The role of career education on students' education choices and postsecondary outcomes

Theoretical and evidence base preparation

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ACKNOWLEDGEMENT

This literature review represents the initial stage of a research project funded by the Canadian Education and Research Institute for Counselling (CERIC) on "*The role of career education on students' education choices and postsecondary outcomes"* which aims to clarify understanding of when, where and how youth initiate and craft their career aspirations. The review draws heavily from a previously unpublished report funded by Employment and Social Development Canada, under an agreement with SRDC in 2015 (100003644) entitled "How youth develop career decisions?" The support of CERIC has allowed SRDC to update the earlier work to inform the further analysis it is undertaking as part of the CERIC research project. We are grateful to ESDC for its earlier support and agreeing to the dissemination of the current updated work via CERIC.

INTRODUCTION

While Canada is an international leader on many indicators of K-12 education performance (OECD, 2019) and has among the highest rates of PSE attainment of all OECD countries (Buchanan, 2013), it still has a significant proportion of youth who leave the formal education system ill-equipped for their transition to the world of work. Transition "derailment" can take many forms:

- Students leaving high school before graduating;
- High school graduates who go straight to the workplace but struggle to provide the job skills required of them;
- High school graduates who go on to apprenticeships, college or university but who drop out, or switch inefficiently to other programs, citing a lack of "fit";
- PSE graduates who secure employment after graduation for which they are substantively overqualified who can question the investments they made in PSE (which can, in turn, deter others from making educational investments) and feel dissatisfaction with their work; and
- PSE graduates who struggle to demonstrate the skills required by employers, who seek to switch occupations or upgrade their skills further.

According to Connelly, Blair and Ko (2013), Canadian students typically exit education with insufficient career education and first-hand experience of the labour market: "fewer and fewer students leave high school with exposure to the world of work, yet we expect them to choose a post-secondary education (PSE) pathway that will lead to a career" (p. 13). If students leave high school without a basic idea of who they want to become and are under- or mis-informed about the relevant opportunities open to them, it becomes inevitable that they will not plan appropriately and find themselves making what in retrospect turn out to be poor choices. Even among those who enter into postsecondary education, a substantial number leave before completing – and therefore fail to reap the full rewards of their investments (and governments' and others' investments) in their education.[1]

Derailed transitions can cost students valuable time and money – relative to a successful transition – as they engage in education without gaining a credential or the full benefit of the

[1] Oreopoulos and Petronijevic (2013) report that those who participate in postsecondary education but do not complete do still see a return relative to what they would achieve if they had not chosen postsecondary education at all.

investment. The chances of ending up in precarious employment or unemployment can increase.[2] The situation can become chronic if they cycle through periods of work, poorly focused re-training and unemployment. They may ultimately find themselves losing self-confidence due to unemployment or underemployment.

To tackle such problems, educators as well as policy and program decision-makers are likely to want to develop measures to target youth at different stages of their educational and early labour market careers. Truly informing youth's decisions goes beyond the provision of career education. It must also embrace how youth access and use information to become rational decision-makers (see Arcidiacono et al., 2014). Well-designed supports to career-decision making would ideally be delivered in ways that help youth grow into discerning consumers of education, who know when and how they should invest in their futures for optimal impact on their later lives. Such refinement and customization of career education – broadly-defined – need to be founded on the best evidence concerning how such interventions fit into youth's decision-making, which is where this project is intended to make a contribution.

PROJECT OBJECTIVES

This project will utilize new data to examine how the piloted early career education interventions in SRDC's BC Advancement Via Individual Determination (BC AVID) and Future to Discover (FTD) affect the evolution of high school students career decision making. This project makes use of two rich longitudinal data sources created through the linkage of education records to surveys of youth and parents to examine the career expectations and decisions of students for five years since Grade 10.

To ensure the construction of the most appropriate analytical models reflecting the latest evidence on successful career development strategies for youth, SRDC has examined the existing literature to consider (a) the stages of youth decision-making and the key influences at each stage, (b) the role of career education in supporting postsecondary decisions, and (c) the kinds of career education resources available, taking into account the strengths and weaknesses of these sources. This scan of the literature draws from on earlier work SRDC undertook for an ESDC project "*How Youth Make Career Decisions*" in 2015 but adds four years of recent literature and updates previous lessons learned relevant to the current project.

