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Unexpected Pathways Through Education: Why Do Some Students Not Succeed in School and What Helps Others Beat the Odds?

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Abstract

In this overview of Volume 64, Issue 1, of the *Journal of Social Issues*, we describe why it is important to consider the diversity of student pathways through time and in context and why it is important to focus particularly on youth who defy predictions. We describe the ways in which expectations are formed in statistical analysis and also in real-world education systems and how the structural rigidity inherent in such systems can lead to poor person–environment fit for young people in education or training and to misleading statistical analysis. Our intention is to move beyond analytic approaches that assume “one size fits all” while recognizing both that policy cannot provide fully individualized environments for everyone and that research cannot focus only on the unique characteristics of each individual. By focusing on individuals for whom our models typically do not apply, we highlight the value of research on complex but meaningful patterns of commonality among people, not in terms of the average person or effects, but in terms of coherent, distinct, and relatively homogenous subgroups of people experiencing systematic and consequential differences in their lives and lifepaths.

Education systems around the world are set up to support the progress of children through a series of increasingly sophisticated and demanding educational challenges that support the development of academic and technical skills. However, countries differ in terms of both their education systems and their wider social and structural pressures. For example, the impact of poverty, race, ethnicity, and gender varies within and across countries in terms of the kinds of educational risks and opportunities to which children are exposed (e.g., the percentage of age 15 math and reading achievement test scores explained by socioeconomic status [SES] has been found to be twice as great in the United States and United Kingdom as in Canada or Finland and nearly 3 times as great as in Japan or Korea (Organisation of Economic Cooperation and Development, 2004). Countries also differ in the age at which key choices have to be made (e.g., when to begin subject specialization), the extent of streaming or curriculum tracking at each age, the timing of the transitions between schools, and the extent of continuation in education or training after completion of primary or secondary education (e.g., high school graduation). Despite the diversity of these multilevel contexts, a wide range of normative and unexpected educational pathways is readily identifiable.

The articles in this issue consider the fundamental question of educational progress within the educational systems and cultural contexts of Canada, England, Finland, Sweden, Switzerland,

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and the United States. We do not focus on cross-cultural comparisons of the effects of different educational systems on the education progress of students at similar ages. Rather, the focus of these articles is on understanding a wide range of factors that promote or inhibit the educational progress of students of varying ages as they mature and pass through the different challenges that their respective environments pose for them. In particular, we are interested in factors that help account for why some students who appear to be on promising educational pathways fail to succeed and why other students, who appear to be at risk for failure, nevertheless go on to negotiate successful educational pathways.

The existence and nature of unexpected pathways are important issues in themselves but also call attention to a wider issue for social policy; namely, the dynamic interaction of persons and contexts in the formation of life chances and experiences. All the articles in this issue draw on individual-level longitudinal data to explore the complexity and diversity of these pathways through education during childhood, adolescence, or adulthood. Thus, the main focus of analysis is the person-in-context and the interactions among person factors and wider social systems. We assume that each of the observed educational pathways reflects dynamic interactions among several levels of complex personal and social systems (Eccles et al., 1993; Roeser, Peck, & Nasir, 2006). Developing youth of all ages are engaged in a series of mutual influences between their own developing agency, capabilities, and self-concepts and the material and social supports provided by their families, peers, neighborhoods, and schools. These person-context interactions are the centerpiece of the analyses in this collection of articles. Although different articles focus on different elements of persons or contexts, all the articles can be seen within a framework that emphasizes the bounded agency of the developing person, agency constrained and supported by the meso-level contexts that form the basis of their daily life such as homes and schools.

Although we assume that these features of children and their environments have strong influences on patterns of educational progress, we also believe that these influences are constrained heavily by macro-level systems. For example, educational progress for each individual is influenced by (a) available schooling choices that differ internationally as the result of educational policy decisions made at the national level, (b) economic and structural conditions such as labor markets and international trade and competitiveness, as well as (c) cultural and social differences between countries in terms of generally prevailing values and norms that influence students' choices through the impact of national media and other cultural forms. For example, the importance of age 14 school achievement in a national or regional education system that tracks children at age 15, as in Switzerland (Neuenschwander & Garrett, 2008), will be different than in a country with a less rigid, explicit tracking system such as the United States or United Kingdom. Yet, even in these less rigid systems, achievement at age 14 will still have relevance for self-concepts and other individual and contextual factors that may impact educational pathways.

In this sense, the macro-system moderates the functioning of the lower level systems. Some of these macro-level features will differ among children in the same country and even within the same school. For example, factors such as SES, ethnicity, and gender will often differentiate children within the same school context. Further, students within macro-systems will differ in how they react to the pressures and constraints of their national systems. Consequently, we expect there to be considerable variation in the kinds of pathways students follow both within countries, despite the relative homogeneity of their cultural and education systems, and between countries due to substantial heterogeneity in the cultural and educational factors impinging on developing youth. Despite the variety of national contexts studied and the focal points for the analyses, one of the common themes across the articles in this issue is the evidence of person-context interactions influencing developmental outcomes.

