I learned that you can do quite a lot at school, if you plan it well. I do set my priorities, what I do and what I don’t do’. In a similar pragmatic vein he criticizes his school’s policy that when students in lower secondary school-level years (grades seven, eight and nine) achieve high grades they are stimulated, expected even, to start extra-curricular projects (‘verbredingsprojecten’): ‘It doesn’t work. […] people build robot’s and that sort of things. I think it’s rather a waste of time. [And] because you miss classes your grades actually decline’. About his profile choice he explains: ‘[…] I think that it gives me the most chances for a good profession and I chose for advanced mathematics because I could eventually study econometrics, or something along that way’. Later he adds: ‘I also like physics but I really wouldn’t like to have a profession
in natural sciences ['beta'] later. He associates that with ‘working on things like dikes or building bridges’ and that is ‘not his passion’.

For Jasper his parents are a kind of personal consultants that he can call upon when necessary. He feels that they leave him free to make his personal choices. Compared to students in the other categories, pragmatic hedonists as Jasper also seem to be more intrinsically motivated in making their choices, emphasizing the importance of following your interests instead of keeping options open or securing material wealth and security. This is also confirmed in various similar ways by other students in category. Fatih for example says that his interests in physics, chemistry and mathematics was the most important reason for choosing a NT profile and explains that: ‘When [a subject] doesn’t interests me, then I won’t put any effort into it’ […] If find something interesting, I just put a lot of time and effort into it, not by force or anything but just because it automatically happens’. Likewise Omar, explains his interest in mathematics as a study fields as: ‘I don’t know I just think that, at a certain moment, I just got very interested in mathematics and thought that I would like to apply that in things, so for example physics becomes very applied, so then I thought, physics would also be fun. I just got interested at a certain moment. I don’t exactly remember when. It just happened’. Omar also explains that although his parents would have initially seen him to go into medicine: ‘They know that it’s useless if I do that because if I don’t enjoy it, then I would make it’.

Similarly, what matters to Jasper are however not only good job opportunities and pursuing his interests in physics and mathematics. ‘I think it’s fun to work in business. I want fun colleagues… and my feeling just tells me that there are more fun people in business than in a laboratory. Jasper is looking for ‘fun’, but also wants a good income. That is what for him defines success: ‘I would think it’s rather a waste of effort if I first do pre university education [‘vwo’] and then university and then not be really successful. I think it is also important that I make a lot of money later, or rather quite a lot in any case’. When we ask Jasper to consider what is more important for him: working with nice people or earning a lot of money, he says: ‘If you studied something like business administration you won’t earn bad in any case - usually its between 2500 and 3000 euro’s net, something like that - I would value a nice working place higher. I don’t want to work myself to dead to become rich either, that’s not what I want. What I mean is that I don’t want to earn bad with choosing a field of study with which you eventually can’t do much and then make a bad living’. The idea
that work should be ‘fun’ and at the same time ‘well-paying’ also resonate in other students stories. Lars for example says: ‘[when I think of my future job] the most important thing is that it’s fun. Look, if you don’t think your work is fun then you won’t feel good in your day to day life. I will probably be working almost 40 hours or 40 hours a week, then it needs to be something you enjoy. Of course you’ll spend a lot of time with work and I also think it should pay reasonable because you won’t do it for nothing of course. You should also be able to live comfortable from your earnings, to be able to buy the things you want’. Often the idea that work should be both fun and well-paying is implicitly assumed by students in this type. The following quote from Willem is a good example of this: ‘For me a job should be on the right [high] level, otherwise I will get bored easily and do nothing. […] Besides that, I think it would be nice to have some variation in what I do, just like most people would, I think. […] Money is not really important. I assume that, given the fact you will also have a university degree, in any case you won’t end up in the lower salary scales’. Likewise, Mark, says that status is not important to him in comparison to income: ‘Status no. Money yes. Status doesn’t make a difference, if you have a low status but earn a reasonable income, then you are also good. With 5 million euro’s you can do more but a reasonable income you already have enough.’