The report's focus is on Canada, but there is a lot to be learned from how these issues are also being addressed in other countries. In the UK, for example, the Department for Business, Innovation, and Skills declared in 2009 that ensuring young people have adequate information,

[2] Again though, as Arcidiacono et al. (2014) have argued, there is still value in trying out college and deciding against it versus not trying it out at all.

advice and guidance to make well-informed choices regarding their future plans "will be the most powerful force for change over the next decade."

REPORT STRUCTURE: FRAMING FOR THE LITERATURE REVIEW

The main goal of this scan and analysis of the literature is to identify theoretical and empirical work on the effects of early career education and resources on the evolution of career decision making among high school students. Specifically, how, when and where important career decisions are being influenced among Canadian youth.

To frame this logically, the report has four parts:

- First, it considers the context briefly for supporting career development decisions in the 21st century: what is influencing the demand for information and support for career decisions among Canadian youth;
- Second, it reviews mainstream models in the literature for career development/educational decision-making and the optimal decision making process – including lessons informed by behavioural economics and other disciplines – for youth. This section explores the extent to which there is consensus in the literature on the ages and/or staging of different steps in the process for young people (in Canada);
- Third, it emphasizes what is known about where career education and resources fit into the overall process; and
- Finally, the objective is to prepare the ground for producing evidence-informed recommendations for an empirical analysis that support youth and those who influence them (parents, counselors, peers) as they make decisions about postsecondary education and career choices.

THE ROLE OF CAREER INFORMATION IN SHAPING 21ST CENTURY CAREERS

INCREASING DEMAND FOR SUPPORT IN CAREER DECISION-MAKING

Career guidance, which in its broadest sense includes providing support to individuals to make decisions about how to spend their lives, has a long history. Societies with any elements of differentiation in their labour markets and that allow individual freedom of determination have acquired (or required) mechanisms to allocate work opportunities that take into account individual preferences and aptitudes.

The need for ever more sophisticated support in navigating information about the labour market has, however, grown with each successive diversification of available choices. Key historical points of growth have included the industrial revolution, which placed before many more people a new choice they could make between agricultural and industrial or manufacturing work (Herr, 2001) and later associated expansions in transportation and mass education have opened up diverse opportunities to more and more people. More recently, increased globalization of economic production, the digital revolution and recurring revolutions in telecommunications have each expanded career choice and increased career information needs.

Each change in the nature of the world of work has also dramatically modified the *context* for career decision making. New technologies and continuing changes in Canada's economy and demographics have contributed to this demand. Canadian students currently face "unprecedented challenges" in preparing for the world of work (Hirsch, 2016). Educators, business leaders and senior government officials who attended the 2012 Summit on the Future of Education in Canada unanimously agreed career supports and information are needed to help youth meet the challenges they face (Connelly et al., 2013).

This section of the report summarizes some of the reasons why demand for better support for career decisions has been growing. We consider two broad areas in turn – changes to the definition of career and changes in the labour market.

CHANGES IN THE DEFINITIONS OF CAREER

A fundamental reason for changes in the demand for career information follows from changes in the notion of what *career* comprises. Application of the term "career" to occupational transitions is relatively recent, only achieving widespread use by the 1960s (Herr, 2001). Early uses were associated with traditional, narrowly-bounded hierarchical occupational paths within organizations, popularly conceived in commentaries such as *The Organization Man* (Whyte, 1956). Career, then, was used to represent gradual movement upward within a single organization's hierarchical structure. While this use of the term career was relatively new, the path it described existed in many organizational settings, including government and military, for a much longer period.

There is a popular perception that by the 21st century the experience of such single-employer careers was becoming less common, and being replaced by the experience of a sequence of different work (and increasingly non-work) roles producing for each individual much less predictable career paths through multiple organizations and (even) multiple occupations, sometimes simultaneously. Career under this new definition would be typified by greater uncertainty and its existence would call for more individual autonomy, ingenuity and flexibility. Many commentate on individual workers currently needing to change jobs or occupations much more frequently over a lifetime (e.g., Meister, 2012).