The bulk of within- and between-country variation in educational pathways will appear as normative development that follows the typical pattern: Positive educational outcomes follow from sufficient capabilities and supports, and negative educational outcomes follow from insufficient capabilities and supports. Yet, within each country, there will be some students who forge positive educational pathways despite adverse conditions and other students who flounder educationally despite environments or capabilities that would lead us to expect them to achieve positive educational outcomes. These “unexpected” cases are interesting because they represent individuals who did not follow a predicted direction at key turning points, calling for further analysis of the questions: (a) Why? and (b) What are the long-term consequences? These are important, yet often neglected, research questions for developmental and social scientists studying patterns of educational achievement. However, as discussed below, these are also important, yet often neglected, policy questions.

One might see these unexpected turning points as evidence of resilience or vulnerability. An individual or organization that forges ahead despite apparent adversity may be providing evidence of resilience. However, as discussed below, the deviation from a predicted trend may in fact be due to measurement error or analytical misspecification. There are weaknesses associated with ascribing deviation from statistical prediction to features of individuals and contexts. This highlights the importance for policy and practice of a sound methodological and conceptual base. If the methods by which evidence is developed are not soundly understood then inferences and implications will be erroneous. These concerns bring issues of methodology further to the fore than is often the case; hence, they motivate much of the ensuing discussion as well as much of the content found in this collection of articles. Before elaborating on these methodological concerns, we first describe the themes that both unite and divide the articles in this volume.

Themes

All of the articles in this volume draw on data sets that include information about youth over time and about one or more of the contexts with which they interact. Predictions about likely educational pathways can be made on the basis of information from different sources. One might make a prediction from what is known about the developing youth, from what is known about one or more contexts, or from interactions among these elements. The articles differ in terms of the sources to which they look for the unexpected turn away from a prediction. One set focuses on how features of the individual explain the deviation from a prediction that one would have made on the basis of other information about the context, development, and institutional memberships of the individual. A second set focuses on how features of particular social agencies such as families and schools (i.e., meso-level contexts) are important in explaining unexpected turnings. Some of the articles in this set focus on the family context as the source of deflection; others consider how a period of engagement in wider social institutions such as schools, adult learning, and extracurricular activities can impact on educational pathways. The final set of articles explores various complex multiplicities of factors that may be important in the formation of educational pathways, emphasizing our general theme of heterogeneity by highlighting that there is no single factor, level of analysis, context, or construct that fully determines an individual’s educational pathway.

Theme 1: The Person as the Source of Deflection

The first set of articles focuses on the person as the source of deflection from the expected outcome. Neuenschwander and Garrett (2008) consider the impacts on self-concept and well-being of students passing through the highly structured educational transitions of the Swiss school system. The deviation of students from the pathway predicted by prior grades and track can be explained by expectancies and values. It is always worth reminding policymakers and nonpsychologists of the importance of these personal factors. However, the article also finds

that the unexpected deviation by the student from a normative pathway that has been set out for him or her brings a level of risk and uncertainty for the student that can lead to negative repercussions for student well-being in a school system for which such behavior creates challenges.

Janosz, Archambault, Morizot, and Pagani (2008) use growth mixture modeling to group participants in a large sample of Quebec students according to their trajectory of school engagement from ages 12 to 16. The majority of the students are classified into stable trajectories of engagement that are described as normative. Those in nonstable trajectories are found to be at much greater risk of dropping out of school, whether the trajectory is increasing or decreasing. Thus, instability in engagement is identified as a risk factor for drop out. The probability of drop out was 3% on average for the sample but 42% for those with engagement trajectories described as “transitory increasing” and 35% for those with “decreasing” trajectories.

In a Finnish sample, Kokko, Pulkkinen, Mesiäinen, and Lyyra (2008) model the role of pathways of educational participation from ages 8 to 42. They distinguish four educational pathways based on the duration and timing of educational participation in adulthood and highlight a group who return to education “off-time”; that is, after an extended period following the completion of secondary schooling (i.e., “comprehensive school”) during which most people who pursue education have already enrolled in and completed their college education. This group is distinct from those who also left school at the earliest opportunity but who did not return. There were particular benefits for women in the “off-time” group in terms of increasing optimism between ages 27 and 42. However, this study again shows some risk to the emotional well-being of individuals who followed the nonnormative (i.e., off-time) educational pathway.

These three articles, thus focus attention on the importance of stability and change in educational pathways for subsequent outcomes, above and beyond any impact of a measurement at a particular time. The clear implication is that educational theory and social policy would benefit from tracking risk and protection over time, taking explicit account of the substantial discontinuity that exists in human development, and responding constructively to it, rather than making excessively rigid judgments based on normative snapshots at particular times that may be important in the organization of schools and colleges but have less resonance or importance as developmental moments in the lives of students.

Theme 2: Meso-Level Sources of Deflection: the Family and Wider Social Institutions

The four articles in this set consider in more detail how meso-level contexts such as families, schools, or out-of-school contexts might impact educational pathways. These articles consider not just the impact of these institutions, as observed implicitly in the articles in theme 1, but also both the processes and pathways involved in these impacts. Thus, the focus here is on how wider social institutions and contexts might influence resilience or deflection in lifespan development.

