The Evolution of Belief Ambiguity During the Process of High School Choice*

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Abstract

We study how children's expectations about consequences of an important schooling decision evolve during the period preceding choice. Our newly-collected data include repeated survey measures of the degree of belief ambiguity, and of awareness about existing schooling alternatives, perceived by a sample of Italian middle-schoolers during the process of high school track choice. We interpret the evidence about evolution of subjective beliefs in our data in light of existing theories of learning with belief ambiguity and limited awareness.

Our evidence suggests that children direct attention to the most preferred alternatives, not only ignoring or failing to acquire information on irrelevant alternatives, but also letting information 'selectively deteriorate' during the decision process. This can be rationalized by a limitation in the *stock* of information children can retain, as opposed to limits in the *flow* of acquirable information typically considered by the literature on limited attention.

Keywords: Subjective Beliefs, Learning Under Ambiguity, School Choice.

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1 Introduction

Human capital is fundamental for a wide range of private and social outcomes, including skill mismatch, long-term unemployment, and income inequality. Individuals accumulate human capital throughout the life course; but key stages in the process occur between early childhood and young adulthood. Crucially for this study, schooling, career choices, and subsequent outcomes are subject to uncertainty and limited knowledge.

Expectations are fundamental to schooling decisions, as persons evaluate their options by the outcomes they believe will result from them. Schooling decisions may depend on expectations of many future events. For example, a student's school choice may depend on his beliefs about the likelihood of successful completion of the required curriculum. It may additionally depend on his beliefs about his chances of continuing onto college and/or about his chances of finding a job after graduating from high school.

In real life, individuals and their families assimilate information from government announcements and media reports (e.g., the 600 pages directory of public high schools in NYC); communication from friends, extended family, and experts (e.g., school teachers or counseling staff); and personal experiences and observations of the experiences of others (e.g., older relatives and friends). The sampling process generating these forms of information is obscure and likely to vary across individuals or families. In addition, the chances associated to future outcomes of consequential human capital decisions might be perceived as partly unknown and to some extent unknowable by family members at the time of choice. Such uncertainty perceptions and subsequent behaviors seem to be more germane to economic theories of (subjective) *uncertainty* than 'pure risk'.

Following Ellsberg (1961), the economic literature that models choices under uncertainty, has recognized the need to relax the assumption that individuals hold a single vector of beliefs. Much more successful recent frameworks postulate that agents have 'multiple priors,' that is, agents hold a set of probability distribution over states and hence over possible outcomes (e.g., Camerer and Weber (1992) and Gilboa and Marinacci (2013), among others). Each probability distribution can be seen as a 'model' and situations where agents hold multiple probability distributions over states can be seem as *ambiguity or model uncertainty*.

Clearly, school choices are also shaped by the 'awareness set' of the child and his/her family. Building on the most recent theoretical literature, in our analysis, *limited awareness* refers to situations of incomplete knowledge of available options, of the consequences of the choices, or of causal relationships (e.g., Karni and Vierø (2013b,a, 2015)). Such dimension of limited information markedly differs from uncertainty or risk. For example, when considering school application or choice, relevant facts may include the current admission policies, current curriculum content, student-body compositions, and graduation rates of various institutions. Some youths and their families might not even be aware of the existence of schools that may potentially be good matches. When aware of their existence, they might not know or consider relevant institutional attributes of the school.

This paper measures and analyzes the extent of uncertainty and ambiguity about school choice consequences, and the degree of (un)awareness about schooling alternatives, perceived by a sample of Italian 8th graders and their parents during the months preceding children's pre-enrollment in high school. We quantify the extents of children's and parents' perceived ambiguity and (un)awareness at the beginning of 8th grade. And we document the evolution of those perceptions over the decision process. The dataset is unique at least along two dimensions that are relevant for this study. First, we are able to analyze empirically the dynamic evolution of subjective beliefs during the decision process. Second, we measure the degree of belief ambiguity and its evolution during the decision process. There is a growing body of evidence on the relevance of ambiguity measures for economic decisions, mainly in portfolio choice. Understanding the evolution of subjective beliefs is also important, as it informs researchers on how to specify the (structural or reduce form) choice model aiming to identify the determinants of choice.

Our data allows us to answer to questions such as: Does perceived ambiguity about the likelihood of a range of outcomes following alternative schooling choices decreases or increases over the time of the choice process? Does the evolution of respondents' perceived ambiguity vary by choice alternative? How?

Existing decision-theoretical models of decision-making and learning under ambiguity offer a natural interpretative framework for our empirical findings. Our evidence suggests that in order to explain the pattern of observed beliefs and ambiguity the standard paradigm must be extended to allow for *selective attention and information retention*. Children seem to direct attention to the most preferred alternatives, not only ignoring or not acquiring information on irrelevant alternatives, but also permitting information to 'selectively deteriorate' during the decision process. This can, for example, be rationalized by a limitation in the *stock* of information the children can retain, as opposed to limits in the *flow* of acquirable information typically considered by the literature of rational and selective inattention.

Literature Following an exploratory effort by Dominitz and Manski (1996), a small but growing body of studies has elicited youths' subjective expectations about monetary and non-monetary outcomes of schooling decisions, while enabling respondents to use a numerical probabilistic scale of chance and, thus, express uncertainty about their expectations (e.g., Fischhoff, Parker, de Bruin, Downs, Palmgren, Dawes, and Manski (2000), Arcidiacono, Hotz, and Kang (2012), Zafar (2013), Dominitz, Manski, and Fischhoff (2001), and Giustinelli (2015)). The majority of these studies have performed descriptive analyses of numerical expectations. They have assessed the 'validity' of such measures by comparing elicited expectations to population realizations, or by using expectations to predict behavior. None of them study the evolution of such beliefs over time.

Only a small number of studies has elicited probabilistic subjective expectations about consequences of college major choice (Stinebrickner and Stinebrickner (2012, 2014) and Wiswall and Zafar (2015a,b)), and has used such data to study how individuals form and update expectations in real life rather than in the laboratory.[1] Wiswall and Zafar also elicit conditional beliefs under a variety of hypothetical scenarios and analyses such data within the paradigm of Bayesian learning, with the aim of detecting possible departures from the Bayesian benchmark.

Only recently a consensus has been reached on how learning should be modeled in presence of multiple priors and, as a consequence, on how ambiguous expectations evolve (Marinacci (2002) and Epstein and Schneider (2007)). We read our data in light of this paradigm. To the best of our knowledge, there is no empirical work regarding subjective ambiguity and its evolution within a real-word context.[2]

Finally, no work exists - that we are aware of - documenting the evolution of kids' awareness over time, in the context of human capital accumulation.[3] In a static framework, Schneider, Teske, and Marschall (2000) and Neild (2005) provide quantitative and qualitative evidence, suggesting that knowledge and information gathering styles vary by families' socioeconomic status and other family characteristics. Dawes and Brown (2002) and Hoxby and Avery (2012) consider again a static picture focusing on prospective students' awareness of college alternatives and on their knowledge of the admission process to college, respectively.

The paper is organized as follows. Section 2 describes the study and the sample. Section 3 describes our main survey measures. Within a generalized Bayesian framework, Section 4 defines the object of our empirical analysis: subjective beliefs, belief ambiguity, the level of awareness, and the rules governing their evolution over time. The empirical analysis is conducted in Section

[1] Experimental psychologists and economists have long studied how persons update objective probabilities following receipt of random sample data in highly structured settings similar to those presented in textbook statistics exercises. A particular concern has been to test adherence to, and characterize departures from, the Bayes' Rule (e.g., Tversky and Kahneman (1974), El-Gamal and Grether (1995)).

[2] Within the experimental literature, Abdellaoui, Baillon, Placido, and Wakker (2011), Baillon and Bleichrodt (2014), Butler, Guiso, and Jappelli (2013), Conte and Hey (2013), Di Mauro (2008), and Dimmock, Kouwenberg, Mitchell, and Peijnenburg (2013) study the role of ambiguity attitudes in static decision making under ambiguity. Cohen, Gilboa, Jaffray, and Schmeidler (2000), Baillon, Bleichrodt, Keskin, L'Haridon, and Lia (2013), and Moreno and Rosokha (2014) deal with learning under ambiguity. Baillon, Cabantous, and Wakker (2012) tackle belief aggregation under ambiguity.

[3] A sizable amount of empirical work on awareness has been done within the marketing literature. In most cases, this literature does not read the empirical findings through the eyes of firmly founded theoretical model.

5. In Section 6, we critically asses some of the existing theories in light of the empirical evidence and we propose some conclusions.

2 The Study

Institutional Background We measure and analyze children's and parents' ambiguity and (un)awareness perceptions within the context of high school track choice in Italy, a country whose schooling system features curricular specialization or tracking.[4] Curricular specialization makes this choice consequential and one subject to greater uncertainties the younger the students at tracking.

Enrollment of Italian students into high school tracks–general, technical, or vocational (with additional sub-categories)–occurs non-selectively ('open enrollment') by family choice. The latter takes place during the final year of middle school (8th grade), and is aided by non-binding teachers counseling. Table 1 lists the main tracks and sub-tracks of the Italian secondary education in the school year of the study (2011-2012).

Italian tracking has both 'rigid' and 'flexible' features. On the one hand, different tracks or curricula are generally offered in separate schools, and track-switching occurs infrequently and can be costly time wise. On the other hand, graduation certificates from the majority of curricula (including vocational ones), enable students to continue onto college, albeit at the cost of training and, hence, skill mismatch.

Table 1: HIGH SCHOOL TRACKS AND SUB-TRACKS OFFERED IN 2011-12

Track	**Sub-Track (or Curriculum)**
General	Art and Music & Choral
General	Humanities
General	Languages
General	Mathematics & Science
General	Learning and Social Sciences
Technical	Economic Sector
Technical	Technology Sector
Vocational	Services
Vocational	Industry & Crafts
Vocational	Professional Training

[4]Betts (2011) provides an excellent introduction and international overview. Brunello and Checchi (2007), Brunello, Giannini, and Ariga (2007), and Hall (2012) discuss the relevant issues.

Sampling Our data come from a series of surveys, fielded on a sample of 8th graders and their parents in Vicenza (Italy).[5] The study took place between the fall of 2011 and the spring 2012, and targeted the universe of public middle schools of the Municipality. 10 out of 11 schools endorsed the study, and were used as a sampling frame for students entering 8th grade in the fall of 2011 and their parents, all of whom were invited to participate (a little less than 900 participants).[6] The study's focus on 8th graders and their parents was motivated by existing evidence suggesting that families concentrate their high school choice efforts during the fall and winter of the final year of junior high school.[7]

Timeline The study encompassed 4 waves of data collection. The first 3 waves took place between October 2011 and February 2012. Wave 3 was fielded during the week preceding the pre-enrollment deadline on February 20th 2012. Each of the first 3 waves entailed fielding of two questionnaires, one for children and one for parents. Wave 4 (for children only) was fielded in April 2012. Hence, actual choices corresponding to the pre-enrollment distribution were observed within the study.[8]

Survey Mode All questionnaires were paper-and-pencil and self-administered by respondents. Each survey took approximately 60 to 75 minutes to complete. Because of the longitudinal design requiring respondents to take 3 or 4 questionnaires within 4 or 6 months, respondents were given 10-to-15 days to individually and privately complete each questionnaire in their homes and return it to the school in a sealed envelope.

Trained interviewers introduced the study and described the first questionnaire to the children in class, with a special focus on the mechanics of subjective expectations questions. Moreover, interviewers were personally in charge of distributing and collecting child and parent questionnaires in each wave, and to answer any clarification questions respondents may have and contact them about.

Participation Study participation was incentivized through the following scheme: children who answered and returned all 4 questionnaires were entered a lottery awarding one scientific

[5] Vicenza is a mid-size city of the Italian North-East region of Veneto. The surveys were designed by Giustinelli in collaboration with a team at the nearby University of Verona, and were funded by the local Fondazione Studi Universitari di Vicenza (Foundation for Vicenza Higher Education Studies).

[6] At the end of 2010, the Municipality of Vicenza had approximately 116,000 inhabitants, 999 of which were 12 years-old, and the Province had approximately 870,000 inhabitants, 8761 of which were 12 years-old. About 16% of residents of the Vicenza Municipality are foreign born.

[7] This was indicated by respondents to the qualitative in-depth interviews the research team fielded during the study's development.

[8] In principle families may change their choice during the summer preceding high school entry. In practice only a small fraction of families ($< 5\%$) modify their pre-enrollment decision.

calculator in each participating school and class (47 participating classes in total). In addition, families whose parents took and returned all 3 questionnaires were entered a lottery awarding a 100 Euros voucher in each participating school and class to be spent toward purchase of 9th grade textbooks for the participating child.

649 students and 619 parents returned a fully or partially completed questionnaire in wave 1, corresponding to participation rates of approximately 72% and 68% respectively. These participation rates are highly satisfactory for mail surveys.[9]

Sample Characteristics Basic demographic and physical characteristics of children were measured through questions eliciting their gender, month and year of birth, country of birth, year in which they moved to Italy (if born abroad), location where they live in Vicenza, their height and weight. In addition, the survey collected extensive information on family composition and on demographic and socio-economic characteristics of parents and siblings (wave 1) and grandparents (wave 2) (e.g., gender, age, country of birth, year in which each family member moved to Italy if applicable, main language spoken at home, educational attainment, fields of secondary and tertiary degrees if applicable, employment status, occupation, etc.). Finally, the survey included few questions on home environment and possessions (wave 4).[10]

Tables 5, 6-7, and 8 in the tables appendix provide a snapshot of participating children and parents at wave 1. Specifically, Table 5 shows the sample distribution of respondents' self-reported identity. In each wave, parents could choose between jointly taking the survey (whenever both of them were present), or having one parent respond. They were asked to record their choice on the survey.

Tables 6-7 show the sample distributions of children's demographic and socio-economic characteristics. Similarly, Table 8 shows the sample distribution of responding parents' background characteristics.

Sample sizes reported in column headings (N) refers to respondents' participation in the corresponding waves. Children participated at a slightly higher rate than parents did in all waves, and participation decreased across waves due to attrition both among children and parents. Sample sizes reported in column headings do not include item non-response. Non-response rates specific to individual questions are shown under the sample distributions of answers to the corresponding questions.

Sample statistics shown in Tables 6-7 and 8 enable us to assess selectivity of wave 3 samples

[9]Unfortunately, in-class administration was not an option in this study, as school principals objected that the number and length of the surveys would take up too much of children's classroom time.

[10]These questions were borrowed from the PISA questionnaire (OECD Programme for International Student Assessment, http://www.oecd.org/pisa/).

relative to their baseline counterparts (i.e., wave 1), along basic observable characteristics. Wave 3 samples do look selected in expected directions relative to wave 1 samples (e.g., wave 3 features more females, more younger or 'regular-in-school' children, less foreign-born children, higher SES children, etc.), but the differences look modest overall.