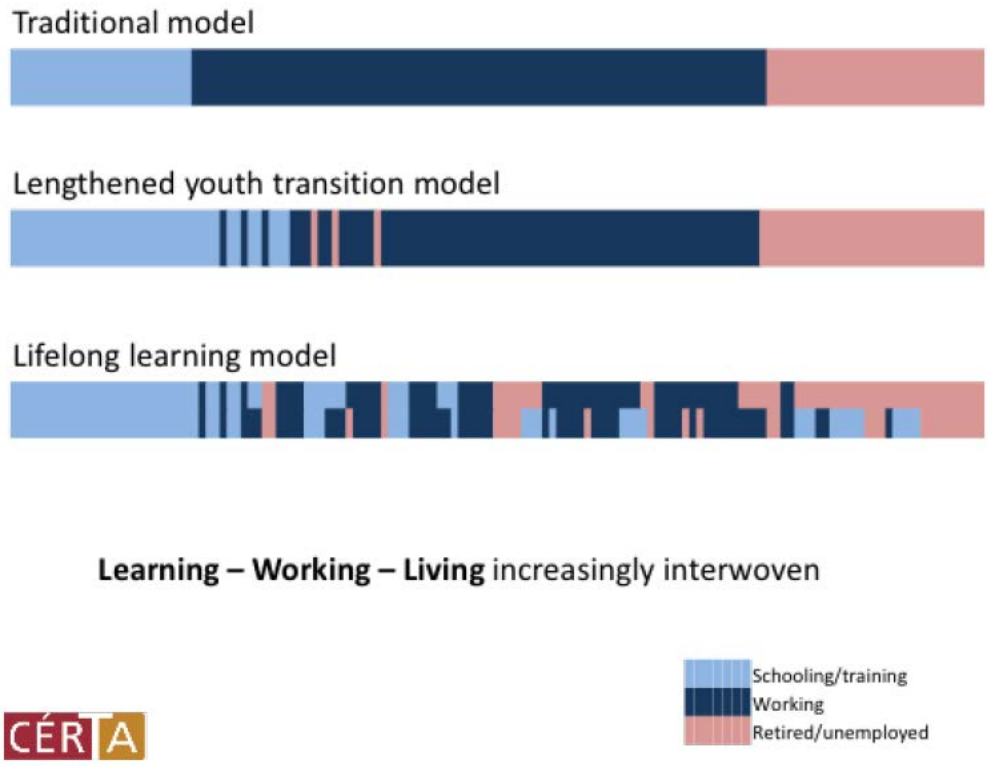
In Canada (at least) the evidence that individuals have become increasingly likely to experience a change in employers is scant (Jodoin, 2014). And growth in multiple job holding has been modest (Fulford & Paterson, 2019). Nonetheless, careers are currently portrayed as a sequence of diverse work and non-work roles, requiring early and ongoing education and training to support both, rather than as an assured gradual movement upwards within a hierarchical structure (Arthur & Rousseau, 1996; Zikic & Franklin, 2010). Consequently, more attention has been paid to supporting work-role transitions in adulthood as well as learning and career re-direction throughout the life course.

Visually, the traditional conceptualization of a career in youth development and learning would depict a set of linear steps from one stage to another through the life course – "learn-work-live" – as seen in the first bar of Figure 1. This appears to be changing towards a model that embraces life-long learning and, critically, incorporates a prolonged period of "youth" (in the second and third bars). The implications were noted at the Canadian symposium on employment challenges for youth in a changing economy (Public Policy Forum, 2013).

As Canadians anticipate moving from the traditional to lifelong learning model in Figure 1, with ever more transitions between learning and working, they will require more career planning and decision-making. In short, the number of occasions within each person's life during which career decision-making support will be called upon to inform decisions appears to be growing and with

it the demand for more finely-tuned and relevant labour market information (LMI) for each decision point.[3]

Figure 1 Changing life course models



Source: Le Centre d'études et de recherches sur les transitions et l'apprentissage, reproduced in Public Policy Forum (2013, p. 8).

Whether the structure of individuals' occupational pathways has actually changed as depicted in Figure 1 may not matter as much as the perception that it has, at least as far as demand for information is concerned. The change in the notion of what constitutes a career still has the potential to change requirements for career information. If career paths are increasingly seen as less constrained and *boundaryless* (Arthur & Rousseau, *ibid.*), the range of opportunities to be considered with each transition grows, and with it the need for information on alternative options including acquiring those skill sets that are in demand across a wide range of settings. This may in part be driving calls for more youth to possess non-cognitive (or "soft") skills (Futureworx, 2018).