Englund, Collins, and Egeland (2008) form prediction models for dropping out of high school based on academic achievement and behavior problems at ages 12 and 16. They show that the error in these models includes a substantial element of variation that can be explained by much earlier parent–child relationships (at 22 and 42 months). There may be important sleeper effects associated with early childhood relationship quality that do not manifest as strongly during middle childhood as they do during the later stresses of adolescence. It may also be that the earlier measures of parent–child relationship quality are proxies for aspects of the parent–child relationship that are also manifest but unmeasured around the time of high school drop out. These possibilities highlight again the importance of understanding diverse pathways of

development, recognizing the complex timing of interactions between persons and contexts that produce these pathways, and developing high-quality longitudinal data sets to study them.

Using a cohort born in the United Kingdom in the late 1990s, Melhuish et al. (2008) demonstrate that the early home-learning environment can be critical in predicting which of our youngest students will progress well from school entry to age 7 and which will not progress so well. The authors trace through the implications of the home-learning environment not just for families but also for personnel in preschools who can help families provide appropriate home-learning experiences. There is considerable on-going debate in the United Kingdom about the relative importance of distal factors such as SES or income and proximal factors such as the home-learning environment. The authors of this article are substantial contributors to this debate, in which their theory and data have had a major influence. They focus on unexpected pathways to highlight the importance of the home-learning environment, above and beyond the effects of SES.

In a second article from the United Kingdom, Feinstein and Vignoles (2008) consider the importance of participating in higher education (HE) for the lifecourse development of members of the 1970 British Cohort Study, a nationally representative birth cohort. The focus is on heterogeneity of the background resources and childhood capabilities of the study participants. The authors show that the effects of HE may be very different for different individuals, depending on whether their HE participation is normative or nonnormative. On average, mental health problems were less likely to be reported in adulthood (age 30 years) for those who participated in HE than for those who did not. However, among those of average childhood capability and from low-income family backgrounds, HE participants were much more likely than nonparticipants of similar childhood capabilities and backgrounds to report mental health problems. Thus, the average finding disguises important differences between subgroups of the population.

From U.S. data, Peck, Roeser, Zarrett, and Eccles (2008) use a mixture of variable- and pattern-centered analyses to describe the family contexts and personal capabilities of youth on educational pathways from approximately 14 years (end of eighth grade) to ages 19 or 21 (i.e., 1 or 3 years after this cohort's normative graduation from high school at age 18). The chances of following the normative pathway to college depend on eighth-grade *lifespace configurations* defined by the intersections between profiles of family, peer, and school context factors and profiles of academic motivation and mental health factors. Beyond the impact of these configurations, they show that different 11th-grade activity profile patterns (e.g., more or less time spent in sports vs. school clubs vs. hanging out with friends) can substantially alter the chances of the most vulnerable youth following a normative (i.e., no college) versus unexpected (i.e., college) educational pathway, independent of the total amount of time engaged in positive activities. For example, vulnerable youth who subsequently engaged in positive extracurricular activity patterns were about 3 times more likely to go on to college than vulnerable youth who did not.

The articles in theme 2 show that social institutions such as the family, college, or out-of-school activities afford risks and opportunities that interact with individual characteristics to influence educational pathways and associated lifespan developmental outcomes. Tracking schemes and educational or vocational pathways that omit such contextual information fail to adequately represent and support students and risk misestimating and misclassifying capability.

Theme 3: Multilevel Sources of Deflection

Three articles are hard to classify in terms of a specific focus on a particular context or level of analysis because they focus on interactions among the complex multiplicity of factors that are likely to be important in the formation of educational pathways. This focus is important

because although different analysts and policy experts may wish to emphasize the role of specific features of the person's own agency or of the family environment or other intervention contexts, it is always useful to be reminded that pathways and outcomes are rarely the result of a single factor or single set of factors. Thus, just as there is no single magic bullet or policy intervention that will address all the concerns that may require intervention for all people in any circumstances, so there is also heterogeneity in both the salience of potentially important features of context for any individual requiring support from his or her environment at a particular time of need and the particular configurations of self and context factors that may lead to social need and intervention.

Trost and El-Khoury (2008) highlight the use of pattern-centered approaches by identifying homogeneous subgroups of Swedish females characterized by different profiles of academic competence and internalizing and externalizing problem behaviors at three points in time, ranging from childhood to middle adulthood. They then link these profiles across time to distinguish between structural- and individual-level stability and change in educational pathways and to show how these pathways vary as a function of the interdependent relations between academic competence and problem behavior. Despite substantial amounts of individual-level profile stability within normative pathways across 33 years, they also identify several different kinds of unexpected educational pathways. They focus their analysis on an unexpected pathway characterized by persistently low levels of both academic competence and problem behavior and show that, in contrast to females whose low academic competence was coupled with higher levels of problem behavior, the "low-low" females managed to achieve unexpectedly high levels of SES by age 43.

Pagani et al. (2008) use a Quebec sample to show some striking relations between childhood personal and family risk factors and the likelihood of high school drop out by age 21. Using only three measures (maternal education, family configuration, and middle childhood school failure), they form subgroups of high and low risk. For the highest risk group, with problematic ratings on all three measures, graduation rates are zero for males and slim for females. Thus, at least some of these multivariate person-in-context risk profiles during childhood are highly predictive of educational pathways into early adulthood. This high level of predictive power comes from grouping context measures with child factors. When this is done, a tremendous amount of prediction accuracy is possible from only three measures. This also suggests high levels of structural stability in life chances in Quebec, where there appears to be minimal social mobility or preventive success in the education system for those at highest risk. Pagani et al. also find that, for the lowest risk group, high school graduation is not assured and attention-related problems in childhood predict this unexpected educational pathway.