3 Main Survey Measures

(Un)Awareness of Choice Alternatives In the initial section of each survey, (waves 1 through 3, both child and parent questionnaire), respondents were asked the following question:

What high school curricula do you know or have you heard the name of? (Please mark one.)

◯ *I know it*

◯ *I have heard the name only*

◯ *I have never heard of it*

The question was asked with reference to each of the curricula listed in Table 1, as all of them were offered by high schools in Vicenza in Fall of 2011-2012.

The three mutually exclusive response categories seek to measure different degrees of (un)awareness. Specifically, 'I have never heard of [track K]' aims to measure complete unawareness by the respondent about existence of track K. 'I have heard [track K]'s name only' aims to identify respondents who are aware of K's existence but have no or very limited knowledge about its characteristics. Finally, 'I know [track K]' aims to identify respondents who are aware of K's existence and have fairly refined knowledge about its characteristics.[11]

Point Belief and Range Measures of Model Uncertainty The awareness questions above were followed by a sequence of questions eliciting respondents' probabilistic expectations of choosing each curriculum, as well as their expectations for a range of future outcomes (or consequences), following choice of each curriculum.

Specifically, respondents were first asked to rank the curricula available in Vicenza (listed in Table 1), from their most preferred one to the least preferred one. Then, they were asked

[11] A similar question was asked with direct reference to the schools of Vicenza. Clearly, the act itself of asking the question may be thought of as an 'existence awareness' treatment, which in turn might prompt information seeking about schools' and tracks' characteristics. While no randomization was implemented to avoid low power, the fact that the potential treatment induced by this question may be assumed to be homogeneous across curricula and that we have 3 repeated measures, one at the beginning of each of the first 3 waves, so we can potentially assess the extent to which respondents' knowledge and behavior might be modified as a result.

to assign a number between 0 and 100 to the chance that they would choose each schooling alternative. Finally, respondents were asked their perception of the likelihoods of a range of outcomes, following (hypothetical) choice of each curriculum.

Each question of the latter set was structured into three components, or 'sub-questions.' The first sub-question asks the respondent to assign an individual value between 0 and 100 percent, (or 'point belief'), to the chance of the event specified in the question's text. The second sub-question asks the respondent to indicate how sure (s)he feels about her point belief answer. The third sub-question asks respondents who reported being unsure, to give a range of chances or indicate they ignore the chances altogether, as follows.[12]

Curriculum	**Number of Chances (between 0 and 100)**	**How sure do you feel about your answer? (Please mark one.)**
Curriculum name	- - -	◯ I am sure about my answer ◯ I am unsure about my answer **minimum** chances: ...... **maximum** chances: ...... ◯ I have no idea about the chances

The elicited beliefs about choice consequences include shorter-term outcomes which they would realize during high school (e.g., enjoyment, grades, effort, graduation, etc.) and longer-term outcomes pertaining to opportunity sets, college choice, and the labor market after high school. Parents were asked to report their expectations for their children's outcomes. A core set of expectations questions was repeated in each of the first three waves, while the remaining expectations were asked in individual waves. Table 2 gives a selected list of questions asked within the study.

In this work, we concentrate our analysis to the outcome regarding the probability of passing all high school grades with passing or higher marks and eventually graduate in the regular time. This outcome allows an interpretation that is closest to a genuine subjective belief as defined in the theoretical section. In addition, Giustinelli (2015) shows that this object is an important determinant of high-school track choice.[13]

We interpret 'I have no idea about the chances,' as expressions of perceived total ambiguity; 'I am unsure about my answer,' as expressions of perceived partial ambiguity quantified by the

[12] Manski (2004) argue in favor of allowing respondents to report their beliefs using ranges of chance. Manski and Molinari (2010) pilot the idea on the American Life Panel (ALP) with encouraging results. Wallsten et al. (1983) review earlier measurement attempts using numerical ranges in psychology.

[13] Choice of the vector of outcomes families' expectations were measured for was informed by the literature on career choice (reviewed by Hartog and Diaz-Serrano (2014)), by experience and findings from a related earlier study by one of the authors (see Giustinelli (2010, 2015)), and by respondents' answers to the qualitative in-depth interviews fielded during the development of the current study.

difference between the maximum and minimum percent-chance beliefs; 'I am sure about my answer,' as expressions of perceived lack of ambiguity (or very precise subjective beliefs).

Additional Measures As mentioned earlier, existing qualitative evidence indicates that families of Italian 8th graders-as well as their current and prospective schools-concentrate their choice-surrounding efforts during the first school term, especially the 2-3 months immediately preceding pre-enrollment.

Because of this likely heterogeneous 'initial conditions' across families, it seemed important to include a series of questions in the introductory questionnaire, eliciting respondents' decision-making effort and sought information at the beginning of 8th grade. Specifically, wave 1 questionnaires elicited children's and parents' perceptions of whether, to what extent, and for how long they had been devoting thoughts and time to the high school track decision prior to beginning of 8th grade (e.g., by reasoning for themselves about the choice or by gathering information on available curricula or future prospects implied by different choices). Respondents were additionally asked whether, to what extent, and for how long they had been talked with relevant others or consulted specific sources of information (listed in the question) about the upcoming choice.[14]

[14] A sub-set of these questions were repeated in the following waves in order to keep track of choice-related activities by children and parents during the first term of school. We do not use such information in the current analysis.

Table 2: SELECTED EXPECTATIONS QUESTIONS ACROSS FORMATS, RESPONDENTS, AND WAVES

Type	**Future Outcome**	**Format of Expectation Question**	**Respondent**	**Wave Asked**
Stated choice/preference	Would choose for himself/herself/child today	Percent chance (point only)	Child; mother and father (or resp.parent)	W1 (only top 3 alternatives), W2, W3, W4 (all ranked alt.)
Event following choice	**Child graduates in time with passing (or higher) grades in all subjects**	Percent chance (point & range)	Child; responding parent(s)	**W1, W2, W3**
Event following choice	**Child's high school training permits a flexible college-work choice** (college &/or work, college only, work only)	Percent chance (point, with no idea option)	Child; responding parent(s)	**W1, W2, W3**
Event following choice	**Child's high school training permits a flexible college major choice** (hum. or soc. sciences; math & science or engineering; law or econ.)	Percent chance (point, with no idea option)	Child; responding parent(s)	**W1, W2, W3**
Event following choice	**Child's college-work choice** (college only, work only, college & work)	Percent chance (point, with no idea option)	Child; responding parent(s)	W3
Event following choice	Child's job after graduating from high school & no college	Expected job (job name, with no idea option)	Child; responding parent(s)	W3
Event following choice	Child's job after graduating from high school & college	Expected job (job name, with no idea option)	Child; responding parent(s)	W3
Family process	Parents would allow child's choice, without child explaining his/her choice	Percent chance (point, with no idea option)	Child; responding parent(s)	W1, W2, W3
Family process	Parents would allow child's choice, provided child explains his/her choice	Percent chance (point, with no idea option)	Child; responding parent(s)	W1, W2, W3
Family process	Curriculum mother would choose for the child today	Percent chance (point, with no idea option)	Child	W1, W2, W3 (top 3 ranked by mother)
Family process	Curriculum father would choose for the child today	Percent chance (point, with no idea option)	Child	W1, W2, W3 (top 3 ranked by father)
Family process	Curriculum child would choose for himself/herself today	Percent chance (point, with no idea option)	Child; responding parent(s)	W1, W2, W3 (top 3 ranked by child)
Family process	Curriculum other parent would choose for the child today	Percent chance (point, with no idea option)	Responding parent(s)	W1, W2, W3

4 Beliefs Formation and Evolution: Theory

I this section, we provide the interpretative framework applicable to our data on reported subjective beliefs which is based on recent theoretical contributions in Bayesian decision making under uncertainty and limited awareness.

The fundamental elements of our framework are constituted by a finite set of *states* Ω with associated set of *events* Σ (a set formed by all the subset of Ω), and a probability measure m over Σ. We refer to the measure m as the *probability model*. There is a finite set of *consequences* Z and a finite set of acts A over Ω that generates consequences for each realised state: $a : \Omega \rightarrow Z$. Each act $a \in A$ hence generates a probability distribution p_a on the associated payoff-relevant events $\mathcal{Z}$ (the set of all subsets of Z) via m as flows $p^a(B) = m(\{\omega \in \Omega : a(\omega) \in B\})$ for all $B \in \mathcal{Z}$.

We now briefly describe the 3 theoretical paradigms we consider in this paper. The following subsections specialize such abstract frameworks to the school track choice.

Subjective (Physical) Uncertainty (e.g., Kreps (1988), chapter 8-10). Although there can be possibly many probability models such as m, the agent firmly believes only in such model. When some of the events in Σ get known, the Bayesian agent changes his probability over the relevant outcomes induced by any act. For each $\mathcal{I}_1, \mathcal{I}_2 \in \Sigma$, let $m(\mathcal{I}_1|\mathcal{I}_2) := \frac{m(\{\omega \in \mathcal{I}_1 \cap \mathcal{I}_2\})}{m(\{\omega \in \mathcal{I}_2\})}$, be the conditional measure over states. The probability of $B \subset Z$ conditional on $\mathcal{I} \subset \Omega$ is:

$$p^a(B|\mathcal{I}) = m(\{\omega \in \Omega : a(\omega) \in B\} \mid \mathcal{I}).$$

Model Uncertainty or Ambiguity (e.g., Gilboa and Marinacci (2013)) This situation is almost exactly as in the previous case with a crucial difference. Suppose now the agent believes that m is not the only possible probability model, instead, he beliefs there can be a set M of possible models. The size of M reflects the (lack) of confidence the agent has on each such models. Now, the probability of a subset B of Z induced by an act $a \in A$ is not a single number but the set of probabilities:

$$P^a(B) = \{p \in [0,1] \ : \ p = m(\{\omega \in \Omega | a(\omega) \in B\}), \ m \in M\}.$$

Conditioning on new information $\mathcal{I} \in \Sigma$ might induce updating on the set of models and a *model-by-model* updating on the set of probabilities:

$$P^a(B|\mathcal{I}) = \{p \in [0,1] \ : \ p = m(\{\omega \in \Omega | a(\omega) \in B\}|\mathcal{I}), \ m \in M(\mathcal{I})\}.$$

Following Cerreia-Vioglio, Maccheroni, Marinacci, and Montrucchio (2013), we might additionally assume that the agent holds a (subjective) probability measure μ over the possible models M (and associated set of subsets $\mathcal{M}$). In this case, we can construct 'point' objects similar to those described for the case where M is a singleton: $p^a(B) = \int_M m(\{\omega \in \Omega : a(\omega) \in B\})d\mu(m)$, and the conditional probabilities $p^a(B|\mathcal{I}) = \int_M m(\{\omega \in \Omega : a(\omega) \in B\} \mid \mathcal{I})d\mu(m|\mathcal{I})$. Importantly, even when the kids holds a measure μ over $\mathcal{M}$, he might have different attitudes towards the uncertainty regarding the states (i.e., m) and model uncertainty (i.e., μ). This asymmetry in attitudes will obviously be reflected into choices (such as bets on ambiguous versus risky urns as in Ellsberg's experiments). The attitude of the agent towards the uncertainty implied by a given model is indicated as risk aversion (or love), while the attitude towards model uncertainty is indicated as ambiguity aversion (or love).

Limited Awareness (Karni and Vierø (2013b,a, 2015)). Now go back to the case where the kid has a single model m in mind. The tuple $W = (\Omega, m, A, Z)$ can be seen as the kid's 'view of the world'. This view might be incomplete. Nevertheless, the agent firmly believes in W.[15] During the decision process, the agent might discover a new act that was not in his awareness set A.[16] This discovery changes some of the elements in W replacing it with a 'new view of the world' W'. Under the *Reverse-Bayesianism* paradigm, the discovery of a new relevant act induces a change in the set of states to $\Omega' \supset \Omega$, increasing the number of coordinates defining each state. In addition, it changes the probability model m to m' such that m' can be obtained from m with a 'proportional' shift of probability mass from states in Ω to the corresponding event in Ω', in such a way as to preserve the likelihood ratios of the events in Ω' and their projections in the old Ω:

$$\forall \omega_l, \omega_q \in \Omega \qquad \frac{m(\omega_l)}{m(\omega_q)} = \frac{m'(E_l)}{m'(E_q)},$$

where $E_l, E_q \subset \Omega'$ are, respectively, the projections of ω_l, ω_q on the new set of states Ω'. The set of consequences Z also changes to Z', and the new probability measure p' over subsets of $\mathcal{Z}'$ induced by acts in A' can be computed as described above, where m and Ω are replaced, respectively, by m' and Ω'. Extensions to multiple models can again be done model-by-model.

4.1 Bayesian Kids and Marginalization

Suppose first that the kid holds only one belief model m over an immutable set of states Ω. Moreover, suppose the kids knows about all feasible available tracks and curricula and is able to forecast all consequences of each choice. We here specify the general framework and present a

[15] Formally, Unawareness is the union of the following logical statements (axioms) regarding an event: 'I do not known it' and 'I do not know that I do not known it', and so on at infinitum (e.g., Modica and Rustichini (1994, 1999)).

[16] We do not consider what Karni and Vierø classify as discovery of 'new scientific links' and of 'new consequences'.

'marginalised' version of the model. In the terminology of the previous paragraphs, we will focus to a subset of possible states and on their marginals, and on a subset of acts and their implied consequences.

We will focus on the school (curriculum) choice, which can be modelled as a subset of the set of acts $\hat{A} \subset A$.[17] The agent might either succeed or fail in each of the N curricula. Let $\hat{A} = \{a_1, \ldots a_j, \ldots, a_N\}$ and Ω_1 the set of directly curriculum-related states, with $\Omega = \Omega_1 \times \Omega_2$ and hence $\omega = (\omega_1, \omega_2)$. The set Ω_1 is constituted by 2^N elements. Each $\omega_1 \in \Omega_1$ is a list of length N of zero and ones, where a 1 in position j indicates 'pass in track a_j' and 0 in the same position indicates a 'fail in curriculum a_j'.[18] A subjective (marginal) probability distribution over Ω_1 can be described by a vector of marginals $\Pi_0 = \{\pi_0^a\}_{a \in \hat{A}}$, where π_0^a indicates the probability of passing curriculum a. The zero subscript indicates that these probabilities are obtained from unconditional priors, by 'marginalization' from the model m. For each $j = 1, 2, \ldots. N$, let $C_j \subset \Omega$ be the following set: $C_j = \{\omega \in \Omega \ : \ \omega_1 = (x_1, \ldots x_{j-1}, 1, x_{j+1}, \ldots, x_N), \ x_k \in \{0,1\} \forall k \neq j \ \}$, then

$$\pi_0^{a_j} = m\left(C_j\right) = m(\{\omega \in \Omega \ : \ \omega_1 = (x_1, \ldots x_{j-1}, 1, x_{j+1}, \ldots, x_N), \ x_k \in \{0,1\} \forall k \neq j \ \}). \quad (1)$$

Since the utility of the agent is insensitive to states that do not regard the chosen curriculum, we can normalize such payoffs to zero and, given Π_0, the expected payoff for choice $a \in \hat{A}$ is

$$\beta^a \pi_0^a + \varepsilon^a,$$

where ε^a indicates the subjective preference for the curriculum while β^a represents the additional payoff obtained by getting the degree. The payoff β^a also accounts for the curvature of the (Bernoulli) utility over consumption and wealth.