When Jasper is asked how he expects his life to look like when he is about 30, 40 years old, he answers, without too much enthusiasm: ‘I presume a family maybe’.

Young men like Jasper combine a hedonistic outlook – fun comes before earnings – with a desire for security. They want fun in life and an interesting job, but it should also be a steady job with a good income. They are willing to work, but do no more than is necessary to reach their goals. This ambition and pragmatic strategy guide their educational choices. Concerns about combining work and care are absent.

5.3 The materialist maximalist

A combination of male and female students of both native Dutch and in particular non-Western migrant origin in our research sample tends to respond differently and may be typified as a modern or materialist maximalist, who is concerned with choosing options that grant him or her maximum status and material wealth and security. As a result he or she will prioritize study- and career choices that combine these two aspects most. However, compared to the two other types, students in this category are generally less well informed about how to
exactly achieve this due to lack of parental knowledge on the higher education system, professional labour market and limited social networks.

Ayla is an 18-year-old with a non-Western origin and who has a NH profile, including advanced mathematics B and physics and French as her free-choice subject. Ayla’s mother studied economics in her country of origin and later specialized in accountancy. She used to work as a bookkeeper for several years but is currently not working. Her father tried to study dentistry as a foreign exchange student in Europe but failed to obtain a diploma after which he returned to his home country of origin to find work. Ayla’s father now works as a store manager of a jewellery store in the Netherlands.

By choosing advanced mathematics in combination with physics, biology and chemistry Ayla actually has a double profile consisting of NT and NH. Ayla was initially hesitating between ES and CS but then thought: ‘CS, that’s nothing compared to ES or NH. I am attending gymnasium, I am a clever girl. I want more status you see’. Later she adds: ‘Smart people do NT and NH, that is generally known’. Her initial interest in ES was because she considered becoming a judge or work in business. A visit to a study information market convinced her that her interest is in health related fields: ‘So I choose NH. […] I now want to study dentistry’. This is also because she considers herself as a person who wants to socialize with people and who is practical and good at technical things.

Ayla’s ideas about different occupations - and the societal status attached to these – is crucial for her choice for a NT and NH combination profile. As we have seen earlier, occupational expectations are fundamental in understanding choice patterns towards or away from MST fields for all students. However, in contrast to the two other cases, the preference for high status occupations is much more overtly present in the motivations of students with a migrant background. Yet, unlike postmaterialist perfectionists and pragmatic hedonists, materialist maximalists are generally less well informed about the requirements or conditions for obtaining these jobs. Asked why status is so important for her Ayla answers: ‘Well, for example, you are somewhere, in a plane and somebody gets a heart-attack, then you, as a doctor well, you can help. You know, not everyone can do that. With medicine and dentistry, your name is even different after studying that[ she is referring to the title of medical doctor]’. She continues: ‘And you also make piles of money. […] Money does make
you happy. Money is everything these days. Nobody can convince me that money doesn’t make you happy’. That Ayla, after careful deliberation has chosen to study dentistry instead of medicine, is related also to a cost benefit calculation: ‘After 6 years medicine, you still are nothing while – yes of course you will have a diploma, but you can’t really work, you need to specialize – while with dentistry, […] after 6 years you can really work as a dentist. [And] with medicine […] you have to know a lot of different parts of the body, I think that is much more difficult. While I only have this part [shows head area], plus mouth and teeth of course, that’s much more easy’. Dentistry however is a numerus fixus study that works with selection by drawing lots. It is a weighted lottery: higher grades increase one’s chances. This puts pressure on her to have high grades. Therefore she is afraid for the exam, not because as she adds she has fear of failure. Has Ayla considered alternatives in case she fails to secure a place? Not really it appears. She would take up another study for one year and then try her luck again in taking part in next year’s selection. It could be business administration, or engineering, again because ‘being an engineer also has a lot of status, you know’. If we ask her what she would do if she eventually would not get in Ayla says: ‘No, I really want to commit suicide if I don’t get… I really want to study dentistry so badly, it really is a dream’.