[3] Labour market information can be defined as "labour market conditions and operations, namely the full range of information about labour market conditions and trends, including employment and unemployment, wages, businesses and labour market projections." (Savard et al., 2005, p. 5)

THE CHANGING LABOUR MARKET

While the current functioning of the labour market and the place of youth within it are critically important to the demand for and design of career education, it is a highly complex topic in which there are many competing theories. This report cannot hope to explain fully the current youth labour market. Nonetheless, it is important at least to consider the many factors affecting the youth labour market to better understand the current career development needs of youth and likely trends for the near future, since these will affect the need for career interventions or education. Topics covered in this section provide context for the report's later recommendations for analysis.

Technological change is disrupting the labour market. More tasks are becoming automated. For instance, a study on OECD countries shows that about 14 per cent of jobs in the 32 countries are highly automatable (Nedelkoska and Quintini, 2018). This form of technological change alters the range of skills demanded for many occupations and reduces the demand for some occupations entirely. It also generates new occupational categories. In general, these changes are "skill-biased", meaning they favour those with skills that best *complement* the new technology. One implication for career decision-making is the potential for the labour market to become polarized with low-wage, low-skill service jobs on one side and jobs that combine very high, diverse and multiple skill demands on the other yet few jobs in between. The balance between these types of jobs is very hard to predict, but positioning youth relative to, and preparing them for, this skills bias may prove critical in providing useful career advice.

An increasingly global economy has led to greater competition and increased pressures for improved productivity, whilst presenting more opportunities for work in different parts of the world. The popular prescription is that workers will need to be more prepared for the unexpected, such as layoffs or organizational restructuring. These events are considered quintessential characteristics of the knowledge economy (Zikic & Franklin, 2010) and would be expected to broaden demands for career information, to help new (and existing) workers identify alternative and possibly less precarious occupational pathways.

Possibly as a result of technological change and globalization, but possibly also due to unfortunate career choices, there may be a mismatch locally between young Canadians' education and skills on one hand and their jobs on the other. That highly-educated young workers take jobs requiring less education or fewer skills than they have is cited as evidence of a mismatch (Connelly et al., 2013). A study by de Broucker (2005) using OECD data found a third of Canadian PSE graduates between the ages of 25 and 29 worked in low-skilled occupations. This rate was about the same as in the United States but about twice the rates observed in the United Kingdom, Germany, or Scandinavian countries. According to Li, Gervais, and Duval (2006), nearly one out of every five university-educated people in the Canadian workforce works in a job that requires at most a high school education. While they found this proportion had not

changed between 1993 and 2001 and the 2016 Census produces a similar statistic (17 per cent), the number of university-educated people has grown by nearly one-third over this period, and with it the number of highly-educated people experiencing a mismatch (Zhao et al., 2017). Using data from the 2000 General Social Survey, Crompton (2002) found one third of workers between the ages of 20 and 29 with postsecondary credentials reported feeling overqualified. Oreopoulos and Petronijevic (2013) have pointed out that university graduates in 'high school' jobs tend to be paid more and work for more prestigious employers. They argue traditionally-defined 'high school' jobs may in fact be changing to require university-acquired skills.

It is not clear how much of any mismatch is due to demand-side factors (a shortage of available jobs requiring higher education and skills) and how much is due to supply-side factors (young people not having the information or job seeking skills, or career decision-making skills, to transition into jobs that better match their education and skills). Either way, good quality career education has the potential to help job seekers adjust occupational pathways.

Youth appear to have emerged as an especially vulnerable economic group from recent labour market changes. The economic downturn commencing 2008 led to youth unemployment rates in Canada that exceeded those of any other age category, with unemployment rates for youth (ages 15-24) and students reaching highs of 16.4 per cent and 20.9 per cent respectively in July 2009 (Public Policy Forum, 2013). Given that this downturn coincided with the peak of the demographic echo "boom" born in 1990-91 entering the labour market, the downturn affected numerically more youth than if it had occurred when there were relatively fewer young people seeking the diminished supply of jobs.

Downturns in the economy tend to disproportionately affect youth employment meaning a recession of the kind experienced in Canada in 2008 was responsible for increasing the number of youth unemployed relative to other age workers. Experiencing reduced job stability and job quality at this stage may have "scarring" effects on lifetime employment earnings (Quintini & Martin, 2006; Oreopoulos et al., 2006). There are many possible mechanisms:

- Youth may delay their transition to the labour market as they prepare to graduate;
- Youth may remain unemployed longer;
- More youth will decide to return to school;
- Some youth decide to leave school as they lack income liquidity to continue their studies;
- Others already unemployed and not in school detach themselves even further from the labour force if they foresee declining employment prospects.