Prospect Theory (PT). We might assume that - when making his choices - the kid perceives the probability success as somewhat 'twisted'. If the kid gets a differential payoff of β^a from passing the exams, and holds a subjective probability of passing π^a the payoff from alternative a equals

$$\beta^a v(\pi_0^a) + \varepsilon^a.$$

PT assume that small probabilities are overestimated while higher probabilities are underestimated. This can be captured to a large extent by a concave v.[19]

[17] We can of course allow for probabilistic choices.

[18] Note that states indicate 'success' or 'fail ' in a given curriculum independently on the choice of the agent. Only the payoff consequences (in $U(Z)$) are affected by the choice a.

[19] According to the modern view of PT, after ranking the alternatives, the value of the two-outcome lottery is computed using the cumulates as follows $\beta[v(\pi) - v(0)] + 0[v(1) - v(\pi)]$ (e.g., Gilboa (2009), chapter 16). PT forces $v(0) = 0$

Beliefs' Evolution without Model Uncertainty. Although the realization of the event related to getting curriculum degrees (i.e., elements in Ω_1) are obviously known to the kid only after the curriculum has been chosen (and all exams taken), some other events in Σ (those sensitive to changes in elements in Ω_2) might occur before the curriculum choice. Such events constitute *signals* that can be correlated to events described by elements in Ω_1. Exactly as the vector Π_0 summarizes the (marginalized) subjective probabilities held by the kid at date $t = 0$, for $t = 1, 2, 3$, $\Pi_t(\mathcal{I}_t)$ represents the vector of probabilities the kid holds at date t and are obtained by the same marginalisation as above using conditional probabilities $m(\cdot|\mathcal{I}_t)$, where $\mathcal{I}_t$ indicating the 'information' at date t with $\mathcal{I}_0 = \Omega$.

$$\pi_t^{a_j}(\mathcal{I}_t) = \frac{m\left(C_j \cap \mathcal{I}_t\right)}{m\left(\mathcal{I}_t\right)} = m(\{\omega \in \Omega \,:\, \omega_1 = (x_1, \ldots x_{j-1}, 1, x_{j+1}, \ldots, x_N),\ x_k \in \{0,1\} \forall k \neq j\ \} \,|\mathcal{I}_t). \tag{2}$$

Interpreting Kids' Answers We now make assumptions regarding the information acquired by the econometrician through the survey.

ASSUMPTION 4.1. *At each wave $t = 1, 2, 3$ and for each alternative $a \in \hat{A}$ the answer $r_t^{a,i}$ corresponds - possibly with symmetric additive ad independent measurement error - to $\pi_t^a(\mathcal{I}_t^i)$:*

$$r_t^{a,i} = \pi_t^a(\mathcal{I}_t^i) + \zeta_t^i,$$

with ζ_t^i independently distributed across agents and time, with zero mean and time constant variance.

By assuming that the (systematic) cross-sectional dispersion in π_t^a is fully accounted by variations in the differential information received by the kids, we are following the 'Harsanyi doctrine' in that all agents hold the same model m. Within this context, the assumption of 'Rational Expectations' simply amounts in adding the requirement that the common m is the 'true' probabilistic model.

4.2 Model Uncertainty and Ambiguous Kids

Suppose now the agent holds a set M of possible models, each one describing a probability distribution over the states. The uncertainty regarding models typically emerges in situations where the decision maker does not have enough information to compute a unique vector of probabilities. As we saw above, each one of such models can be marginalised to obtain a set of possible

and $v(1) = 1$ so the function v must have a convex part close to $\pi = 1$. This might refer to arbitrary small portions of the support. PT also allows for asymmetries between gains and losses compared to a reference point. Since we work directly in the space of payoffs $U(Z)$ (as oppose to the set of outcomes Z) such distinction is less relevant to us.

vectors of the for $\Pi_0^m = \{\pi_0^{a,m}\}_{a\in\hat{A}}$; that is, we have one vector for each model. For each curriculum choice $a \in \hat{A}$, we can defined the upper and lower bounds of such beliefs as follows:[20]

$$\overline{\pi}_0^a := \max_{m\in M} \pi_0^{a,m} \quad \text{and} \quad \underline{\pi}_0^a := \min_{m\in M} \pi_0^{a,m}. \tag{3}$$

Most existing theories of decisions in presence of model uncertainty consider such upper and lower bounds as crucial determinants of choice. A natural measure of the model uncertainty (ambiguity) perceived by the kid is given by the difference $R_0^a := [\overline{\pi}_0^a - \underline{\pi}_0^a]$, which is zero if an only if the kid is not perceiving any relevant ambiguity regarding the alternative.

Ambiguity Aversion. In their seminal paper, Gilboa and Schmeidler (1989) list a set of assumption (axioms) that imply the following choice-relevant payoff over curriculum choice $a \in \hat{A}$ for ambiguity averse kids:

$$\beta^a \underline{\pi}_0^a + \varepsilon^a.$$

The $\alpha -$ maxmin model. Several generalizations of this model have been suggested. A particularly successful one implies the following expected payoff for the same choice:

$$\beta^a[\alpha\overline{\pi}_0^a + (1-\alpha)\underline{\pi}_0^a] + \varepsilon^a = \beta^a\underline{\pi}_0^a + \beta^a\alpha R_0^a + \varepsilon^a,$$

where α measures the sensitivity of the decision maker to the 'degree on ambiguity' measured by the range $R_0^a = [\overline{\pi}_0^a - \underline{\pi}_0^a]$.

Smooth ambiguity. Finally, a now widely used model for portfolio choice implies the payoff:

$$\int_{\underline{\pi}_0^a}^{\overline{\pi}_0^a} \phi\left(\beta^a \pi_0^{a,m}\right) d\mu(m) + \varepsilon^a,$$

where $\phi : [0,1] \to \mathbb{R}$ is a possibly nonlinear transformation of the expected utility $\beta^a\pi^a$ and - recall - μ is the probability measure the kids holds over models. Both ϕ and μ must be recovered. Here a disperse μ indicates a large amount of ambiguity (a more sophisticated version of the range measure R_0^a), while the concavity of ϕ describes the *intensity of the aversion towards ambiguity* held by the kid.

Beliefs' Evolution with Model Uncertainty As discussed above, new information might induce the agent to adjust his believe over the set of models. We assume that the set of models M_0 at $t = 0$, is a proper subset of $\Delta(\Omega)$, the set of all possible probability distributions over Ω. This assumption is needed to have some dynamic action going on regarding the sets of posteriors

[20]For expositional simplicity, we assume both max and min exist.

in presence of model uncertainty. Alternatively we could introduce an elimination procedure for models in M_0, such as the likelihood tests discussed in Epstein and Schneider (2007).[21]

Recall that the 'marginalized' version of each model m on the curriculum-related entries is represented in $t = 0$ by a vector Π_0^m. For $t = 1,2,3$, $\mathcal{I}_t \subset \Omega$, and $m \in M(\mathcal{I}_t)$, the vector $\Pi_t^m(\mathcal{I}_t)$ represents the period t beliefs over curriculum success conditional in information $\mathcal{I}_t$. This vector is obtained by updating Π_0^m model-by-model as defined in (2). From (3) we then obtain the bounds $\overline{\pi}_t^a(\mathcal{I}_t)$ and $\underline{\pi}_t^a(\mathcal{I}_t)$ and the associated range $R_t^a(\mathcal{I}_t) := \overline{\pi}_t^a(\mathcal{I}_t) - \underline{\pi}_t^a(\mathcal{I}_t)$.

The main implication of this model is that we can interpret both the subjective beliefs and the ambiguity measures within the Bayesian framework, with a model-by-model updating that follows the classical Bayes' Rule.

Interpreting Kids' Answers Again, we need to assume how agents respond to the boundary questions. Here is the most natural one:

ASSUMPTION 4.2. *The answers to the bounds questions are read as follows:*

$$\overline{r}_t^{a,i} = \overline{\pi}_t^a(\mathcal{I}_t^i) + \overline{\xi}_t^i \quad \text{and} \quad \underline{r}_t^{a,i} = \underline{\pi}_t^a(\mathcal{I}_t^i) + \underline{\xi}_t^i,$$

where $\overline{\xi}_t^i$ and $\underline{\xi}_t^i$ are independent measurement errors, both with zero mean and time constant variance.

Recall that we also elicit answers to the *point subjective probabilities.* The model of ambiguity proposed by Gilboa and Schmeidler gives no discipline on how the answer to the point-belief report should be interpreted. A 'classical' option consists in assuming the agent holds an uniform distribution over the marginalized probabilities delivering the following interpretation:

$$r_t^{a,i} = \frac{\overline{\pi}^a(\mathcal{I}_t^i) + \underline{\pi}^a(\mathcal{I}_t^i)}{2} + \xi_t^i.$$

In analogy to the $\alpha - maximin$ model, we could also speculate that the weight α is related to the response on the point probability question as follows:

$$r_t^{a,i} = [\alpha \overline{\pi}_t^a(\mathcal{I}_t^i) + (1-\alpha)\underline{\pi}_t^a(\mathcal{I}_t^i)] + \xi_t^i.$$

We could hence use the point-belief answer to recover the sensitivity parameter to the range measure of ambiguity $R_t^a(\mathcal{I}_t^i)$ as follows:

$$\alpha = \frac{\mathbb{E}[r_t^{a,i}] - \mathbb{E}[\underline{r}_t^{a,i}]}{\mathbb{E}[\overline{r}_t^{a,i}] - \mathbb{E}[\underline{r}_t^{a,i}]},$$

[21]For a discussion on the undesired implications of the likelihood test based elimination of models suggested by Epstein and Schneider (2007), see Heyen (2014).

where $\mathbb{E}[\cdot]$ indicates the cross-sectional mean. Finally, assuming the agent actually holds a probability distribution $\mu(\cdot|\mathcal{I}_t^i)$ over models $M(\mathcal{I}_t^i)$, a natural possibility is to assume

$$r_t^{a,i} = \int_{\underline{\pi}_t^a(\mathcal{I}_t^i)}^{\overline{\pi}_t^a(\mathcal{I}_t^i)} \pi_t^{a,m}(\mathcal{I}_t^i) d\mu(m|\mathcal{I}_t^i) + \xi_t^i.$$

4.3 Limited Awareness

As discussed, we follow the *Reverse Bayesian* approach of Karni and Vierø (2013b,a, 2015). The main result of that paper is a representation theorem that allows to use the previous framework to address this issue, with effects similar to 'reverse learning'. Consider the case where the agent becomes aware of a new curriculum. This can be seen as an enlargement of the set of acts which can be accommodated by extending Ω_1 to include a new slot with 0-or-1 entries. If, for simplicity, we suppose the set Ω_2 remains constant, the numerosity of Ω gets doubled by this change. Of course, the joint probabilities between events - and hence the kid's reading of the signals - must be adjusted accordingly. The uniqueness result of Karni and Vierø guarantee there is only one way to perform such adjustment.

Perhaps the most useful result of this framework for our analysis is that one can study the evolution of beliefs and belief ambiguity without having to jointly keeping curriculum of the evolution in kid's awareness: pure changes in the awareness sets do not affect our measures of the marginals π_t^a or their evolution for alternatives that were in the awareness set in previous periods: for these alternatives (if the conditioning set does not change of course) the likelihood ratio $\frac{\pi_t^a}{1-\pi_t^a}$ is simply re-interpreted within the 'new view of the world' W'.

5 Evidence

(Un)Awareness Perceptions Table 9 shows the sample distributions of awareness perceptions of responding children (top panels) and responding parents (bottom panels) during the first month of school. Figures in the left panels are based on all respondents who participated in wave 1. Whereas figures reported in the right panels are conditional on respondents who took both waves 1 and 3 and, thus, enable assessment of attrition selectivity with respect to the awareness measure. Among children, the fraction of 'Never heard of' answers (corresponding to unawareness) is generally small for curricula of the general track (4-5%) and sizably larger for technical and vocational curricula (14-36%). The Learning & Social Science and the Music & Choral curricula feature rates of perceived unawareness comparable to those reported for technical and vocational tracks (18-35%). This is not surprising as such curricula had been newly introduced in the Italian secondary education system at the time of the survey.

Parents' answers feature a similar pattern of heterogenous perceived (un)awareness across tracks and curricula, although the distributions of parents' responses appear somewhat less polarized than those of children. That is, parents' display comparatively greater awareness ('Know' plus 'Heard of') about vocational curricula, greater knowledge ('Know') about technical curricula, and greater unawareness ('Never heard of') about general curricula than children do.[22]

Given the documented heterogeneity across schooling alternatives characterizing both children's and parents' (un)awareness reports at the beginning of 8th grade, one might wonder whether such heterogeneity is systematically related to specific characteristics of respondents and their families. In keeping with this version's focus on children, we next ask what observable characteristics of children and their families (if any) predict children's awareness levels at start of 8th grade.

Table 10 shows estimates of ordered probit regressions of children's reported awareness level about each high school curriculum (one per column), on a range of covariates that might be related to the amount of information held by 8th graders and their families about alternative high school options. The set of regressors listed in the first column of Table 10 includes dummies for child's gender (1=female), child's country of birth (1=foreign born), family structure (1=child lives with both parents), maternal education (college or higher and high school), whether the child has a stay-home mom, and whether the child has a blue-collar dad. Additionally, the set of predictors includes the child's number of older siblings (who therefore have already attended or are attending high school), the child's GPA at the end of 7th grade, and an indicator for whether the child did think on his/her own or communicated with others about the corresponding curriculum before wave 1. Children's awareness levels were coded in terms of increasing awareness ('Never heard of'=1, 'Heard of'=2, and 'Know'=3); hence, a positive coefficient indicates a positive association between the outcome variable (i.e., the child's awareness level) and the predictor, and *vice versa*.