Similar to other students of non-Western migrant origin, Ayla’s parents’ opinions are important to her. What mattered to her parents is that as a dentist: ‘You are never unemployed and [you will] also make lots of money easily’. Students who fall in this ideal-type emphasize the importance of job security, high income and status much more often than the students in the two other categories over autonomy, having fun or following one’s passion. As Fatima explains, this probably stems from the fact that parents: ‘themselves have never had an option. And now they work as blue collar laborers and that is very hard, they say. And they also then say: ‘You have to have it easy. You have to work very hard now so that you can have an easy life later on’. […]. And yes, they think it is very important, and of course that I also have a bit fun doing it but, according to them, the best thing to do is to end up as high as possible so that I have live a very easy life’. Similarly, Hanan says that it’s not more than natural that school and homework come before anything else during this period in her life because: ‘Now you have to work hard, but you will profit from this hard work for the rest of your life. […] If I would now work like a cleaning lady, then I will be on a low salary
for the rest of my life but if I learn hard and really do my best and engage in school work in my free time, than I will have a good salary later on; I can lead a normal life.’

As these two examples also show, parents of students with a non-Western origin usually put more explicit pressure on their children than parents with a native Dutch origin to make certain study choices. When we ask whether her father stimulated Ayla to become a dentist, it appears that her parents’ influence is much more directed towards wanting their daughter to choose a profession she can practice anywhere in the world. Had she chosen law, it would therefore have been international law and likewise international business administration instead of business administration. Ayla explains: ‘I am not from the Netherlands originally you see, I have been born here but my parents are from the middle-East, so I might later live there or perhaps somewhere else because I have relatives abroad. I don’t know if I’ll stay in the Netherlands and if you study dentistry or medicine or something related to health, yes… the demand for doctors is just the same everywhere. Everyone needs doctors in life. You can work everywhere’. Ayla is a-typically in the sense that most students with a migrant origin have parents who have no knowledge about academic disciplines or careers. Other students descriptions, inevitable shows that parents of non-Western migrant origin, mothers more than fathers, knowledge of the Dutch higher education system and professional labour market is more limited than parents of native Dutch students. This is often rooted in migrant parents’ lack of own experience with higher education fields, jobs and limited social networks. Emre’s account of his mothers’ reaction, who is a high school graduate from Turkey, to his interest in a NT-profile is a good example of this: ‘My mother knew I wanted to do NT and she understood that but with Economics and [Society] she asked: ‘what will you be then?’ I told her: “for example Minister of Foreign Affairs”, and then she said: “oh that is nice”. With NT she knew in which direction I would go, but with Economics and [Society] she totally didn’t have an image of what I would be’. In relation to NT, according to Emre, his mother expected him to: ‘do something related to designing or constructing, inventing, researching or something like that. With economics she didn’t have a clue, she only thought of a bank or something’.

This unfamiliarity with alternative educational and occupational trajectories also applies to most students with a native Dutch background within this type, albeit to a much lesser extent due to larger social networks and more advanced Dutch language skills. This also becomes clear from other students’ account of the role their parents
played in their choice-making process: ‘Neither of my parents has had university education. So they don’t have any firsthand experience with higher education. Instead they obtained a lot of information from internet and from acquaintances who did enjoy a university education or their children’. Like Ayla, Rick also talks extensively about the importance of wealth and status: ‘I have searched very actively for professions and things that seemed interesting. And I have always been very interested in – I realize that this sound really corny but - people who have made it’.

Like the other students in this category, Ayla has a materialistic value orientation and is status-minded. Although they speak the same language of freedom of choice, happiness and personal responsibility, their parents appear to have a much larger influence on their choices than the parents of native Dutch students. Immigrant parents feel less inhibition to explicitly formulate their expectations towards their children. They want their children to make educational choices that lead to jobs with high income and high status and some parents, dreaming of a possible return home, also encourage their children to choose professions that they can practice anywhere in the world. This is what guides this group of students in their study choices.