Messersmith and Schulenberg (2008) focus on young adults who either do or do not fulfill their high school expectations for college graduation. Many factors predicted both positive and negative unexpected educational pathways. Effect sizes and even the direction of effects are found to be different depending on the type of deviation considered: failure to graduate for those who expected to graduate, or graduation for those who expected not to graduate. For example, skipping school was negatively related to graduation for those who expected to graduate and positively related to graduation for those who expected not to graduate. This pattern of findings highlights the complexity of relations and developmental sequences underlying manifest developmental phenomenon such as skipping school and how its importance for subsequent outcomes is questionable where considered out of context.

Methodological Issues

Forming Expectations

In order for a pathway to be classified as unexpected there must also be an a priori expectation. Researchers, policy systems, educators, and other practitioners and young people in education systems all form such expectations. In this set of articles, we make these expectations the frame of analysis and explore what happens when expectations are not met. Students whose educational pathways do not conform to predictions can motivate scientists to consider why their theoretical and empirical models failed in these cases. There are also lessons for policymakers, educators, and young people themselves.

As commonly applied, simple ordinary least squares (OLS) regression tends to stop at the point at which an estimation model has led to a typically linear prediction of the dependent variable by independent explanatory variables (e.g., high school graduation being predicted from parents' SES and youths' grade point average). This standard approach to predicting behavior accepts that the prediction model will include a substantial amount of "error" and that the substantive conclusions drawn from this model will be based firmly on the line of prediction (generated by estimated coefficients that represent average relationships among the variables included in the model). The "line of prediction" corresponds to the "expectation" of the prediction model.

Similar assumptions about expectations and errors apply to structural equation modeling that commonly assumes an equal degree of correlation between all measures for all people, or all members of a fairly general subcategory such as Hispanics, females, and so on. The partial correlations, which are the bones of a structural equation model, obscure the errors that are more apparent in OLS approaches that consider only one dependent variable and assume all other variables to be independent (though not necessarily orthogonal).

In much of mainstream economics, the concern has recently been with evaluation methodology and the attempt to ensure that the estimated coefficients in a linear function are accurate as expressions of the impact of one variable (say, A) on another (B) such that we could be confident that if we could create the same effect on variable A by a policy intervention as in the context in which the data were measured then we would realize the same impact on variable B as predicted by the regression equation. This approach can be valuable for thinking about policy interventions in advance but works best when we know the context within which the variables were measured and in which the policy is to happen. Off-diagonal or unexpected cases can be very helpful for identifying and understanding important features of such contexts.

The approaches used in this issue go a step further than standard variable-centered approaches by explicitly investigating cases (people) that deviate from the prediction model. We are concerned with cases that differ from the average case and, specifically, with cases characterized by a high degree of prediction error (from the point of view of the given model). By focusing on these cases, analysts can explore other factors that might help explain the unpredicted patterns by, for example, returning to theory to select additional variables to include in the estimation process. In this sense, the approach is akin to step-wise regression analysis in that richer estimation models are built up by adding more predictor variables to the model. However, approaches taken in this issue go further by (a) identifying the specific cases for which these additional factors are particularly salient and (b) observing subsequent outcomes for these cases. This focus on "cases" (i.e., people) as the units of analysis highlights the prevalence and forms of heterogeneity across individuals within study samples that typically "gets lost" in the error term of variable-centered prediction models. This approach is similar to standard null hypothesis falsification methodology except that the falsifying cases,

rather than being outliers that do not matter except in disturbing the estimation process, become the focus and motivation for theory development and model building.

In statistical terms, our approach is abstract but becomes concrete when applied to a particular research question (regardless of the extent to which that question might be framed more in psychological, economic, or sociological terms). For this reason, it is important that the specific definition of what constitutes an unexpected case in each study be clearly specified. All the articles in this issue focus on unexpected educational pathways yet, reflecting the variety of interests of this international group of authors, each differs in how the unexpected pathways are defined and examined in relation to other factors.

In the articles included here, there are two general ways in which the authors define the unexpected cases. The first way is in terms of a single factor that describes a particularly important contextual feature for the individual moving through the available set of educational pathways. For example, two articles define unexpected pathways as those which deviate from the academic/vocational track that one would have predicted on the basis of the prior school track. Neuenschwander and Garrett (2008) consider the transitions of Swiss adolescents to secondary school and postsecondary school; and in their study of educational progression in Finland, Kokko et al. (2008) define unexpected pathways as the return to postcompulsory education later in adulthood, after a period out of education.

Messersmith and Schulenberg (2008) use a different focus to define the unexpected pathways in their U.S. study on graduation from college. They define the unexpected pathway as that of students whose educational pathway differs from their own 12th-grade expectation of college graduation. The other articles in this volume all define unexpected pathways on the basis of deviation from a trajectory predicted by a statistical model. There are differences in the type of modeling used, but all these articles form a statistically based prediction to define an expected outcome on the basis of personal and contextual characteristics.