Estimated coefficients reveal existence of systematic associations between some of the covariates and children's awareness reports. Girls display significantly greater awareness than boys about the majority of curricula, with the exception of the new Music & Choral school (coefficient not significant) and the Technology Sector curriculum of the Technical track (typically perceived as a "male school"). Being foreign born is negatively associated with reported awareness for all alternatives; however, the estimated coefficient is statistically significant for general curricula

[22]These patterns do not change qualitatively when sample statistics are conditioned on responding child-parent(s) pairs (not shown in the interest of space).

only. Having a highly educated mother is positively associated with awareness of traditional general curricula (i.e., Humanities, Math & Science, and Languages) and negatively associated with awareness of the remaining curricula. Only some of these coefficients are statistically significant.[23] Children with a higher GPA at the end of 7th grade display greater awareness than their lower performing peers about general curricula, and lower awareness of the technical and vocational ones. Finally, having thought or discussed about a specific alternative before wave 1 is positively associated to reported awareness about that alternative in wave 1. These coefficients are significant for only a subset of the curricula, including the two newly introduced general curricula (Music & Choral and Social Sciences) as well as curricula of the technical and vocational tracks children are generally less aware of based on Table 9.

Table 11 shows results of a related prediction exercise, where the two outcome variables are respectively defined by the number of alternatives the child is aware of (in column 2) and the number of alternatives the child indicates knowing (column 3). Once again, on average girls hold a significantly larger awareness set than boys do. Whereas foreign born children hold a significantly smaller awareness set than children who were born in Italy. Perhaps unsurprisingly, higher-performing students tend to have larger awareness sets. On the other hand, having a highly educated mother is negatively associated with the overall size of children's awareness set. As shown in Table 10, having a highly educated mother is positively associated with awareness of general curricula and negatively associated with awareness of technical and vocational curricula.

Combined together these two pieces of evidence suggest that awareness of children from more educated families is more concentrated on schooling alternatives of the general track, more likely to be relevant to them.

While families' awareness and information about alternative high school options at the beginning of 8th grade (wave 1) is important, actual choices are based on information available to families at the time of pre-enrollment. Table 12 shows the sample distributions of awareness perceptions of responding children and their parents the week before the pre-enrollment deadline (wave 3). Reported awareness levels increase over time for all curricula, as revealed by the substantially higher fractions of 'Know' responses (and also of 'Know' plus 'Heard of'), and by the substantially lower fractions of 'Heard of' and 'Never heard of' responses, observed in wave 3 relative to wave 1. Notwithstanding this marked increase in awareness levels for all curricula, the main pattern of heterogenous awareness observed in wave 1 persists through wave 3. Put it differently, gaps in reported awareness levels among different curricula and tracks do not vanish by the time of choice. For instance, while only about 1-2% of children reports having never heard

[23] Consistent with existing empirical evidence, father's educational attainment does not have additional explanatory power over mother's education. Hence, we include the latter only.

of curricula of the general track as of time of pre-enrollment, 10% or more of children still indicate having never heard of specific vocational curricula.

Having documented the extent of children's and parents' self-reported awareness (or lack thereof) about alternative high school options, and how children's and parents' awareness perceptions evolve over the months preceding pre-enrollment in high school, we now concentrate our analysis on the degrees of uncertainty and ambiguity families perceive with regard to a particular dimension of choice. Specifically, we document and analyze the extent of children's and parents' uncertainty and ambiguity surrounding the probability that the child would perform satisfactorily and would eventually graduate in the regular time following choice of alternative high school options. We are particularly interested in characterizing the dynamics of perceived ambiguity during the decision process. To this aim, in this paper we focus on children's reports.

Point Beliefs and Perceptions of Model Ambiguity at School's Start. Tables 13 through 15 document the extent of children's and parents' uncertainty and ambiguity perceptions at the beginning of 8th grade. In particular, Table 13 summarizes respondents' point beliefs about the likelihood that the child will pass all high school grades and graduate in time following choice of alternative curricula ('passing probability' for short), by showing mean, standard deviation, and main quantiles of the sample distributions of children's answers (top panel) and parents' answers (bottom panel). Once again, these statistics are shown both for the larger samples of children and parents who participated in wave 1 (left panels) and for the smaller set of respondents who participated also in subsequent waves (right panels).

Figures in Table 13 reveal that children's and parents' subjective assessments about the child's passing probability vary greatly across families, with responses spanning the whole 0-100 scale - or a large portion of it - for all curricula (see first and ninth deciles). In addition, reported point beliefs vary substantially across curricula both among children and among parents (see means and medians), reflecting respondents' perception of how challenging each curriculum may be in general and for the specific child in particular.[24]

As explained in the theoretical section, individuals may have multiple models in mind, corresponding to a situation of ambiguity rather than to one of mere (physical) uncertainty. In order to document whether 8th graders and their parents display ambiguous beliefs about the prob-

[24]Item non-response rates are reported in the tables together with sample size. For this particular outcome they range between 14% and 35%, depending on the sample. Such rates are high but fairly typical for this type of questions. For a comparison, item non-response rates to expectations questions in the Health and retirement Study (HRS) range between 3-4% to over 40%, depending on the outcome or question domain as documented by Manski and Molinari (2010) and other papers. In our sample children display lower item non-response rates than parents do, similar to Giustinelli (2015)'s findings in a similar sample. Finally, item non-response rates tend to be higher for curricula of the vocational track, that is, those respondents seam to have less knowledge of based on our awareness measure.

ability of passing, Table 14 shows the sample distributions of survey participants' responses to the follow-up question that asks them whether they feel 'Sure,' 'Unsure,' or 'have No Idea' about their point belief answer. In addition, Table 15 shows main features of the sample distributions of range widths (calculated as max chances minus min chances of passing), among the sub-samples of respondents who indicated feeling unsure about their point belief.

The majority of respondents indicate feeling sure about their belief of the passing probability, approx. 76% of children and 67% of parents. However, the remaining fractions of respondents who report some degree of perceived ambiguity (i.e., who say that they are 'Unsure' or 'Have no idea' about the chances) are sizable. Once again, these distributions display some heterogeneity across schooling alternatives. For example, while the proportion of children who report being sure is fairly stable across curricula and tracks, about two thirds of children who indicate having ambiguous beliefs of passing in general or technical curricula characterize their ambiguity as being 'Unsure' and the remaining one third characterize their ambiguity as having 'No idea.' Such proportions are reversed with reference to curricula of the vocational track, that is, those curricula children are least aware of to start with.

Inspection of Table 15 reveals that conditional on reporting being 'Unsure,' the width of children's subjective ranges varies between 5 and 40 for most curricula, and between 5 and 60 or 70 in a couple of cases. This evidence suggests that children tend to describe their ambiguity as being 'Unsure' as long as their perceived ambiguity is reasonably limited and, in practice, this translates into a range whose width is smaller or equal to about a half of the maximum possible width; whereas, they characterize their ambiguity as 'have No Idea' whenever they perceive larger amounts of ambiguity.

Similar to our earlier analysis of awareness, in Tables 16 and 17 we analyze potential predictors of children's point beliefs about the likelihood of passing in different curricula and of children's reported degree of ambiguity around those beliefs. Table 16 focuses on predictors of point beliefs; each column in 2 through 11 shows estimated coefficients from a linear regression of the subjective point belief of passing in the curriculum indicated in the column's heading on a set of covariates listed in the first column. The vector of covariates is identical to that we used above for prediction of awareness reports and it additionally includes dummies for awareness levels. Two strong predictors of children's point beliefs of the probability of passing–regardless of the curriculum–are the child's GPA at the end of 7th grade and whether the child reported thinking or talking about the curriculum previous to wave 1. These variables have the expected positive sign and are statistically significant in all regressions shown in Table 16. Gender negatively and significantly predicts children's point beliefs of the probability of passing in the General Math

& Science curriculum and in the Technical of the Technology Sector curriculum. This finding is consistent with previously documented under-confidence among girls about their ability or performance in STEM subjects. Finally, the awareness dummies have positive and significant predictive power on children's point beliefs of passing for the newly introduced General Music curriculum and the vocational curricula, that is, those curricula children are least aware and knowledgeable of on average. Actually, the awareness dummies are the only variables, together with child's GPA, which appear to have some predictive power on ambiguity reports for selected curricula in Table 17.

Before moving to the analysis of the evolution of belief ambiguity, we establish the predictive relevance of children's beliefs of passing to observed pre-enrollment choices. In Table 18 we show estimates of probit regressions of observing choice of each alternative on the child's point belief of passing for that alternative and on the remaining covariates. Child's point belief of passing in a curriculum positively predicts choice of that curriculum, conditional on the remaining predictors. The coefficient is significant for all curricula of the general track and for one of the technical curricula. This exercise confirms that children's reports of their belief about the passing probability contains variation that explains observed choices in addition to what is explained by those same covariates that are predictive of the point belief.

Evolution of Perceived Ambiguity Preceding Pre-Enrollment. We now examine evolution of perceived ambiguity among children. We focus on individuals who answered in all waves, so as to avoid sample composition effects due to varying participation across waves. Our comments refer to the statistics shown in Tables 3 and 4, but the main patterns are confirmed on the whole sample (see Table 19 reported in the appendix).

The 9 matrices in Table 3 report transition probabilities of children's ambiguity perceptions across the three ambiguity categories: 'Sure' (S), 'Unsure' (U), and 'No-Idea' (NI), between the three waves of our analysis. To simplify the presentation, we focus the analysis on the rightmost matrices, representing transition probabilities between Wave 1 (W1) and Wave 3 (W3). As reported in the table, very similar patterns are observed in the transition matrices between W1 and W2 and between W2 and W3.

Unconditional Transitions. The top matrices refer to the aggregate (unconditional) picture. Although most transitions occur from higher to lower levels of ambiguity, a sizable fraction of children move in the opposite direction, i.e., from S or U into the NI state. Some of the transitions from U to either S or NI might be due to the lower response burden of these answer categories, as they did not required respondents to additionally provide a range.[25] However, by looking at the

[25]This hypothesis must be combined with a supposedly more precise knowledge of such additional burden acquired

U row we note that most transitions occur toward S, while the fraction of individuals who move to NI is roughly the same as the fraction of those remaining in U. Similarly, while the 'response burden effect' might explain why there is little movement from NI to U, it would be difficult to rationalize the large observed fraction of agents moving from NI to S with such an explanation.

Conditional Transitions. If arrival of new information can explain transitions toward lower ambiguity, it is less immediate how to account for the transitions toward higher levels of ambiguity such as those from S to NI in the transition matrices on the top of the table we just described. In order to derive a more precise picture of the evolution of the degree of ambiguity during the decision process, the matrices in the middle row of Table 3 we compute the transition probabilities conditional on the chosen alternative. That is, we only look at the dynamic patter of the alternatives that are actually chosen by the family.

The figures point more clearly toward a reduction in ambiguity for these alternatives. Among children who starts in the S state, we observe only minor movements towards higher ambiguity levels, which may be easily interpreted as 'mistakes' or random picks. Similarly, the persistence of the S state is now stronger compared to the unconditional case above, and the U state is either more persistent or has higher transition probabilities toward S compared to the corresponding unconditional figures. Cell counts in row NI are too small and we do not comment their pattern.

To complete the picture, at the bottom row of Table 3, we report the transition matrices conditional on alternatives that the child ranked at the bottom in W1 (i.e., ranked 4th or lower). These alternatives seem to be those driving the increase in ambiguity observed in the aggregate (unconditional) matrices. Let's focus again on transitions between W1 and W3, reported in the matrix at the bottom right of the figure. Transitions from S or U toward NI are more frequent than their unconditional counterparts, while transitions from NI or U toward S are less frequent than in the unconditional matrix. The NI row is roughly the same as that in the unconditional transition matrix. If we assign the 'mistake' flag to transitions from S or U toward NI in the chosen-alternative conditioning, we are left with a 10% of individuals moving from S or U toward NI, suggesting a 'genuine' increase in the degree of ambiguity during the months immediately before enrollment for the alternatives ranked 4th or lower in W1. The entry in the S-to-U transition is the same and small across the two conditionals (and the aggregate), suggesting that accounting for such deterioration in the information (and consequent increase in ambiguity) would require a learning process that discontinuously increases the ambiguity degree perhaps by simply 'selectively' dropping some of the alternatives from the 'attention set'.

in previous waves.

Table 3: Transition Matrices Across Survey Waves of Children's Ambiguity Perceptions ('no idea' vs. 'unsure' vs. 'sure') about Point Belief of the Probability of Passing–Sample of Children who Responded to Waves 1 & 2 & 3

Unconditional

		Wave 2 Sure	Wave 2 Unsure	Wave 2 No Idea	Tot
Wave 1	Sure	0.88	0.02	0.10	1
	Unsure	0.68	0.21	0.11	1
	No Idea	0.60	0.07	0.33	1

		Wave 3 Sure	Wave 3 Unsure	Wave 3 No Idea	Tot
Wave 2	Sure	0.87	0.02	0.11	1
	Unsure	0.65	0.18	0.17	1
	No Idea	0.48	0.03	0.49	1

		Wave 3 Sure	Wave 3 Unsure	Wave 3 No Idea	Tot
Wave 1	Sure	0.86	0.02	0.12	1
	Unsure	0.71	0.15	0.14	1
	No Idea	0.58	0.04	0.39	1

Conditional on Chosen Alternative

		Wave 2 Sure	Wave 2 Unsure	Wave 2 No Idea	Tot
Wave 1	Sure	0.93	0.02	0.05	1
	Unsure	0.77	0.18	0.05	1
	No Idea	0.83	0.17	0	1

		Wave 3 Sure	Wave 3 Unsure	Wave 3 No Idea	Tot
Wave 2	Sure	0.93	0.02	0.05	1
	Unsure	0.38	0.62	0	1
	No Idea	0.62	0.13	0.25	1

		Wave 3 Sure	Wave 3 Unsure	Wave 3 No Idea	Tot
Wave 1	Sure	0.93	0.02	0.05	1
	Unsure	0.73	0.22	0.05	1
	No Idea	0.43	0.14	0.43	1

Conditional on Alternatives Ranked at the Bottom in Wave 1

		Wave 2 Sure	Wave 2 Unsure	Wave 2 No Idea	Tot
Wave 1	Sure	0.83	0.01	0.16	1
	Unsure	0.67	0.33	0	1
	No Idea	0.57	0.10	0.33	1

		Wave 3 Sure	Wave 3 Unsure	Wave 3 No Idea	Tot
Wave 2	Sure	0.85	0.01	0.14	1
	Unsure	0.83	0.17	0	1
	No Idea	0.57	0	0.43	1

		Wave 3 Sure	Wave 3 Unsure	Wave 3 No Idea	Tot
Wave 1	Sure	0.81	0.02	0.17	1
	Unsure	0.83	0.17	0	1
	No Idea	0.68	0	0.32	1

Finally, Table 4 summarizes the evolution of point beliefs and ranges over the survey three waves and with various conditionals. The additional information contained in this table compared to the transition matrices is of two types. First, we make an attempt to give a quantitative dimension to the evolution of ambiguity by displaying mean upper bound, mean lower bound, and mean range width. Second, we study the evolution of these measures across tracks and with further conditionals. Given the finer information reported in this table, we focus on the top panel where the whole sample is used. The bottom panel reports the same information restricted to the sample of respondents who answered to the question is all waves.