6. Conclusion and debate

This study has focused on the question why relatively few girls in the Netherlands choose MST options and in particular on the question how study choice-processes develop in practice, given the influence of the different factor mentioned earlier in different theories related to gendered patterns of MST choice. In our effort to shed more light on these issues we focused our attention to the profile choice of VWO students in the school in grades 10, 11 and 12. We did so, based on the assumption that the profile choice constitutes an important and crucial step in deciding to opt for a MST field in higher education or not. Our research results provided some unexpected insights which we like to shortly summarize at the end of this article.

Gender

Perhaps the most surprising insight that we gained is that although girls much less often opt for MST fields in higher education, this does not become evident from their profile choice(s) in grade ten. Girls very frequently choose a NT-profile and in doing so they don’t differ that much from their male counterparts (42% as opposed to 59%). A difference that remains is that boys more often chose a NT profile without combining it with a NH profile than girls (21% as
opposed to 3% of the exclusive NT choosers). In other words, the overwhelming majority of
the girls in our schools with a NT profile combine this with a NH profile.
The results of our qualitative research provided us further understanding into the mechanisms
behind these different study choice behaviours of male and female students with a NT profile.
Our analyses suggest that male students who are capable of doing a NT profile, in general
choose this profile for very pragmatic reasons. They think they can manage this profile, they
think that this profile fits their personality, and they think that this profile also provides them
with enough possibilities for choosing a future field of study and procuring a good career later
in life.

For the interviewed girls in our sample this is more complicated. The first thing that we notice
is that the girls we interviewed can generally be described as very eager and perfectionist.
They work hard for their education and are able to choose a NT profile, but they have
different ideas on whether a NT profile fits or matches with their personality. The same
applies in relation to their future expectations and their abilities to successfully graduate with
this profile.

With regard to the question of a match between a NT profile and their personality, girls
hardly seem intrinsically motivated for NT. Their real interests seem to be in health- and
medicine related subjects, such as biology. But since different fields in health and medicine
require physics and advanced mathematics, it implies that girls need a NT profile to qualify
for these studies. Moreover for many of these fields there is a considerable probability of not
getting in because of the numerus fixus, which also leads to a second instrumental reason to
choose a NT profile. A choice in favour of NT enables these girls to keep their options open.
In sum, the institutional context of the Dutch education system for a large part explains the
reason why girls choose a NT profile.

With regard to the capacity to successfully finish high school with a NT profile, girls do not
necessarily doubt their abilities – their grades are good to very good – but do question the
personal value of graduating with a NT profile. A NT-profile is generally known as the profile
for the best students. In relation to their ambition to belong to the best, the choice for NT also
seems logical. However, the most important factor for choosing a NT profile is that it a NT
profile gives access to almost all academic studies. Compared to boys, girls seem to be much
more thoughtful of and focused on their future, and also more pondering the insecurities that
the future brings along with it. With that insecurity and doubt in mind, it’s prudent for them to
keep as many options open as possible. With a NT profile they can do exactly that. Even if that means that they possibly need to work harder for school.

Ethnic origin
In relation to ethnic origin, our quantitative results suggested that students’ background did not have an effect on the choice in favour or against a NT profile, contrary to what we expected. However, based on our qualitative research, we have to conclude that that this assumption is unwarranted. The interviews suggest that ethnicity can also be read as a proxy for social class. Although on the face of it students seem to apply the same discourse about self, their choices are nevertheless driven by different values. In this sample of interviewees students with a migrant background often had parents who were much lower educated and who held less prestigious jobs. The higher the parents’ education level, the more knowledgeable students seemed about alternative educational and occupational trajectories, also through extended networks through family etc. Students’ with less knowledgeable parents did mention more direct pressure to choose high status and well-paying jobs and careers to make up for their parents low social status. A NT profile, followed by a NH profile, in the current Dutch institutional context seems to be perceived by students as the best or highest profile, was equally preferred by native Dutch students and by students with a migrant background. Although both groups end up with the same preferences, they have reached them through different paths. Students with a migrant background opted for a NT profile, because they wanted to make their parents proud and obtain high status jobs to secure material prosperity, while female students with a native background choose a NT profile because of fear of missing out on future opportunities and thus keeping all options open.