Whether or not students' expectations for educational attainment are confirmed should have important implications for their development more generally. The study by Messersmith and Schulenberg (2008) explores these implications and considers systematic relations between a variety of background factors (e.g., high school academic performance and parents' education) and the form of the unexpected pathway (e.g., graduating from college despite earlier expectations to the contrary, and failing to graduate from college despite earlier expectations of graduation). Similar deflections occur in relation to the institutionally established normative pathways explored in the Neuenschwander and Garrett (2008) and the Kokko et al. (2008) articles. However, when the "error in expectations" is the result of the form of the statistical model, these errors have a different impact on our understanding of educational pathways and, ideally, prompt analysts to consider carefully the source of these errors, or why there were deflections from the expected pathways.

Errors in Expectations

The core focus of these articles is not on the prediction itself, however formed, but on what can be learned by examining the deviation from this prediction, particularly by focusing on those people who made the "unexpected" deviation from prediction. These unexpected cases may result from a range of factors that include (a) methodological issues such as measurement error, model misspecification, and confounding bias; and (b) substantive factors germane to the individual or their context such as resilience, developmental discontinuity, or social support that may be unknown to the analyst of longitudinal data and to the adults and agencies responsible for guiding young people through education systems or for providing and funding those systems.

When a statistical model is used to form a prediction of a pathway that turns out to be inaccurate, a prediction error has been identified. It is useful to think about three general forms of such error: (a) randomness, (b) model misspecification, and (c) measurement problems.

The existence of random events can be critical for understanding and explaining unexpected turning points across the lifespan (cf. Bandura, 1982). Although these random events may have some underlying, unobserved, or unobservable systematic elements, they nevertheless arrive in the lifespan of individuals with a nonsystematic degree of chance or “unexpectedness” in terms of the knowledge, plans, and information available to the individual. Thus, in terms of our concern with accurate statistical forecasting, randomness means that some individuals will achieve an outcome that was not forecast because unexpected and unpredictable events or personal changes intervened.

The concept of model misspecification encompasses a wide variety of theoretical and statistical concerns such as choice of estimator, linearity assumptions, missing variables, and unobserved sample heterogeneity, each of which can produce some degree of error in prediction. These specification problems can be viewed as sources of estimation bias, or systematic error in prediction. Measurement issues such as low reliability and attrition can also lead to errors in prediction.

In many of the articles in this volume, we highlight pathways that are unexpected relative to a specific statistical modeling prediction. Although we are mindful that such foregrounding may emphasize cases that have been misclassified because of measurement error or other methodological weaknesses, our underlying focus on errors of prediction, and the reason why we have pursued this focus in these articles, is based on our belief that many deviations from predicted pathways are signals that important information is missing. These signals may turn out to be associated primarily with random events, but we will only know this by focusing our analytical tools on them (and the people they represent) and exploring their meaning.

Related to this concern is the sense that, just as in terms of policy and practice, one size does not fit all, so in statistical terms average relations between measures can mask underlying patterns of continuity and discontinuity that occur for specific subgroups of people. Specifically, underlying the average relations among variables may be forms of individual heterogeneity that make specific configurations or patterns of relationships among variables relevant and meaningful for some individuals but not for others (Bergman, Magnusson, & El-Khoury, 2003; Richters, 1997). The cases that are “misclassified” should provide clues about this underlying structural heterogeneity because these are the cases that differ most from the average.

The Importance of Interactions and Heterogeneity

In line with our concerns about accurately modeling the dynamic interactions between persons and contexts, the advantage of using the diverse array of approaches adopted here is that they enable a focus on the interaction between different features of the models and bring out particular sets of interactions that are hard to bring out in standard regression models through the use of interaction terms. For example, it can be misleading to focus on mean effects in a regression model in the presence of higher order interactions (such as age*gender or ethnicity*age*gender or ethnicity*SES*age*gender) because the parameter estimates used to indicate these effects can vary widely in magnitude and direction across subgroups. In addition, data associated with designs that imply complex interactions rarely contain sufficient cell sizes and multivariate-normal distributions to estimate such interaction terms with statistical confidence. Even where such statistical support is present, interaction terms are a weak mathematical approximation to the complexity of the dynamic processes of real interaction between persons and contexts that they are often used to represent. Where interaction terms

include continuous measures, the problem can be exacerbated and interpretation can become a conceptually impossible task. Nevertheless, without knowledge of these higher order interactions, it is hard to get a convincing picture of the task of the individual in negotiating the journey into adulthood.

These interactions are important because they tend to reflect the deeper structure of the pathways individuals take through multiple, multilevel contexts across the lifespan. Within this deeper structure, we identify subsets of individuals for whom key factors are configured or linked in ways that differ qualitatively from the configurations characterizing individuals who conform to the linear expectations implied by the model. The approaches adopted here focus on higher order interactions in a way that brings out the complexity of individuals' lifespaces and enables an interesting and informative consideration of the heterogeneity of individuals' educational pathways.

The overarching principle that guides this work is that appropriately applying statistical procedures based on the general linear model depends heavily on satisfying the assumption of sample homogeneity (Lindley & Novick, 1981; Richters, 1997). The articles in this issue vary in the extent to which they adequately address the homogeneity assumption, but the explicit identification and analysis of at least one relatively homogeneous subgroup (defined in terms of individuals characterized by unexpected educational pathways) reflects our collective commitment to take seriously the idea that the educational pathways of different people in different contexts are likely to be understood best when considering how complex interactions among variables imply different causal dynamics for different subgroups of people. In other words, complex interactions at the sample level tend to mask the ways in which predictor variables come together in qualitatively different ways for different subgroups of people.