Recall that we have measures of point beliefs about the probability of passing for the whole sample. Whereas, ranges were elicited only from those children who reported being unsure (U) about their point belief of passing $r_t^{a,i}$ (for alternative a in wave $t = 1, 2, 3$). In order to compare quantitatively the ranges using all observations, we perform the following assignments. We assign a range of size 0 (or lower bound=upper bound) to responses in S and a range of size 100 to responses in NI (or lower bound=0 and upper bound=100). Relating this to the notation in the theoretical section, we have: $\overline{\pi}_S^a = \underline{\pi}_S^a$ and $R_S^a = 0$ corresponding to absence of ambiguity, and $\overline{\pi}_{NI}^a = 1$, $\underline{\pi}_{NI}^a = 0$, and $R_{NI}^a = 1$ corresponding to maximal ambiguity.[26]

In the first column of Table 4, we list the conditioning variables. The rows named 'None', Chosen Alternative', and 'Ranked Bottom in Wave 1' use the same conditionals as the transition matrices described above. The quantitative evidence shown in this table complements the qualitative evidence generated by the transition matrices. At the same time, the latter helps us assessing the potential effect of our range imputations on the figures we present in this table. Consistent with evidence from the transition matrices, the decrease in mean range width corresponding to the 'Chosen Alternative' points to a consistent reduction in the level of ambiguity across waves. On the other hand, for alternatives 'Ranked bottom in W1' ambiguity increases over time, once again consistent with the pattern observed in the transition matrices.

A disaggregation by track of the statistics corresponding to the chosen curriculum reveals that the pattern of decreasing ambiguity hold only for some of the tracks. In particular, average ambiguity does not monotonically decrease over time for chosen curricula within the General Traditional and the Technical tracks. This preliminary evidence requires further investigation. A detailed analysis to the parent-child relation and of the decision process within the family might

[26]Of course, our aggregate measures will be likely affected by such assignments. In particular, true range widths underlying S are likely overestimated and true range widths underlying NI are likely overestimated. Less extreme upper and lower bounds centered on the point belief would require more work, as they involve at least two complications. First, if we want them to be meaningful and at the same time generate ranges that are weakly larger than the largest observed range they must be constructed at the alternative level. Second, their 'centering' properties must be somewhat adjusted to the level of the point belief in order to have them both representing 'maximal ranges' and at the same time numbers between 0 and 100.

reveal important new readings. For example, the general-traditional curriculum is typically the most preferred option by the parents. In some cases, parents impose such choice on the children; it is hence not very surprising that the conditioning on the chosen-curriculum for such options leaves virtually unaffected the dynamic picture.

6 Discussion

In this paper, we document and analyze the evolution of children's awareness about alternative options of a consequential schooling decision, as well as the evolution of their point beliefs and ambiguity perceptions about the likelihood of a choice-relevant outcome, during the months preceding choice.

Our analysis might be relevant for policy as it identifies specific dimensions of information (i.e., knowledge of facts concerning specific schooling alternatives), expectations (i.e., beliefs about the likelihood of specific outcomes), and families' profiles (e.g., their socioeconomic characteristics), in which informational policies are more (or less) likely to be relevant and potentially effective at reducing skill misallocation and inequality.

Findings from our analysis also have the potential to direct theoretical research. The 'plain' Bayesian framework for example, even if extended to account for model uncertainty, appears unable to explain some of the features characterizing evolution of children's beliefs and ambiguity perceptions as measured in our dataset.

When agents have infinite memory and infinite computational ability, the learning process does not change with the complexity of the environment. It does not seem to be extremely difficult to incorporate model uncertainty into various models of learning biases or limitations such as those of Rational Inattention (RI). RI models however, describe imperfect filtering processes of information, so they impose limitations on the *flow* of 'information' acquired (typically measured as reduction in the entropy index). In our data instead, we observe a *selected crowding out in the information acquisition across tracks and curricula*.

In order to account for such features, we might conjecture that the child holds constraints on the *stock* of information. Limitations on the stock of information will not only make new signals to be partially ignored, possibly slowing down the learning process as in RI models. This class of models also has the potentials of explaining the increase in the agent's level of reported ambiguity, along the lines we observe in our data. This is so since the agent might decide to *selectively 'forget'* some of the information he acquired in the past.[27]

[27] Equivalently one could postulate an exgenous depreciations of information which is 'uniform' across alternatives and an agent choosing a targeted effort level to limit such process for certain tracks.

Table 4: EVOLUTION OF CHILDREN'S BELIEFS ACROSS SURVEY WAVES OF THE PROBABILITY OF PASSING, BY MIN BELIEF, POINT BELIEF, MAX BELIEF, AND RANGE WIDTH

	Sample of Children who Responded to Wave 1														
	Wave 1					Wave 2					Wave 3				
Conditioning Variable	N of Obs	Min Belief	Point Belief	Max Belief	Range Width	N of Obs	Min Belief	Point Belief	Max Belief	Range Width	N of Obs	Min Belief	Point Belief	Max Belief	Range Width
None	5776	43.3403	51.0208	60.2025	16.8622	3215	45.2787	53.4582	62.3160	17.0373	2663	47.0199	56.1487	66.4063	19.3864
Gen Track, Traditional	1750	42.5582	48.0457	55.2017	12.6434	978	46.0297	51.2281	56.9806	10.9509	802	45.5174	51.4414	59.3940	13.8765
Gen Track, Newly Introduced	1157	42.9861	49.0337	56.8245	13.8383	647	45.7681	52.1313	58.9443	13.1761	537	49.0521	55.6387	63.9366	14.8845
Tech Track	1160	44.9448	53.2931	62.5353	17.5905	640	45.5968	54.6156	64.5140	18.9171	533	45.1594	56.3151	68.0619	22.9024
Voc Track	1709	43.2919	53.8700	66.0269	22.7349	950	43.9579	55.8778	68.6242	24.6663	791	48.4171	61.1554	74.0771	25.6599
Chosen Alternative	284	68.7218	72.4049	77.6514	8.9295	209	69.5837	74.2249	78.2009	8.6172	245	70.1347	74.0489	78.1306	7.9959
Chosen–Gen T, Traditional	139	77.3309	78.8057	81.1079	3.7769	104	76.5192	80.4134	82.6346	6.115384615	113	76.7345	78.4955	80.0885	3.3539
Chosen–Gen T, Newly Introduced	43	58.5348	64.0465	71.4418	12.9069	37	65.3513	70.3513	76.4324	11.08108108	40	73.8750	76.6250	79.75	5.875
Chosen–Tech T	65	63.2153	67.7538	74.0461	10.8307	45	62.6	66.8222	70.2666	7.666666667	55	58.7272	66.1818	75.0909	16.363
Chosen–Voc T	37	57.8919	66.2432	78.2162	20.3243	23	58.6956	66.9565	76.5217	17.82608696	37	62.8919	69.3783	74.9189	12.0270
Ranked Bottom in Wave 1	3941	38.7457	46.9251	57.0393	18.2936	1995	41.0998	50.8672	61.3830	20.2832	1680	45.1744	55.5392	66.8869	21.7125
Ranked Last/Unranked in All Waves	194	41.6701	47.2422	53.0670	11.3969	195	38.4359	49.8564	59.0307	20.5948	179	41.6648	49.7933	61.1061	19.4413
	Sample of Children who Responded to Waves 1 & 2 & 3														
	Wave 1					Wave 2					Wave 3				
Conditioning Variable	N of Obs	Min Belief	Point Belief	Max Belief	Range Width	N of Obs	Min Belief	Point Belief	Max Belief	Range Width	N of Obs	Min Belief	Point Belief	Max Belief	Range Width
None	2059	48.3156	55.3788	63.3385	15.0228	1964	48.1665	55.9256	63.5387	15.3722	1950	50.1364	58.6246	68.3487	18.2123
Gen Track, Traditional	627	49.4577	53.4098	58.1993	8.7416	595	48.5226	53.0050	57.3361	8.8134	588	49.7823	54.6938	61.8469	12.0646
Gen Track, Newly Introduced	415	47.5373	53.6265	60.2771	12.7397	396	49.5277	55.6565	61.2575	11.7298	393	53.4809	59.1552	66.6310	13.1501
Tech Track	409	49.1907	57.1173	66.2836	17.0929	391	46.5038	55.7801	64.9437	18.4399	390	48.1359	58.8923	70.2179	22.0820
Voc Track	608	47.0805	57.4358	68.7467	21.6661	582	47.9931	59.1924	70.4879	22.4948	579	49.5738	62.0759	74.8583	25.2849
Chosen Alternative	185	70.2702	73.9405	77.8810	7.6108	174	71.4310	75.05172	78.0402	6.6092	180	72.8277	76.1833	79.7388	6.9111
Chosen–Gen T, Traditional	93	79.9892	81.3548	83.0860	3.09677	90	76.1555	79.4888	81.5444	5.3888	91	78.2637	79.9011	81.4395	3.1758
Chosen–Gen T, Newly Introduced	31	59.9032	65.7742	74.2580	14.3548	30	72.9333	74.6	76.6	3.6667	31	73.7096	77.0967	80.4838	6.7742
Chosen–Tech T	39	64.1282	67.9743	70.4102	6.28205	35	63.7714	67.7714	70.7714	7	36	63.8888	69.7222	77.7778	13.8889
Chosen–Voc T	22	54.6818	64.6818	74.2272	19.5454	19	60.7894	68.1579	77.10526	16.3157	22	63.7272	70.0909	74.8636	11.1363
Ranked Bottom in Wave 1	1407	43.1997	51.1222	60.2359	17.0362	1355	43.4435	52.0228	60.7498	17.3062	1343	46.5606	56.2926	66.7840	20.2233
Ranked Last/Unranked in All Waves	194	41.6701	47.2422	53.0670	11.3969	195	38.4359	49.8564	59.0307	20.5948	179	41.6648	49.7933	61.1061	19.4413

As a way forward, one may assume that the agent is able to replace posteriors on some tracks with pre-specified (and perhaps very diffuse) 'default' priors. By doing so, the agent frees up some memory space which enables him to acquire and retain new information. If all signals have roughly the same 'retention cost' (no matter the informational content) the agent would free memory space by eliminating information on 'less relevant' tracks, that is, tracks that are less likely to be pivotal or chose. This would allow faster learning for more pivotal or preferred tracks. This model would therefore have the potential to generate an increase in ambiguity, especially in wave 3, because of two reasons. First, in the period immediately preceding the decision, the child might have a clearer opinion about what track is pivotal or preferred. As a consequence he would be more prone to drop the information on the irrelevant tracks. Second, the stock constraint on the amount of information related to this particular decision problem is more likely to be binding at later stages of the decision process.

Finally, it might be important to extend our analysis to analyzing child-parent interactions. As we discuss in the last paragraph of the previous section indeed, the ambiguity perceptions and precision of respondents' beliefs across tracks is likely to be related to the processes of family interaction. This analysis is viable to us since our dataset includes detailed information about respondents' role in the decision as well as their perceptions of other members' choice preferences (see bottom 6 rows of Table 2).

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A Tables Appendix

Table 5: Respondents' Identity in Wave 1

	Wave 1		Wave 1 & Wave 3	
Respondent Identity	Children Sample	Parents Sample	Children Sample	Parents Sample[a]
Child (%)	649 (100%)	N.A.	410 (100%)	N.A.
Both parents (%)	N.A.	288 (47.84%)	N.A.	171 (48.44%)
Mother only (%)	N.A.	262 (43.52%)	N.A.	159 (45.04%)
Father only (%)	N.A.	47 (7.81%)	N.A.	23 (6.52%)
Other person (%)	N.A.	5 (0.83%)	N.A.	0 (0%)
N (%)	649 (100%)	602 (100%)	410 (100%)	353 (100%)

[a]: Parents sample in wave 3 is conditional on families where the same parent or parents responded across waves.

Table 6: CHILDREN'S BACKGROUND CHARACTERISTICS

	Wave 1		Wave 1 & Wave 3	
	Children Sample (N=649)	**Parents Sample (N=619)**	**Children Sample (N=410)**	**Parents Sample[a] (N=353)**
Child's gender				
% male	46.53	47.09	43.17	43.34
% female	53.47	52.91	56.83	56.66
N (100%)	649	618	410	353
% item non-response/missing	0	0.16	0	0
Child's place of birth[b]				
% Italy	86.36	87.79	88.02	90.88
% other country	13.64	12.21	11.98	9.12
N (100%)	645	614	409	351
% item non-response/missing	0.62	0.81	0.24	0.57
Child's age[b]				
mean	13.0929	13.0828	13.0732	13.0404
std. dev.	0.4249	0.41276	0.4072	0.3461
min	12	12	12	12
median	13	13	13	13
max	15	15	15	15
N (100%)	646	616	410	353
% item non-response/missing	0.46	0.48	0	0.28
Child's age vs. school grade[c]				
% regular (born in 1998)	83.9	85.23	85.12	88.64
% ahead (born after 1998)	3.87	3.73	4.15	3.69
% behind (born before 1998)	12.23	11.04	10.73	7.67
N (100%)	646	616	410	352
% item non-response/missing	0.46	0.48	0	0.28
Child's GPA [d]				
mean	7.6541	7.6618	7.7405	7.7699
std. dev.	0.9663	0.9649	0.9719	0.97101
min	6	6	6	6
median	7.6	7.6	7.7	7.8
max	9.8	9.8	9.8	9.8
N (100%)	567	555	369	323
% item non-response/missing	12.63	10.34	10	8.5
Parent/s' child lives with[e]				
% both parents	87.84	88.2	88.48	89.39
% one parent	11.66	11.44	10.99	10.3
% none	0.51	0.35	0.52	0.3
N (100%)	592	568	382	330
% item non-response/missing	4.05	4.22	4.02	4.9
Number of older siblings[f]				
mean	0.6248	0.6351	0.5594	0.5636
std. dev.	0.7636	0.7638	0.6966	0.6999
min	0	0	0	0
median	0	0	0	0
max	3	3	3	3
N (100%)	581	559	379	330
% item non-response/missing	10.48	9.69	7.56	6.52

[a]: Parents sample in wave 3 is conditional on families where the same parent or parents responded across waves.
[b]: Constructed from year of birth, using multiple measures from child and parent/s.
[c]: Constructed from year of birth and current grade.
[d]: Constructed by averaging grades in 9 main subjects.
[e]: Constructed from co-residing question, using multiple measures from child and parent/s.
[f]: Constructed by censing up to 3 older siblings, using multiple measures from child and parent/s.