Still, our results revealed that gender differences are more evident and pervasive than differences related to ethnic origin. This is related to importance of the role of gender in the choice-making processes of students. Gender in our study cuts clearly across ethnicity lines. Female students both from native and migrant backgrounds expressed similar concerns related to future study and career choices. Also they equally mentioned concerns about having to combine family life with work when they asked them about their future in 20 and 30 years’ time. Boys hardly even mentioned similar concerns.
Future research
In this study we empirically tested Schreiner and Sjoberg’s theory in the case of Dutch upper secondary school level students’ choice for or against a Nature and Technology profile. Schreiner and Sjoberg’s theory on postmaterialism and MST interests is only partially supported by our study. Based on Schreiner and Sjoberg, we expected that female students and students of native Dutch origin to feel less positively towards choosing a NT profile than male students and students of non-Western migrant origin. First, the expectation that female students feel less positively towards a NT profile than male students is confirmed in this study, although not as strongly as first expected since much more female students have a NT profile than enrolment figures in MST fields suggest. Secondly, our expectation that native students feel less positively towards a NT profile than students of a migrant origin has not clearly been confirmed in this study. Native Dutch students were not as postmaterialist as Schreiner and Sjoberg’s theory suggested. The majority of students in our sample expressed concerns about the future in terms of student financial aid, jobs security and income. We believe this unexpected outcome is related to the period in which the data were collected, almost 4 years after the financial crisis started in the Netherlands (in 2008). Importantly, this particular outcome runs contrary to Schreiner and Sjoberg’s theory as well as the underlying assumption in Ingleharts theory on postmodernity that shift in cultural values from materialist to postmaterialist is a linear process. Our findings suggest that a re-shift in values is possible in case of cultural, political or economic eruptions similar to the financial crisis. However in order to affirm this, longitudinal research is necessary in which students’ cultural values; i.e. postmaterialist and materialist values in relation to their school choices, are examined over a longer period of time. Moreover, comparisons between various cultural and institutional contexts, e.g. countries with different education systems, would be necessary in order to gain a better understanding of how factors at various levels come together in explaining gendered patterns of choice over a changing period of time.
Bibliography

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Annex 1 - Topic list interviews

Theme’s
1. Self-efficacy beliefs in relation to school success/achievement
2. Expectations from parents, teachers and friends
3. Future plans

Topics
1. Students’ profile choice(s)
2. Alternative profile choice(s)
3. NT-profile
4. Future plans in relation to higher education, career and life

Questions about students’ profile choice(s)
- Which profile did you choose?
- Can you tell me how you came about to making your choice?
  o When did it become clear to you that you would choose this/these profile(s)?
  o Why did you choose this/these profile(s)?
  o Can you tell more about your choice(s)?
- If not discussed:
  o To what extent do you think you are capable of doing this profile?
  o Have your parents been involved in your profile choice(s)?
  o What did your teachers think about your profile choice(s)?
  o What did you friends think about your profile choice(s) and which profile choice(s) did they make?

Questions about alternative profile choice(s)
- Did you take into consideration another profile choice(s)? If so, which?
- Why did you eventually decide not to opt for these other profile choice(s)?
  o Can you tell me about that?
  o When did this become clear to you?
  o Do you think that you have a better future ahead of you with your current profile choice(s) than if you had chosen (an) alternative profile(s)?
- If not discussed:
- To what extent do you believe you are capable of doing alternative profile(s)?
- What did you parents think about those other profile choice(s)?
- What did you teachers think of those other profile choice(s)?
- What did you friends think about those other profile choice(s)?