Methodological Diversity

The purpose of this collection of articles is not to provide converging evidence about a narrowly defined research question related to substantive factors associated with unexpected educational pathways; rather, as discussed above, our purpose here is to examine (a) various ways of identifying individuals who follow unexpected educational pathways, broadly defined; and (b) potential causes and consequences of these unexpected expected educational pathways. In these terms, the common "question" addressed across these articles relates less to a specific substantive hypothesis and more to a general methodological question; specifically, to what extent is the diversity of available methodological approaches useful (scientifically and practically) for addressing questions about unexpected forms of individual development?

The apparent answer, given the content of these articles, is that there are a wide variety of approaches that *can* be usefully applied to questions about unexpected forms of individual development. However, successfully using these methods depends largely on assumptions made about both the methods and the questions to which they are applied. For example, applying a variable-centered method such as linear regression to the examination of unexpected pathways may require abandoning the assumption that the "line of prediction" adequately represents the development of either the majority of people in a given sample or even any given person in the sample. Similarly, addressing research questions about unexpected developmental pathways may require abandoning assumptions about both normative development and methods suitable for examining development more generally. For example, it may be misguided to assume either that (a) the concept of normative development is necessary or sufficient for understanding individual developmental pathways or (b) statistical methods based on the general linear model are necessary or sufficient for understanding individuals who follow unexpected developmental pathways. It is in this spirit of "questioning assumptions" that the diversity of methods used by the authors in this volume are brought to bear on the many possible natures, causes, and consequences of unexpected educational pathways.

Finally, the set of methods used by the authors in this volume highlights two important but often-neglected issues associated with methodological diversity: the distinction between persons and variables and the related issue of dealing with multiple “levels of analysis.” First, despite the increasing popularity of so-called person-centered methods, and the tendency to draw stark distinctions between “person-centered” and “variable-centered” methods, the diversity of methodological approaches used in this volume reminds us that these are not necessarily separate approaches that can be easily dichotomized in an either/or fashion. The prolific use of this often-false dichotomy suggests the need for some kind of higher order synthesis of the concepts of person- and variable-centered methods that better reflects the fact that one rarely exists without the other. Although most researchers appear to assume the importance of both the individuals (i.e., persons) and some subset of attributes characterizing these individuals (i.e., variables), the methodological approaches applied to the study of people and variables rarely reflect a viable balance between these assumptions. In other words, there seem to be some unresolved issues about how to best understand and utilize the joint contributions of variables and people to our understanding of human experience and development.

This somewhat ambiguous set of issues can be organized in relation to the following multiple-choice item (adapted from Kluckhohn & Murray, 1948, p. 35): Every person is in some respects (a) like all other people, (b) like some other people, (c) like no other person, or (d) all of the above. Despite the obvious answer (i.e., “d”), statistical approaches based on the general linear model tend to assume “a” (i.e., the units sampled from the population are homogeneous with respect to the dynamic properties of the system being studied). This means, for example, that variables used to reflect properties of the system being studied are generally assumed to be relevant for everyone in the sample (e.g., every person gets a score on every scale). Clinical case studies, on the other hand, tend to assume “c” (i.e., that each person is unique and that understanding his or her experience and behavior requires attending to these unique details). This means, for example, that some people get no “scores” on some variables because those variables are assumed to be irrelevant for these people. Somewhere between these nomothetic (i.e., “a”) and idiographic (i.e., “c”) extremes, we find “idiothetic” approaches (cf. Lamiell, 1981) that are based on the assumption that people are unique, but that there are a relatively small number of homogenous subgroups of people within any given sample that are similar enough (i.e., “b”) for us to discover laws that are both specific and generalizable to these “types” of people. This means, for example, that some people might get scores on all variables whereas others might get scores on only a subset of variables and that such diverse sets of scores can, nevertheless, be used to further the study of human experience and behavior more generally. In these terms, the various methods used by the contributors to this volume can be viewed as a collective effort to move toward the idiothetic ideal by integrating variable- and person-centered approaches in a way that balances their respective strengths and weaknesses.

The second issue highlighted by the various methods used across these articles can be treated as a “levels of analysis” issue. From this perspective, the focus on people versus variables as units of analysis can be construed as emphasizing, respectively, individuals versus groups of individuals. In the simplest case, treating whole individuals as the unit of analysis is the defining feature of person-centered methods, and treating variables as the unit of analysis is the defining feature of variable-centered methods. This focus on variables in variable-centered methods, together with the homogeneity assumption upon which it is based, translates into a focus on group-level phenomena (e.g., average effects). For example, variable-centered approaches to interindividual differences refer to group-level phenomena to the extent that an individual’s score on a variable gets its meaning as a function of other people’s scores on the same variable (Magnusson, 2003). In contrast, person-centered approaches to intraindividual differences refer to individual-level phenomena to the extent that an individual’s score on a variable gets its meaning as a function of the same individual’s score on different variables (Magnusson,

2003). Further, variable-centered methods generally lead to conclusions about members of samples and populations in general, whereas person-centered methods generally lead to conclusions about specific subgroups within samples and populations.