Table 7: CHILDREN'S BACKGROUND CHARACTERISTICS (CONTINUED)

	Wave 1		Wave 1 & Wave 3	
	Children Sample (N=649)	Parents Sample (N=619)	Children Sample (N=410)	Parents Sample[a] (N=353)
Mother's country of birth[b]				
% Italy	87.79	81.66	82.7	85.96
% other country	19.21	18.34	17.3	14.04
N (100%)	609	589	393	342
% item non-response/missing	4.25	3.6	3.2	3.12
Father's place of birth[b]				
% Italy	81.16	82.09	83.03	85.93
% other country	18.84	17.91	16.97	14.07
N (100%)	584	564	383	334
% item non-response/missing	2.99	2.42	1.79	1.76
Language prevalently spoken at home[c]				
% Italian	47.2	48.28	56.79	59.32
% other language	52.8	51.72	43.21	40.68
N (100%)	125	116	81	59
% item non-response/missing	19.87	17.14	14.74	14.49
Mother's highest schooling degree[d]				
% elementary or less	2.37	2.26	1.85	0.9
% junior high school degree	20.14	20.35	18.78	20.06
% HS diploma (includes 3-years vocational degrees)	50.08	50.26	52.12	50.91
% college degree or higher (includes 3-years degrees)	27.41	27.13	27.25	28.35
N (100%)	591	575	378	334
% item non-response/missing	7.08	5.89	6.9	5.38
Father's highest schooling degree[d]				
% elementary or less	1.94	1.81	1.62	1.22
% junior high school degree	21.3	21.38	22.16	22.94
% HS diploma (includes 3-years vocational degrees)	50.35	50.91	50.81	50.76
% college degree or higher (includes 3-years degrees)	26.41	25.91	25.41	25.08
N (100%)	568	552	370	327
% item non-response/missing	5.65	4.5	5.13	3.82
Mother's working status[e]				
% works full-time	39.43	39.17	41.04	39.94
% works part-time	37.58	37.44	36.36	36.39
% does not work	22.90	23.40	22.60	23.67
N (100%)	596	577	385	338
% item non-response/missing	6.29	5.56	5.17	4.25
Father's working status[e]				
% works full-time	92.06	92.14	91.84	91.64
% works part-time	4.32	4.11	4.21	4.18
% does not work	3.63	3.75	3.95	4.18
N (100%)	579	560	380	335
% item non-response/missing	3.82	3.11	2.56	1.47
Mother's occupation[f]				
% stay-home mom	24.28	24.83	23.76	24.55
N (100%)	593	576	383	334
% item non-response/missing	3.93	3.27	2.46	1.98
Father's occupation[f]				
% blue collar	28.75	29.08	24.54	24.70
N (100%)	574	557	379	332
% item non-response/missing	4.65	3.63	2.82	2.35

[a]: Parents sample in wave 3 is conditional on families where the same parent or parents responded across waves.
[b]: Conditional on having one. Constructed from country of birth, using multiple measures from child and par/s.
[c]: Conditional on one or multiple family members being foreign-born; asked of child only.
[d]: Conditional on having one. Constructed from original question on educational attainment, using multiple measures from child and parent/s.
[e]: Conditional on having one. Constructed using multiple measures from child and parent/s.
[f]: Conditional on having one. Constructed from question on occupation, using multiple measures. Selected categories only.

Table 8: RESPONDING PARENTS' BACKGROUND CHARACTERISTICS

	Wave 1[a]		Wave 1 & Wave 3 (or 2)	
	Children Sample (N=649)	Parents Sample (N=619)	Children Sample (N=410)	Parents Sample[b] (N=353)
Responding mother's age				
mean	44.4614	44.4614	44.6712	44.6667
std. dev.	4.8075	4.8075	4.4908	4.4574
min	30	30	32	32
median	44	44	45	45
max	63	63	63	63
N (100%)	518	518	295	300
Responding father's age				
mean	47.6950	47.6950	48.8984	48.8626
std. dev.	5.9205	5.9205	6.3393	6.3023
min	28	28	31	31
median	47	47	48	48
max	73	73	73	73
N (100%)	318	318	128	131
Responding mother's place of birth				
% Italy	83.24	83.24	85.81	86.05
% other country	16.76	16.76	14.19	13.95
N (100%)	525	525	296	301
Responding father's place of birth				
% Italy	81.73	81.73	85.94	86.26
% other country	18.27	18.27	14.06	13.74
N (100%)	323	323	128	131
Responding mother's highest schooling degree				
% elementary or less	1.55	1.55	1.04	1.04
% junior high school degree	18.64	18.64	19.72	19.72
% HS diploma (includes 3-years vocational degrees)	50.68	50.68	50.52	50.52
% college degree or higher (includes 3-years degrees)	29.13	29.13	28.72	28.72
N (100%)	515	515	289	289
Responding father's highest schooling degree				
% elementary or less	1.89	1.89	0.79	0.77
% junior high school degree	21.45	21.45	24.41	26.15
% HS diploma (includes 3-years vocational degrees)	50.79	50.79	44.88	43.85
% college degree or higher (includes 3-years degrees)	25.87	25.87	29.92	29.23
N (100%)	317	317	127	130
Responding mother's working status				
% works full-time	39.65	39.65	40.96	40.94
% works part-time	37.72	37.72	36.18	36.24
% does not work	22.63	22.63	22.87	22.82
N (100%)	517	517	298	298
Responding father's working status				
% works full-time	92.26	92.26	90	90.23
% works part-time	4.02	4.02	5.38	5.26
% does not work	3.72	3.72	4.62	4.51
N (100%)	323	323	130	133

[a]: These statistics were constructed by matching responding parents' identity and parents' background characteristics.
[b]: Parents sample in wave 3 is conditional on families where the same parent or parents responded across waves.

Table 9: SAMPLE DISTRIBUTIONS OF AWARENESS PERCEPTIONS ABOUT CHOICE ALTERNATIVES ('KNOW' VS. 'HEARD OF' VS. 'NEVER HEARD OF') BY CURRICULUM, SAMPLE, AND RESPONDENT IN WAVE 1

	Wave 1 Sample			Wave 1 Matched with Wave 3[a]		
	Children					
	(N=642; missing=1.08%)			(N=405; missing=1.22%)		
	'Know'	**'Heard of'**	**'Never heard of'**	**'Know'**	**'Heard of'**	**'Never heard of'**
Aggregate	42.45	41.11	16.44	44.40	40.34	15.26
Gen, Art	51.56	44.24	4.21	51.60	45.43	2.96
Gen, Humanities	59.81	35.67	4.52	64.20	32.84	2.96
Gen, Languages	66.04	29.13	4.83	70.12	25.93	3.95
Gen, Math & Science	73.21	22.59	4.21	75.06	20.99	3.95
Gen, Music & Choral	31	44.70	24.30	29.14	47.90	22.96
Gen, Soc Sciences	35.36	46.42	18.22	37.28	46.42	16.30
Tech, Economic Sector	35.98	47.51	16.51	38.02	47.41	14.57
Tech, Technology Sector	42.68	43.61	13.71	45.93	40.99	13.09
Voc, Services	28.66	47.20	24.14	31.11	45.68	23.21
Voc, Industry & Crafts	17.60	46.11	36.29	18.27	45.93	35.80
Voc, Prof Training	25.08	45.02	29.91	27.65	44.20	28.15
	Parents					
	(N=610; missing=1.45%)			(N=335; missing=0.89%)		
	'Know'	**'Heard of'**	**'Never heard of'**	**'Know'**	**'Heard of'**	**'Never heard of'**
Aggregate	47.43	37.58	14.99	48.06	37.78	14.17
Gen, Art	50.66	38.85	10.49	51.34	38.51	10.15
Gen, Humanities	62.13	26.72	11.15	65.67	24.48	9.85
Gen, Languages	63.28	28.36	8.36	66.57	26.57	6.87
Gen, Math & Science	70.33	21.31	8.36	73.43	18.81	7.76
Gen, Music & Choral	26.07	49.02	24.92	25.67	51.04	23.28
Gen, Soc Sciences	43.61	39.84	16.56	44.78	40.60	14.63
Tech, Economic Sector	52.30	33.28	14.43	51.64	33.13	15.22
Tech, Technology Sector	50.82	38.52	10.66	49.55	40	10.45
Voc, Services	41.15	42.13	16.72	40.60	44.78	14.63
Voc, Industry & Crafts	29.84	44.10	26.07	27.46	46.57	25.97
Voc, Prof Training	31.59	51.23	17.18	31.94	51.04	17.01

[a]: Constructed from responses in wave 3. Wave 2 responses used for respondents who did not participate in wave 3.

Table 10: PREDICTORS OF CHILDREN'S PERCEPTIONS OF THEIR AWARENESS ABOUT CHOICE ALTERNATIVES ('NEVER HEARD OF' VS. 'HEARD OF' VS. 'KNOW') IN WAVE 1

Ordered Probit Regression of Awareness Reports about Curriculum:

Predictors	**Gen Art**	**Gen Hum**	**Gen Math**	**Gen Lang**	**Gen Music**	**Gen Soc Sci**	**Tech Econ Sect**	**Tech Tech Sect**	**Voc Serv**	**Voc Ind**	**Voc Prof Train**
female	0.4394*** (0.1279)	0.4801*** (0.1304)	0.5030*** (0.1378)	0.1373 (0.1433)	−0.0014 (0.1139)	0.2890** (0.1150)	0.0775 (0.1148)	−0.2223* (0.1165)	0.2941*** (0.1122)	0.1342 (0.1124)	0.3407*** (0.1122)
foreign born	−0.6107*** (0.2131)	−0.5482*** (0.2121)	−0.4639** (0.2173)	−0.5232** (0.2199)	−0.6331*** (0.2038)	−0.2339 (0.2009)	−0.1587 (0.2030)	−0.2613 (0.2031)	−0.2868 (0.2025)	−0.3821* (0.2057)	−0.4988** (0.2036)
lives with both parents	0.1428 (0.2122)	0.0808 (0.2232)	0.5533** (0.2613)	0.0936 (0.2472)	−0.2233 (0.1897)	0.0891 (0.1963)	−0.0138 (0.1970)	−0.2624 (0.1969)	−0.1339 (0.1920)	0.0346 (0.1929)	−0.2724 (0.1928)
mom has college+ degree	−0.2830 (0.1985)	0.4059* (0.2163)	0.7216*** (0.2225)	0.2696 (0.2285)	−0.0757 (0.1799)	−0.1565 (0.1843)	−0.4630** (0.1866)	−0.5131*** (0.1900)	−0.6350*** (0.1827)	−0.2564 (0.1836)	−0.3232* (0.1815)
mom has HS degree	−0.1779 (0.1695)	−0.0504 (0.1707)	0.1961 (0.1723)	0.1937 (0.1802)	−0.3332** (0.1538)	−0.0295 (0.1556)	−0.3379** (0.1587)	−0.2972* (0.1622)	−0.3870** (0.1552)	−0.0839 (0.1540)	−0.1696 (0.1544)
has stay-home mom	−0.2738* (0.1474)	−0.1012 (0.1530)	0.0755 (0.1584)	−0.0165 (0.1682)	−0.0963 (0.1375)	−0.1062 (0.1369)	−0.1956 (0.1380)	−0.2237 (0.1400)	0.0419 (0.1361)	0.0472 (0.1364)	−0.2728** (0.1365)
has blue-collar dad	0.1063 (0.1465)	0.0317 (0.1495)	−0.0410 (0.1547)	−0.1027 (0.1610)	−0.0360 (0.1335)	−0.1846 (0.1362)	−0.0116 (0.1374)	0.2628* (0.1421)	0.0976 (0.1361)	0.2360* (0.1352)	0.1369 (0.1360)
n of older siblings	0.1889** (0.0843)	0.0764 (0.0864)	0.1865** (0.0931)	0.0573 (0.0960)	0.1454* (0.0775)	0.1437* (0.0789)	0.0226 (0.0792)	0.0022 (0.0789)	−0.0187 (0.0766)	−0.0471 (0.0773)	−0.0410 (0.0766)
7th-grade GPA/grade	0.1813*** (0.0553)	0.2803*** (0.0791)	0.1054 (0.0811)	0.1702* (0.0912)	0.0859* (0.0501)	−0.0088 (0.0674)	−0.0643 (0.0681)	−0.0503 (0.0683)	−0.0925 (0.0566)	−0.0881 (0.0569)	0.0095 (0.0568)
curr. thought on own or discussed before wave 1	0.2526 (0.1648)	0.3111 (0.1999)	0.5459*** (0.1820)	0.5088* (0.1837)	0.7030*** (0.1493)	0.6928*** (0.1710)	0.9956*** (0.1791)	0.5565*** (0.1532)	0.4227** (0.1862)	0.5831* (0.3091)	0.8873*** (0.2853)
threshold 1	−0.5329 (0.4515)	0.4809 (0.6126)	−0.5345 (0.6355)	−0.4547 (0.6969)	−0.1834 (0.4311)	−0.9707 (0.5397)	−1.8176 (0.5522)	−1.9744 (0.5576)	−1.6514 (0.4679)	−1.0560 (0.4676)	−0.6500 (0.4647)
threshold 2	1.5079 (0.45044)	2.0794 (0.6192)	1.0290 (0.6337)	0.8373 (0.6935)	1.1250 (0.4334)	0.4548 (0.5397)	−0.3704 (0.5477)	−0.6036 (0.5521)	−0.2782 (0.4633)	0.3285 (0.4659)	0.6510 (0.4645)
LR $\chi^2(10)$	52.17	63.15	67.56	37.63	49	34.50	46.88	40.73	38.02	23.04	35.33
Prob $> \chi^2$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0106	0.0001
Sample Size	414	414	414	414	414	414	414	414	414	414	414

***: significant at 1%, **: significant at 5%, *: significant at 10%.

Table 11: PREDICTORS OF NUMBER OF ALTERNATIVES CHILD REPORTS BEING AWARE OF ('HEARD OF' OR 'KNOW') VS. KNOWING ('KNOW') IN WAVE 1

Mean Linear Regression of N of Alternatives Child:

Predictors	**'Knows' or Has 'Heard of'**	**'Knows'**
female	0.4144** (0.1836)	0.9285*** (0.2685)
foreign born	−1.3140*** (0.3252)	−1.1397** (0.4754)
lives with both parents	−0.3106 (0.3129)	0.1951 (0.4575)
mom has college+ degree	−0.8899*** (0.2955)	−0.2833 (0.4320)
mom has HS degree	−0.6302** (0.2496)	−0.2598 (0.3649)
has stay-home mom	−0.3701* (0.2212)	−0.2966 (0.3235)
has blue-collar dad	0.0473 (0.2190)	0.2426 (0.3202)
n of older siblings	0.1363 (0.1251)	0.1913 (0.1829)
7th-grade GPA	0.2214** (0.1087)	0.0139 (0.1589)
constant	8.1575*** (0.8692)	4.5155*** (1.2708)
$F(9, 404)$	4.40	2.32
Prob $> F$	0.0000	0.0148
R^2	0.0894	0.0492
Sample Size	414	414