To find work in such circumstances, to compete for employment with older generations, numerically more youth would be expected to need career development support. At the time of writing, nonetheless, youth unemployment is approaching historical lows of around 11 per cent (Statistics Canada, 2019).

Within the youth population, the characteristics of labour market disadvantage differ. To try to improve understanding of the different influences on young people, categorizations of youth labour market disadvantage have been developed. A number of European countries and the Organisation for Economic Co-operation and Development (OECD) – concerned with the integration of youth into the labour force in the 1990s – developed two such definitions of youth, determined by their different challenges and levels of opportunity. They began publishing the NEET rate – the proportion of all youth who are Not in Education, Employment, or Training (Marshall, 2012), which is now also available for Canada. OECD also defines a category labelled Poorly Integrated New Entrants (PINEs) as young people – often with qualifications (diplomas or degrees) – who frequently move back and forth between temporary jobs, unemployment and/or inactivity, even when there is strong economic growth (Quintini & Martin, 2006). (Table 1)

Influences on NEETs

A major concern, common across OECD countries, is that NEET youth are at risk of becoming discouraged, disengaged and socially excluded. Disengagement can arise from experiencing long-term unemployment: those who still would like a job can give up looking because they do not believe any work is available (Marshall, 2012). Even though a proportion of NEET youth meet the definition due to non-economic constraints (choosing travel and leisure or complying with military conscription) (Quintini & Martin, 2006), fluctuations in the indicator over time and between countries highlight the potential vulnerability to exclusion experienced by specific cohorts of youth.

In Canada in 2018, 11.3 per cent of Canadian youth were NEET (Bourbeau & Pelletier, 2019). According to Marshall (2012), NEET youth can be further subdivided into two groups: (a) unemployed and actively looking for a job and (b) not in the labour force (NILF). Among Canadians youths who are NEET, 34.5 per cent were unemployed (3.9 per cent of all youth) and 7.4 per cent are NILF and the remainder are students (42 per cent) or employed (46.5 per cent) (Bourbeau & Pelletier, 2019). Since NEET youth are not a homogenous group, there have been calls to make further distinctions in the NEET category: long-term NEET, transitional NEET, and prospective NEET (Hughes & Gration, 2009). Those who are captured in the rate but who are very temporarily in unemployment are considered less at risk of disengagement. Dorsett and Lucchino (2015) found a fundamental difference between those who are looking for work ('active NEET') and those who are not ('inactive NEET') within the NEET group: young mothers account

for many of the females in the "inactive NEET" group. Low educational attainment and low self-confidence are two other factors predicting "inactive NEET".

Dorsett and Lucchino (2013, 2015) further found that unsuccessful school-to-work transitions, including into NEET, often start at key decision points in a youth's educational career, such as the end of compulsory schooling or the end of the secondary school, because of a "poor" decision – essentially ending one activity without securing a stable outcome in the next – taken at that point. It is suggested that clear and accessible knowledge of career options would be important in minimising the risk of such decisions.

Table 1 Characteristics of PINEs and NEET

Category	Characteristics
Poorly Integrated New Entrants (PINEs)	▪ Often have a qualification ▪ Lacking skills to secure a stable job ▪ Labour market integration marked by frequent movement between temporary work, unemployment, and/or inactivity
Not in Employment, Education, or Training (NEET)	▪ Often lack qualifications ▪ Disproportionately comprised of immigrants/minorities or those living in disadvantaged, rural, or remote areas

Influences on PINEs

The existence of PINEs in Canada and elsewhere creates an important policy issue from a career development perspective because the category includes postsecondary graduates who theoretically should be employable and contributing to economic prosperity (Bell & Benes, 2012). Bell and Benes (2012) draw on literature from other countries and provided some barriers faced by PINEs. These include: polarized growth in the labour market, the 2008 recession, media stereotypes, reduction in earning while learning and lack of career services and safety nets. Irrespective of the reasons why young Canadians face difficulty in entering the labour force, the failure of those with credentials to secure adequate employment has the potential to lead to long-term "scarring" – marked by persistent difficulty finding work and relatively lower earnings (Cockx & Picchio, 2011; Bell & Blanchflower, 2011). A more detailed review of problems faced by PINEs is available in Appendix A.