Notwithstanding these distinctions between variables, individuals, and groups, researchers using both variable- and person-centered approaches tend to overlook the full range of “levels” implicated by the study of human development in context (Peck, 2007). For example, variable-centered methods tend to treat (a) attributes that exist as parts within individuals, (b) individuals as a whole, (c) individuals that exist as parts of larger social groups, and (d) attributes of social contexts as if they all existed at a single level of analysis. Statistical approaches to modeling so-called multilevel data (e.g., where units of measurement at one level are aggregated statistically to form units of measurement at another level) address some of the issues associated with multilevel systems but tend to neglect many others. For example, these approaches commonly assume a unidimensional multilevel system such that “lower-level” units are nested within “higher-level” units (Bryk & Raudenbush, 1992). However, the natural world does not appear to be so neatly organized. For example, rather than being nested within a simple linear hierarchy (e.g., micro, meso, macro), operating characteristics existing at multiple levels of the social context appear also to exist and function as parallel distributed systems (i.e., heterarchically) (Peck, 2007).

Even though treating personal and contextual factors as if they are nested hierarchically is a step in the right direction relative to the traditional approach of collapsing across such levels, the development and application of so-called person-centered approaches highlights some of the inherent limitations of these variable-centered approaches by drawing attention to both (a) distinctions between variables, people, and groups and (b) consequences of ignoring the heterogeneity among sampled units. Nevertheless, dealing adequately with the full range of multilevel systems seems to require expanding the concept of person-centered approaches in terms of the more broadly relevant concept of *pattern-centered* approaches (Peck & Roeser, 2003; Peck, 2007; Peck et al., 2007). These approaches assume the existence of both (a) heterarchically configured multilevel person and context systems as well as (b) heterogeneity among the units of analysis found within and across these multilevel systems. Consequently, rather than promoting the kinds of unitary fallacies that result from assuming homogeneity across levels and units of analysis, pattern-centered approaches promote the development of conceptual and analytic models that more accurately reflect the true complexity inherent in multilevel people developing within multilevel contexts.

Conclusions

A key challenge for policymakers designing systems of progression is to provide contextual opportunities appropriate to individuals’ personal, academic, and technical development. These “opportunities” should be sufficiently discriminating to meet the needs of individuals who possess a wide range of capabilities; that is, rather than being simple linear hierarchies in student “quality,” these opportunities should be constructed by reference to questions of background, previous experiences, style, personality, aspiration, and lifestyle choice. The complex interactions among these different personal and social factors, and the sample heterogeneity they reflect, make linear statistical modeling techniques rather ineffective for modeling complex and varied developmental pathways. In addition, variable-centered analyses often struggle to maintain sample sizes and modeling capability in ways sufficiently rich to explore patterns of association over time for groups of interest, forcing analysts to focus instead on average associations across large and diverse groups. The policy corollary of applying inadequate modeling tools to complex analytic problems is the tendency for one-size-fits-all education systems to restrict agency and diversity of opportunity for large segments of the population.

The 11 articles included in this issue explore different pathways through diverse education systems using methods that focus on (a) differences between individuals and/or groups and (b) the unpredictable or unexpected pathways that students follow as they pass through these complex systems. The articles share a focus on the deviation from prediction and on highlighting what this can teach us about the limitations of prediction models, the complexity of educational pathways, and untapped potential for interventions. Each article provides a glimpse of how personal and contextual risks and opportunities interact to determine the quality of both individual lifepaths and the social context in which these lifepaths unfold. These articles also reveal how short-term interactive processes (e.g., adolescent identity negotiation of narrowing educational opportunities) can have long-term developmental effects (e.g., adult occupational opportunities varying in relation to the form of previous dynamics). Although the articles differ in their specific implications for developmental, educational, and policy research questions, they are linked in their exploration of unpredictability and complexity of pathways through the multifarious influences on students' journeys from childhood to adulthood. In addition, they each provide empirical evidence about the relations of specific person and/or context factors to educational achievements that tend to escape the purview of normative theory and statistics.

The relationship between childhood risk and suboptimal lifespan development is not necessarily deterministic, mechanistic, or inevitable. There are many steps on the pathway from personal and contextual risk to healthy development. There are children at risk who go on to experience generally healthy development, and there are children with low apparent or observable risk who go on to experience generally unhealthy development. Therefore education systems—along with policy and practice systems more generally—should allow for flexibility and change to avoid rigid tracking or excessive and unnecessary stigmatization of vulnerable young people and their families.

If policy and practice are to support person–environment fit and so enhance development, policymakers must recognize, appreciate, and respond to the heterogeneity and local-level complexity of the microsystems on which the policies are designed to impact. The local-level elements of this person–environment dilemma are central because only local-level practitioners and policymakers have the time, information, and contextual knowledge to identify the appropriate supports and investments required for successful intervention with their particular population. It is not the job of a central government to determine the appropriate intervention in the life of a troubled teenager, for example, any more than it is the job of the health ministry to diagnose and determine the treatment for the condition of a patient with symptoms of physical ill health. Recognition of heterogeneity of the kinds explored in these articles suggests a role for policy in empowering local services but not in determining the exact practice to be followed in every given circumstance.