***: significant at 1%, **: significant at 5%, *: significant at 10%.

Table 12: SAMPLE DISTRIBUTIONS OF AWARENESS PERCEPTIONS ABOUT CHOICE ALTERNATIVES ('KNOW' VS. 'HEARD OF' VS. 'NEVER HEARD OF') BY CURRICULUM, SAMPLE, AND RESPONDENT IN WAVE 3

	Wave 3 Sample[a]			**Wave 3 Matched with Wave 1**[a]		
	Children					
	(N=452; missing=3.21%)			(N=397; missing=3.17%)		
	'Know'	**'Heard of'**	**'Never heard of'**	**'Know'**	**'Heard of'**	**'Never heard of'**
Aggregate	61.54	32.95	5.51	61.67	33.46	4.88
Gen, Art	70.13	28.10	1.77	71.03	27.71	1.26
Gen, Humanities	77.43	21.02	1.55	78.84	20.15	1.01
Gen, Languages	78.54	20.35	1.11	80.60	18.39	1.01
Gen, Math & Science	84.73	13.50	1.77	85.89	13.10	1.01
Gen, Music & Choral	47.79	45.13	7.08	47.36	46.35	6.30
Gen, Soc Sciences	62.39	33.63	3.98	62.97	34.01	3.02
Tech, Economic Sector	55.75	39.16	5.09	55.16	39.80	5.04
Tech, Technology Sector	60.84	34.51	4.65	60.96	34.51	4.53
Voc, Services	49.34	40.71	9.96	47.86	43.07	9.07
Voc, Industry & Crafts	39.82	47.35	12.83	38.79	48.87	12.34
Voc, Prof Training	50.22	38.94	10.84	48.87	42.07	9.07
	Parents[b]					
	(N=402; missing=2.90%)			(N=330; missing=2.37%)		
	'Know'	**'Heard of'**	**'Never heard of'**	**'Know'**	**'Heard of'**	**'Never heard of'**
Aggregate	55.34	37.10	7.56	56.56	37.25	6.19
Gen, Art	59.70	37.31	2.99	61.40	36.47	2.13
Gen, Humanities	71.39	24.13	4.48	74.47	22.80	2.74
Gen, Languages	71.32	25.19	3.49	73.86	23.40	2.74
Gen, Math & Science	76.87	19.40	3.73	78.12	18.84	3.04
Gen, Music & Choral	38.65	48.38	12.97	40.12	48.94	10.94
Gen, Soc Sciences	53.23	37.31	9.45	54.10	37.39	8.51
Tech, Economic Sector	56.22	36.32	7.46	57.45	36.47	6.08
Tech, Technology Sector	56.61	37.16	6.23	58.36	36.47	5.17
Voc, Services	44.28	44.28	11.44	44.24	45.76	10
Voc, Industry & Crafts	40.15	47.38	12.47	40.12	49.24	10.64
Voc, Prof Training	40.30	51.24	8.46	40	53.94	6.06

[a]: Constructed from responses in wave 3. Wave 2 responses used for respondents who did not participate in wave 3.
[b]: Figures in parents sample are conditional on families where the same parent or parents respond across waves.

Table 13: SAMPLE DISTRIBUTIONS OF SUBJECTIVE POINT BELIEF (IN 0-100 PERCENT CHANCE) OF THE PROBABILITY OF PASSING BY CURRICULUM, SAMPLE, AND RESPONDENT IN WAVE 1

	Wave 1 Sample							Wave 1 Matched with Wave 3[a]						
	Children													
	(N in 543-471; missing in 16.33-27.43%)							(N in 354-305; missing in 13.66-25.61%)						
	Mean	**Std Dev**	**Q10**	**Q25**	**Median**	**Q75**	**Q90**	**Mean**	**Std Dev**	**Q10**	**Q25**	**Median**	**Q75**	**Q90**
Gen, Humanities	41.78	31.77	0	10	40	70	85	43.49	31.89	0	10	45	70	90
Gen, Languages	48.73	32.26	1	20	50	80	90	51.37	32.31	2	20	50	80	91
Gen, Math & Science	52.81	32.72	5	20	55	80	94	53.80	32.71	10	20	60	83	95
Gen, Art & Music	48.17	32.74	0	20	50	80	90	48.63	33.01	0	20	50	80	95
Gen, Soc Sciences	49.58	31.06	0	5	20	50	75	52.14	30.55	10	25	60	80	90
Tech, Economic Sector	52.66	31.20	10	25	55	80	95	54.35	31.62	9	30	60	80	95
Tech, Technology Sector	54.49	31.58	10	30	60	80	95	55.03	31.50	10	30	60	80	97
Voc, Services	55.25	33.07	5	30	60	85	100	55.75	33.31	4	30	60	85	100
Voc, Industry & Crafts	51.23	34.26	0	20	50	80	100	52.57	34.94	0	20	57	85	100
Voc, Prof Training	57.06	35.75	0	20	60	90	100	56.56	36.77	0	20	60	90	100
	Parents													
	(N in 463-401; missing in 23.59-35.22%)							(N in 264-222; missing in 21.89-34.22%)						
	Mean	**Std Dev**	**Q10**	**Q25**	**Median**	**Q75**	**Q90**	**Mean**	**Std Dev**	**Q10**	**Q25**	**Median**	**Q75**	**Q90**
Gen, Humanities	47.85	33.40	0	10	50	80	90	50.58	33.18	0	20	50	80	95
Gen, Languages	54.67	32.99	5	20	60	80	100	56.92	33.43	5	30	60	90	100
Gen, Math & Science	57.71	32.76	5	30	65	85	100	59.60	31.16	10	40	70	80	100
Gen, Art & Music	52.61	34.23	0	20	50	80	100	54.07	34.36	0	20	60	80	100
Gen, Soc Sciences	55.30	31.93	10	30	60	80	100	57.43	30.72	10	35	60	80	100
Tech, Economic Sector	54.78	31.88	5	30	50	80	100	56.16	32.05	10	30	60	80	100
Tech, Technology Sector	54.90	32.05	5	30	60	80	100	56.05	33.24	1	20	60	80	100
Voc, Services	60.61	32.98	5	40	70	90	100	60.92	33.85	1	40	70	90	100
Voc, Industry & Crafts	53.88	34.87	0	20	55	86	100	53.49	36.22	0	20	57	90	100
Voc, Prof Training	58.60	36.58	0	20	70	95	100	59.10	36.59	0	20	70	99	100

[a]: Constructed from responses in wave 3. Wave 2 responses used for respondents who did not participate in wave 3.

Table 14: SAMPLE DISTRIBUTIONS OF AMBIGUITY PERCEPTIONS ABOUT POINT BELIEF ('NO IDEA' VS. 'UNSURE' VS. 'SURE') OF THE PROBABILITY OF PASSING BY CURRICULUM, SAMPLE, AND RESPONDENT IN WAVE 1

	Wave 1 Sample			**Wave 1 Matched with Wave 3[a]**		
	Children					
	(N in 590-557; missing in 9.09-14.18%)			(N in 376-360; missing in 8.29-12.20%)		
	'Sure'	**'Unsure'**	**'No Idea'**	**'Sure'**	**'Unsure'**	**'No Idea'**
Aggregate	75.49	13.99	10.51	76.44	13.10	10.47
Gen, Humanities	74.32	17.12	8.56	76.20	14.97	8.82
Gen, Languages	77.53	14.75	7.72	79.84	13.44	6.72
Gen, Math & Science	75.17	18.49	6.34	76.74	17.11	6.15
Gen, Art & Music	77.63	15.08	7.19	77.13	15.16	7.71
Gen, Soc Sciences	74	16.64	9.36	74.32	16.49	9.19
Tech, Economic Sector	74.96	17.69	7.36	75	16.85	8.15
Tech, Technology Sector	77.07	13.58	9.35	77.38	12.53	10.08
Voc, Services	74.69	9.80	15.51	73.70	10.41	15.89
Voc, Industry & Crafts	75.31	8.23	16.46	77.62	6.91	15.47
Voc, Prof Training	74.15	7.90	17.95	76.39	6.67	16.94
	Parents					
	(N in 509-471; missing in 17.77-23.91%)			(N in 285-262; missing in 15.68-22.49%)		
	'Sure'	**'Unsure'**	**'No Idea'**	**'Sure'**	**'Unsure'**	**'No Idea'**
Aggregate	67.54	17.02	15.44	66.24	17.46	16.30
Gen, Humanities	69.15	18.75	12.10	67.26	19.93	12.81
Gen, Languages	73.04	18.51	8.45	71.53	19.93	8.54
Gen, Math & Science	74.20	18.80	7	72.14	19.29	8.57
Gen, Art & Music	70.14	18.27	11.59	72.28	16.49	11.23
Gen, Soc Sciences	65.63	19.17	15.21	63.77	20.65	15.58
Tech, Economic Sector	63.67	17.96	18.37	62.04	18.98	18.98
Tech, Technology Sector	64.69	16.94	18.37	63.31	18.71	17.99
Voc, Services	65.36	16.08	18.56	64.71	15.44	19.85
Voc, Industry & Crafts	63.91	13.80	22.29	61.65	13.16	25.19
Voc, Prof Training	64.97	11.46	23.57	62.98	11.45	25.57

[a]: Constructed from responses in wave 3. Wave 2 responses used for respondents who did not participate in wave 3.

Table 15: SAMPLE DISTRIBUTIONS OF SUBJECTIVE RANGES AROUND POINT BELIEF (MAX - MIN PERCENT) OF THE PROBABILITY OF PASSING CONDITIONAL ON 'UNSURE' REPORTS, BY CURRICULUM, SAMPLE, AND RESPONDENT IN WAVE 1

	Wave 1 Sample							**Wave 1 Matched with Wave 3[a]**						
	Children													
	(N in 58-25)							(N in 42-15)						
	Mean	**Std Dev**	**Q10**	**Q25**	**Median**	**Q75**	**Q90**	**Mean**	**Std Dev**	**Q10**	**Q25**	**Median**	**Q75**	**Q90**
Gen, Art & Music	21.87	18.28	8	10	20	25	40	20.14	16.55	5	10	20	25	30
Gen, Humanities	23.33	15.81	5	15	20	30	40	22.86	16.71	5	11	20	30	40
Gen, Languages	21.88	17.08	5	10	20	29	40	22.63	17.90	6	10	20	29	40
Gen, Math & Science	23.26	18.42	10	10	20	25	50	23.65	19.19	10	11	20	20	55
Gen, Soc Sciences	19.76	12.96	6	10	20	20	40	18.72	12.94	6	10	15	20	40
Tech, Economic Sector	25.44	22.17	6	10	20	30	70	26.42	23.85	10	10	20	30	70
Tech, Technology Sector	22.02	18.33	8	10	20	30	40	20.74	16.30	9	10	20	25	36
Voc, Services	24.54	23.04	5	12	19	25	60	24.00	23.10	5	10	18	25	60
Voc, Industry & Crafts	17.70	14.63	5	8	14	20	40	15.20	11.05	5	5	10	20	30
Voc, Prof Training	23.48	22.79	5	10	18	30	40	21.47	20.08	5	5	10	35	40
	Parents													
	(N in 63-31)							(N in 40-16)						
	Mean	**Std Dev**	**Q10**	**Q25**	**Median**	**Q75**	**Q90**	**Mean**	**Std Dev**	**Q10**	**Q25**	**Median**	**Q75**	**Q90**
Gen, Art & Music	32.00	19.35	20	20	20	40	60	30.87	18.01	15	20	20	40	50
Gen, Humanities	28.93	18.68	10	20	20	40	50	29.78	18.45	10	20	20	40	50
Gen, Languages	27.36	17.43	10	20	20	30	50	29.88	17.00	20	20	20	30	50
Gen, Math & Science	31.51	18.50	10	20	30	40	60	29.28	17.16	12	20	20	38	50
Gen, Soc Sciences	28.10	18.18	10	20	20	35	50	26.77	14.52	10	20	20	30	50
Tech, Economic Sector	39.81	24.94	15	20	30	50	80	37.62	23.06	15	20	30	50	60
Tech, Technology Sector	32.22	20.07	10	20	30	40	60	28.10	17.03	10	20	20	40	50
Voc, Services	36.17	22.32	10	20	32	50	70	33.15	21.58	10	20	20	40	60
Voc, Industry & Crafts	30.82	18.37	10	20	30	45	60	30.05	17.83	10	20	30	40	60
Voc, Prof Training	42.87	26.16	10	20	40	60	80	40.88	27.74	10	22	32	50	99

[a]: Constructed from responses in wave 3. Wave 2 responses used for respondents who did not participate in wave 3.

Table 16: PREDICTORS OF CHILDREN'S POINT BELIEFS (IN 0-100 PERCENT CHANCE) OF THE PROBABILITY OF PASSING IN WAVE 1

Mean Linear Regression of Child's Point Belief of Passing Curriculum:

Predictors	Gen Hum	Gen Math	Gen Lang	Gen Art/Music	Gen Soc Sci	Tech Econ Sect	Tech Tech Sect	Voc Serv	Voc Ind	Voc Prof Train
female	−0.3904 (2.7720)	−9.9732*** (2.4960)	2.1219 (2.6728)	2.6996 (3.0062)	−1.4633 (2.6503)	−3.8708 (2.7195)	−12.6098*** (2.7718)	0.6968 (3.0550)	−0.3646 (3.0684)	−0.1461 (3.2783)
foreign born	5.5062 (4.8489)	−4.1510 (4.4376)	10.8993** (4.5667)	6.0772 (5.1581)	−0.2409 (4.6343)	−5.1832 (4.9311)	−2.0442 (4.8662)	−2.7028 (5.4390)	0.9987 (5.4535)	−5.5562 (5.7644)
lives with both parents	0.3020 (4.6332)	0.9220 (4.2318)	2.4491 (4.3869)	3.2232 (4.8635)	−3.1317 (4.4464)	3.4697 (4.6611)	5.4771 (4.7026)	−0.4306 (5.1645)	7.0435 (5.2192)	2.8902 (5.5113)
mom has college+ degree	2.5239 (4.4053)	1.7202 (4.0281)	5.9158 (4.1667)	5.0108 (4.5835)	4.4773 (4.1841)	5.0789 (4.4138)	2.9847 (4.5043)	5.2585 (4.9789)	2.6368 (4.9811)	−3.3793 (5.2213)
mom has HS degree	−0.0399 (3.7006)	3.6821 (3.3834)	3.6437 (3.4934)	5.5602 (3.9223)	3.7593 (3.5274)	4.8878 (3.7227)	4.0710 (3.7532)	7.6281* (4.1605)	6.4758 (4.1982)	3.6273 (4.3967)
has stay-home mom	−2.0579 (3.2693)	−4.3130 (2.9982)	8.2376*** (3.0819)	4.5865 (3.4898)	0.3915 (3.1306)	2.0443 (3.2838)	1.0697 (3.3220)	0.1923 (3.6509)	1.2572 (3.6848)	2.5813 (3.9093)
has blue-collar dad	−4.8475 (3.2341)	−2.0761 (3.0023)	−5.2819* (3.0554)	0.5268 (3.3815)	−4.7257 (3.1054)	−3.2384 (3.2552)	0.7741 (3.3108)	1.9136 (3.6303)	−0.2506 (3.6653)	4.2690 (3.8758)
n of older siblings	−0.3560 (1.8564)	−0.3763 (1.6922)	−1.4926 (1.7566)	−0.8994 (1.9566)	0.3057 (1.7771)	0.9013 (1.8520)	3.6330* (1.8733)	1.2780 (2.0637)	1.6541 (2.0823)	2.3228 (2.2013)
7th-grade GPA/grade	13.7428*** (1.6712)	12.4881*** (1.5810)	12.8561*** (1.5432)	8.8692*** (1.4753)	13.2541*** (1.5504)	11.0582*** (1.6120)	10.9407*** (1.6284)	7.8185*** (1.8317)	11.3989*** (1.8264)	10.3459*** (1.9683)
curr. thought on own or discussed before wave 1	14.1747*** (3.6849)	21.8164*** (2.9284)	18.6188*** (3.0714)	14.1613*** (3.8090)	15.2164*** (3.7355)	10.3676*** (4.0068)	10.3791*** (3.4990)	14.4721*** (4.9127)	6.8933 (8.3690)	10.3133 (7.7627)
knows curriculum	1.2068 (7.9463)	−0.2764 (8.5375)	8.5411 (8.0118)	16.6096*** (4.2777)	10.1415 (4.0534)	8.3477 (4.2908)	14.7241 (4.4875)	9.0740** (4.3254)	8.6139* (4.5848)	11.9797*** (4.5194)
heard of curriculum	−2.4045 (8.0366)	−5.0082 (8.8967)	3.1398 (8.1342)	1.3654 (3.8084)	2.8047 (3.8904)	0.1502 (4.1670)	6.8932 (4.4494)	11.0887*** (3.8583)	5.7666* (3.3539)	9.0545** (3.9126)
constant	−64.5426*** (14.3755)	−43.1459*** (14.4937)	−66.3020*** (14.0502)	−49.8205*** (14.1514)	−59.3635*** (12.4914)	−38.1659*** (13.4042)	−20.8819 (14.8461)	−40.1682*** (13.6348)	−46.6537*** (14.8796)	−35.1262** (15.6970)
$F(12, 401)$	12.44	22.63	17.70	9.12	12.07	7	7.89	3.61	4.25	3.90
Prob $> F$	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R^2	0.2713	0.4037	0.3463	0.2424	0.2654	0.1731	0.1910	0.0975	0.1129	0.1046
Sample Size	414	414	414	414	414	414	414	414	414	414

***: significant at 1%, **: significant at 5%, *: significant at 10%.

Table 17: Predictors of Children's Ambiguity Perceptions ('no idea' vs. 'unsure' vs. 'sure') about Point Belief of the Probability of Passing in Wave 1

Ordered Probit Regression of Ambiguity Reports about Point Belief of Passing Curriculum:

Predictors	**Gen Hum**	**Gen Math**	**Gen Lang**	**Gen Art/Music**	**Gen Soc Sci**	**Tech Econ Sect**	**Tech Tech Sect**	**Voc Serv**	**Voc Ind**	**Voc Prof Train**
female	0.1875 (0.1461)	−0.0474 (0.1473)	0.2461 (0.1504)	−0.0159 (0.1509)	−0.1203 (0.1465)	−0.1508 (0.1405)	−0.1461 (0.1398)	−0.0005 (0.1401)	−0.0334 (0.1351)	−0.2450* (0.1378)
foreign born	−0.1832 (0.2462)	−0.2489 (0.2457)	0.1215 (0.2647)	−0.1304 (0.2452)	−0.2717 (0.2329)	−0.1992 (0.2364)	0.1516 (0.2554)	−0.1617 (0.2483)	−0.1648 (0.2329)	−0.1367 (0.2363)
lives with both parents	0.0156 (0.2454)	−0.1303 (0.2303)	−0.2961 (0.2308)	−0.1864 (0.2292)	−0.1299 (0.2365)	−0.2077 (0.2241)	0.1310 (0.2423)	−0.3266 (0.2249)	−0.2199 (0.2204)	−0.3588* (0.2172)
mom has college+ degree	0.1764 (0.2408)	0.0458 (0.2377)	−0.0730 (0.2397)	0.2737 (0.2221)	−0.1532 (0.2331)	−0.2287 (0.2259)	0.1179 (0.2209)	0.0975 (0.2303)	−0.0790 (0.2256)	−0.0592 (0.2195)
mom has HS degree	−0.1271 (0.2031)	0.0426 (0.2011)	−0.1648 (0.2029)	0.1862 (0.1907)	−0.1584 (0.2021)	−0.0074 (0.1965)	0.1443 (0.1885)	−0.0007 (0.1981)	−0.1390 (0.1935)	−0.0090 (0.1868)
has stay-home mom	0.2648 (0.1811)	0.2773 (0.1895)	0.1406 (0.1781)	0.2343 (0.1820)	0.0400 (0.1752)	0.0510 (0.1712)	0.1739 (0.1710)	0.1316 (0.1753)	0.1261 (0.1670)	−0.0110 (0.1650)
has blue-collar dad	0.2823 (0.1765)	−0.0507 (0.1761)	−0.0189 (0.1713)	0.0985 (0.1685)	0.0936 (0.1737)	0.0039 (0.1694)	0.1268 (0.1714)	0.0845 (0.1737)	−0.0558 (0.1638)	−0.0939 (0.1638)
n of older siblings	0.0107 (0.0986)	0.0456 (0.1024)	0.0401 (0.1004)	0.0004 (0.0985)	0.1154 (0.1029)	0.0196 (0.0964)	0.0363 (0.0953)	−0.0125 (0.0951)	−0.0555 (0.0909)	−0.1985* (0.0895)
7th-grade GPA/grade	−0.0071 (0.0886)	0.1120 (0.0929)	−0.0029 (0.0887)	−0.0166 (0.0736)	0.0490 (0.0650)	0.0417 (0.0628)	0.0459 (0.0611)	−0.1474** (0.0703)	−0.1236* (0.0681)	−0.0968 (0.0687)
curr. thought on own or discussed before wave 1	0.1792 (0.2093)	0.0375 (0.1747)	0.1902 (0.1817)	0.0093 (0.1913)	0.4293* (0.2409)	0.1344 (0.2177)	0.1120 (0.1804)	0.4802* (0.2692)	−0.6176* (0.3441)	0.0164 (0.3203)
knows curriculum	0.8744** (0.3522)	−0.3643 (0.5644)	0.8923** (0.3812)	0.2894 (0.2098)	0.5140* (0.2165)	0.2714 (0.2158)	0.5435** (0.2185)	0.3449* (0.2037)	0.2732 (0.2072)	0.2090 (0.1899)
heard of curriculum	0.7542** (0.3557)	−0.3890 (0.5837)	0.8358** (0.3892)	0.2086 (0.1835)	0.1628 (0.1975)	0.0159 (0.2039)	0.0951 (0.2080)	0.1645 (0.1711)	0.1297 (0.1469)	0.1112 (0.1620)
threshold 1	−0.7572 (0.7344)	−1.0220 (0.8924)	−0.5855 (0.7718)	−0.8091 (0.6791)	−0.7943 (0.5424)	−0.8330 (0.5537)	−0.3966 (0.5386)	−1.7803 (0.6033)	−1.8993 (0.5814)	−1.8136 (0.5788)
threshold 2	0.0827 (0.7345)	−0.3840 (0.8909)	0.0282 (0.7723)	−0.2073 (0.6787)	−0.3145 (0.5416)	−0.5059 (0.5531)	0.0324 (0.5382)	−1.6497 (0.6027)	−1.7097 (0.5805)	−1.6584 (0.5780)
LR $\chi^2(12)$	19.16	7.77	16.40	8.04	18.40	11.39	17.72	17.77	10.56	14.02
Prob $> \chi^2$	0.0847	0.8032	0.1735	0.8871	0.1041	0.4962	0.1244	0.1227	0.5671	0.2997
Sample Size	414	414	414	414	414	414	414	414	414	414

***: significant at 1%, **: significant at 5%, *: significant at 10%.

Table 18: PREDICTIVE POWER ON CHOICE OF CONTEMPORANEOUS CHILD'S POINT BELIEF ABOUT THE PROBABILITY PASSING

Probit Regression of Choosing Curriculum:

Predictors	Gen Hum	Gen Math	Gen Lang	Gen Art/Music	Gen Soc Sci	Tech Econ Sect	Tech Tech Sect	Voc Serv	Voc Ind	Voc Prof Train
point belief of passing prob.	0.0252*** (0.0085)	0.0124** (0.0052)	0.0170*** (0.0045)	0.0334*** (0.0099)	0.0116** (0.0052)	0.0028672 (0.0072)	0.0179*** (0.0054)	0.0095 (0.0075)	0.0579 (0.0356)	0.0079 (0.0079)
7th-grade GPA	0.4625* (0.2387)	−0.1897 (0.1682)	0.3496** (0.1462)	−0.4433** (0.2174)	−0.4632*** (0.1767)	−0.0914792 (0.2145)	−0.4345*** (0.1641)	−0.4258* (0.2552)	−2.2749 (1.9519)	−0.9549** (0.4422)
female	0.5781 (0.3879)	0.6477** (0.2891)	−0.7218*** (0.2401)	0.7904** (0.3830)	0.3951 (0.2955)	0.3971947 (0.3690)	−0.5009** (0.2550)	0.2962 (0.3951)	−2.0779 (1.4891)	0.0851 (0.4735)
foreign born	0.0103 (0.7713)	−0.5894 (0.6558)	−0.0222 (0.4825)	0.0837 (0.4995)	−0.5324 (0.5743)	0.2991232 (0.6902)	−0.0241 (0.5139)	–	3.8721** (1.7342)	0.3202 (0.7414)
mom has college+ degree	−0.5315 (0.5304)	0.0298 (0.4280)	0.7948** (0.3961)	−0.0939 (0.5646)	0.2059 (0.4688)	–	−0.9387** (0.4704)	–	–	–
mom has HS degree	−0.2246 (0.5009)	−0.1999 (0.3955)	0.4119 (0.3764)	0.0395 (0.4794)	0.0134 (0.3955)	−0.4116737 (0.3942)	−0.1317 (0.3505)	0.2296 (0.4710)	−1.8838 (1.3534)	−0.6335 (0.5178)
has stay-home mom	−0.0079 (0.4030)	−0.0543 (0.3379)	−0.2896 (0.2811)	−0.1987 (0.3868)	0.0331 (0.3365)	0.3774426 (0.3808)	−0.2434 (0.2982)	0.2215 (0.3812)	0.1413 (1.0726)	−0.1952 (0.4769)
has blue-collar dad	−0.5658 (0.6967)	−0.9683* (0.5426)	−0.4280 (0.3394)	0.9208** (0.3664)	0.4888 (0.3377)	−0.6820011 (0.5009)	−0.2005 (0.3259)	0.7578 (0.3994)	–	0.8674* (0.5085)
n of older siblings	−0.1102 (0.2451)	−0.1466 (0.2021)	0.0199 (0.1653)	−0.1735 (0.2288)	−0.0317 (0.1838)	−0.4441486 (0.3052)	0.1318 (0.1701)	0.4123* (0.2346)	0.9870 (0.8816)	0.1775 (0.2750)
constant	−6.9599*** (2.0549)	−0.5616 (1.3396)	−4.4489*** (1.1482)	−1.0965 (1.5534)	1.1217 (1.3295)	−0.6950806 (1.6442)	1.7051 (1.2169)	0.1703 (1.8145)	10.5607 (11.0071)	4.6503 (2.9750)
LR $\chi^2(9)$	31.28	20.69	61.20	30.41	16.47	8.36	34.94	13.70	28.22	21.24
Prob $> \chi^2$	0.0003	0.0141	0.0000	0.0004	0.0578	0.3993	0.0001	0.0567	0.0002	0.0065
Sample Size	193	193	193	194	191	133	193	124	100	135

***: significant at 1%, **: significant at 5%, *: significant at 10%.

Table 19: TRANSITION MATRICES ACROSS SURVEY WAVES OF CHILDREN'S AMBIGUITY PERCEPTIONS ('NO IDEA' VS. 'UNSURE' VS. 'SURE') ABOUT POINT BELIEF OF THE PROBABILITY OF PASSING–SAMPLE OF CHILDREN WHO RESPONDED TO EACH PAIR OF WAVES

Unconditional

		Wave 2			
		Sure	Unsure	No Idea	Tot
Wave 1	Sure	0.86	0.02	0.12	1
	Unsure	0.66	0.19	0.15	1
	No Idea	0.57	0.06	0.37	1

		Wave 3			
		Sure	Unsure	No Idea	Tot
Wave 2	Sure	0.87	0.02	0.11	1
	Unsure	0.68	0.17	0.16	1
	No Idea	0.47	0.03	0.50	1

		Wave 3			
		Sure	Unsure	No Idea	Tot
Wave 1	Sure	0.86	0.02	0.12	1
	Unsure	0.64	0.17	0.19	1
	No Idea	0.51	0.03	0.46	1

Conditional on Chosen Alternative

		Wave 2			
		Sure	Unsure	No Idea	Tot
Wave 1	Sure	0.92	0.02	0.06	1
	Unsure	0.77	0.19	0.04	1
	No Idea	0.72	0.14	0.14	1

		Wave 3			
		Sure	Unsure	No Idea	Tot
Wave 2	Sure	0.94	0.01	0.05	1
	Unsure	0.44	0.56	0	1
	No Idea	0.63	0.12	0.25	1

		Wave 3			
		Sure	Unsure	No Idea	Tot
Wave 1	Sure	0.94	0.01	0.05	1
	Unsure	0.68	0.22	0.10	1
	No Idea	0.33	0.11	0.56	1

Conditional on Alternatives Ranked at the Bottom in Wave 1

		Wave 2			
		Sure	Unsure	No Idea	Tot
Wave 1	Sure	0.83	0.01	0.16	1
	Unsure	0.67	0.33	0	1
	No Idea	0.57	0.10	0.33	1

		Wave 3			
		Sure	Unsure	No Idea	Tot
Wave 2	Sure	0.85	0.01	0.14	1
	Unsure	0.83	0.17	0	1
	No Idea	0.57	0	0.43	1

		Wave 3			
		Sure	Unsure	No Idea	Tot
Wave 1	Sure	0.81	0.02	0.17	1
	Unsure	0.83	0.17	0	1
	No Idea	0.68	0	0.32	1