Questions if a NT-profile choice hasn’t been discussed already
- Did you ever consider to choose a NT-profile?
- Why didn’t you choose a NT-profile?
- Can you tell more about this?
- When did it become clear to you that you wouldn’t choose a NT-profile?
  - To what extent do you think you are a capable of doing a NT-profile?
  - What do your parents think of a NT-profile?
  - What do your teachers think of a NT-profile?
  - What do your friends think about a NT-profile and how many of them have chosen a NT-profile?

Questions about future expectations
- How do you imagine your life looks like when you are 30 or 40?
  - Have you already thought about studying? If so, do you want to study later?
  - Have you already thought about the kind of work you would like to do in future?
  - Can you imagine how your life looks like when you are 30 or 40? If so, can you describe it?
- If not discussed:
  - Are you parents involved in your plans for the future?
  - What do they think about your plans for the future?
  - Do they give advice?
  - Have they expressed certain preferences?
  - What do your teachers think about your plans for the future?
  - Do they give advice?
  - Have they expressed certain preferences?
  - What do your friends think about your plans for the future and how many have similar plans?
  - Do they give advice?
  - Have they expressed certain preferences?
Notes

1 In this article MST fields generally refers to the total share of students in science, mathematics, computing engineering, manufacture and construction on ISCED levels 5 and 6 as defined and applied by Eurostat. However, within these fields, we are primarily interested in science, mathematics and computing since the share of female participation is more diversified in relation to these fields, making it a more interesting indicator. For a full list of fields that fall under the definition of MST at this level, see http://ec.europa.eu/eurostat/tgm/web/table/description.jsp.

2 Schreiner and Sjoberg, use the terms ‘Western’, ‘developed’, ‘modern’, ‘modernized’ and ‘late-modern’ as synonyms in reference to cultural, economic and political development in Western societies. In this article we use the terms materialism and post-materialism, which largely overlap the terminology used by Schreiner and Sjoberg, in reference to postindustrial, economically developed, Western societies on the one hand and industrial, economically less developed, non-Western societies on the other hand.


4 Here we follow the standard classifications for ‘autochtonous’, ‘non-Western allochtonous’ and ‘Western allochtonous’ as used by the Dutch Central Bureau for Statistics (hereafter CBS) to distinguish between native Dutch students and students with a non-Western migrant origin. In accordance with the CBS classifications, a non-Western migrant origin or ‘non-Western allochtonous’ background signifies a person with at least one parent who has been born outside the Netherlands in a country that is socio-economically and socio-culturally distinct from the Netherlands. It includes countries in Africa, Latin-America, Asia (with the exclusion of Indonesia and Japan) and Turkey. Similarly, a Western migrant origin or ‘Western allochtonous’ background signifies a person with at least one of the parents is born in a country that is socio-culturally and socio-economically similar to the Netherlands. It includes countries in Europe (with the exclusion of Turkey), North-America and Oceania, or Indonesia or Japan. When students’ parents have both been born in the Netherlands, irrespective of their own birthplace, they are considered native Dutch or ‘autochtonous’ (for further explanations of the various categories, see Alders (2001) and www.cbs.nl).

5 See endnote ii.

6 Studies from the SCP including “Dichter bij elkaar” (2012) and SCR (2010 - Huijn, Gijsberts & Dagevos) show that that in the case of the Netherlands second generation non-Western allochtones differ in their values than the autochtonous.

7 ‘Voorbereidend Wetenschappelijk Onderwijs’ as VWO stands for is pre university education (see endnote iii for more information).

8 “The Randstad region comprises the following areas: Almere, the province of North Holland, excluding Alkmaar and surrounding area and the northern part of North Holland, the provinces of South Holland and Utrecht, excluding the south-eastern part of Utrecht. In the Randstad region, 46 percent of the total Dutch GDP is generated; 41 percent of the entire Dutch population live in the Randstad region” (www.cbs.nl).

9 In the case schools differentiated between advanced and non-advanced grades in these subjects we calculated their mean average.