Nevertheless, there will always be variability in the quality and value of local-level practices such that there is a vital role for central government in creating the appropriate higher-level (national or state) framework of legislation, guidance, funding, and quality control to ensure that this local-level variability does not add to structural inequalities between areas, diminish social cohesion, and lead to poor practice. The challenge in dealing with heterogeneity at the local level is in finding the balance between, on the one hand, recognizing elements of individual variability that impact development and moderate intervention and, on the other hand, working in practice with feasible groups. In this sense, heterogeneity and homogeneity are two poles of a system that range from the individual at one extreme, with all the idiosyncrasies and differences that exist between people, to the collective average at the other, the statistic that simplifies by making the assumption of homogeneity. Discerning the patterns of difference and similarity that underlie the integrative connections between these two poles is therefore necessary for meeting the challenges of education and social policy.

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References

- Bandura A. The psychology of chance encounters and life paths. *American Psychologist* 1982;37:747–755.
- Bergman, LR.; Magnusson, D.; El-Khoury, BM. Studying individual development in an interindividual context: A person-oriented approach. Mahwah, NJ: Lawrence Erlbaum; 2003.
- Bryk, A.; Raudenbush, S. Hierarchical linear models in social and behavioral research: Applications and data analysis methods. Newbury Park, CA: Sage; 1992.
- Eccles J, Midgley C, Buchanan C, Wigfield A, Reuman D, MacIver D. Development during adolescence: The impact of stage-environment fit on adolescents' experiences in schools and families. *American Psychologist* 1993;48:90–101. [PubMed: 8442578]
- Englund MM, Egeland B, Collins WA. Exceptions to high school dropout predictions in a low-income sample: Do adults make a difference? *Journal of Social Issues* 2008;64:77–93.
- Feinstein L, Vignoles A. Individual differences in the pathways into and beyond higher education in the UK: A lifecourse approach. *Journal of Social Issues* 2008;64:115–133.
- Janosz M, Archambault I, Morizot J, Pagani LS. School engagement trajectories and their differential predictive relations to dropout. *Journal of Social Issues* 2008;64:21–40.
- Gluckhohn, C.; Murray, HA. Personality in nature, society, and culture. New York: Knopf; 1948.
- Kokko K, Pulkkinen L, Mesiäinen P, Lyyra AL. Trajectories based on post-comprehensive and higher education: Their correlates and antecedents. *Journal of Social Issues* 2008;64:59–76.
- Lamiell JT. Toward an idiographic psychology of personality. *American Psychologist* 1981;36:276–289.
- Lindley DV, Novick MR. The role of exchangeability in inference. *The Annals of Statistics* 1981;9:45–58.
- Magnusson, D. The person approach: Concepts, measurement models, and research strategy. In: Damon, W.; Peck, SC.; Roeser, RW., editors. New directions for child and adolescent development: Vol. 101. Person-centered approaches to studying human development in context. San Francisco: Jossey-Bass; 2003. p. 3-23.
- Melhuish EC, Sylva K, Sammons P, Siraj-Blatchford I, Taggart B, Phan MB. Effects of the home learning environment and preschool center composition upon literacy and numeracy achievement in early primary school. *Journal of Social Issues* 2008;64:95–114.
- Messersmith E, Schulenberg J. When can we expect the unexpected? Predicting educational attainment when it differs from previous expectations. *Journal of Social Issues* 2008;64:195–211.
- Neuenschwander MP, Garrett JL. Causes and consequences of unexpected educational transitions in Switzerland. *Journal of Social Issues* 2008;64:41–57.
- Organisation of Economic Cooperation and Development. Messages from the Programme for International Student Assessment. Paris: OECD Publications; 2004.
- Pagani LS, Japel C, Vitaro F, Tremblay RE, Larose S, McDuff P. When predictions fail: The case of unexpected pathways toward high school dropout. *Journal of Social Issues* 2008;64:175–193.
- Peck SC. TEMPEST in a gallimaufry: Applying multilevel systems theory to person-in-context research. *Journal of Personality*. 2007;10.1111/j.1467-6494.2007.00470.x(OnlineEarly Articles)
- Peck, SC.; Roeser, RW. Person-centered approaches to studying development in context. In: Damon, W., editor. New directions for child and adolescent development. Vol. 101. San Francisco: Jossey-Bass; 2003.
- Peck SC, Roeser RW, Zarrett N, Eccles JS. Exploring the roles of extracurricular activity quantity and quality in the educational resilience of vulnerable adolescents: Variable-and pattern-centered approaches. *Journal of Social Issues* 2008;64:135–155.
- Richters JE. The Hubble hypothesis and the developmentalist's dilemma. *Development and Psychopathology* 1997;9:193–229. [PubMed: 9201442]

- Roeser, RW.; Peck, SC.; Nasir, NS. Self and identity processes in school motivation, learning, and achievement. In: Alexander, P.; Winne, PH., editors. Handbook of educational psychology. Vol. 2. Mahwah, NJ: Lawrence Erlbaum; 2006. p. 391-424.
- Trost K, El-Khoury BM. Mapping Swedish females' educational pathways in terms of academic competence and adjustment problems. *Journal of Social Issues* 2008;64:157–174.

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