Difficulties in school-to-work transitions

Another common issue that Canadian youth face in the changing labour market is the difficulty in transitioning from school to work. Any obstacle along the transition increases the likelihood of becoming either NEET or PINE. Being inadequately informed about the labour market or the skills it requires increases challenges in the transition to work: youth can end up underemployed or unemployed because they look for or work in a job that they are not equipped to do. In Canada, the youth underemployment rate at 14.2 per cent in 2013 (Canadian Labour Congress, 2014; Gregoire, 2016) reflects difficult school-to-work transitions.

In a recent study, Bell and Benes (2016) interviewed a group of youth, parents, employers, educators and career development practitioners to identify barriers to school-to-work transition in Canada. They found that many youth were less equipped for the transition into the labour market with limited skills in finding jobs that matched their skills and education level. Although this issue was widespread among youth, there were differences across various sub-populations, with vulnerable groups (such as Indigenous youth, youth in rural areas, youth with disabilities, youth from low income families and youth with lower-educated parents) facing particular difficulties. Apart from being less equipped for transitions into work, vulnerable groups faced additional challenges including discrimination, misinformation or paucity of information, and a lower usage of available career transition resources. Many in the disadvantaged groups worked in low-skilled jobs and for some of these young people, "*low aspirations and low-skilled work is not something they see as a transitory state but as rather reflecting their 'natural place' and identity*" (CEDEFOP, 2016b, p. 8). These groups are over-represented among NEET or PINE and have additional difficulties in the school-to-work transition. The respondents to Bell and Benes' study emphasized the need for career education and the importance of integrating work into learning to improve the school-to-work transition.

THE EVOLUTION OF CAREER THEORIES

Career theories underlie much of the design of career support, both online and delivered in-person. To understand how youth make career decisions, what supports may be needed including the role of career education, it is important to take on board theories about how career decisions are made.

Career decisions are among the most important a person has to make. Career choices have fundamental and long-lasting consequences for each individual's overall well-being, health and financial situation. Yet, making a career decision is a highly complex process. There are often many potential alternatives to select from. A considerable amount of information is available about each alternative but also many unknowns. There are many separate decision points over time, many decisions are contingent on the outcomes of others. There are multiple factors to consider with different levels of tangibility for each choice.

During much of the 20th century, the prevailing belief underlying career theory was the *rational choice* paradigm, whereby sufficiently-informed individuals could be expected to weigh the pros and cons of making different decisions and arrive at the optimal outcome. Support for decision-making would therefore largely be fulfilled by providing individuals with the necessary occupational information and guidance to support them in arriving at the most rational – or appropriate – decisions (Landine, 2013).

However, information available to individuals about education and employment pathways varies. It is typically reliable with respect to *past* experience but current information will vary in how well it predicts the future situation, which is the one the individual will encounter. Occupational forecasting varies in its availability and accuracy.

Furthermore, some information sources youth seek out are also likely to be irrelevant, inconsistent, misleading, false, or missing. Very few people will be highly self-aware. It takes skill and effort to have full information on one's own aspirations, preferences and capabilities and be able to predict how these will change over the years. It takes yet more skill and effort to match one's traits to the labour market and know how to prioritize among them. The complexity of the process of career decision-making calls for skill and effort. Most people thus find it difficult to make "the best decision", meaning a well-informed utility-maximizing decision that takes all factors into account to determine the choice that best helps them achieve their goals.

Hartung and Blustein (2002) trace the origins of career intervention theory back to Parsons (1909) who advocated a three-step approach for helping individuals improve their selection of a "vocation": (a) using testing to help raise self-awareness of their own traits and characteristics;

(b) giving individuals information about occupational prospects; and (c) utilizing "true reasoning" to make appropriate matches between the two.

As Table 2 illustrates there have been many subsequent refinements and competing theories to rational choice theory over the past hundred years, many holding currency at the same time as others, although few have fully supplanted the dominance of rational choice. For this brief review, it is more useful to consider what these leapfrogging theories have had to say about the needs of children and youth in making career decisions.

Table 2 Chronology of major career theories

Theory name	Seminal author(s)
Trait-and-Factor Theory	Parsons (1909)
Developmental Theory	Ginzberg et al. (1951, 1972, 1984)
Life-span/life-space theory, career maturity	Super (1953, 1957, 1980, 1990, 1992, 1994, 1996)
Personality development and career choice	Roe and Lunneborg (1956, 1990)
Social cognitive theory of career choice	Bandura (1969, 1977, 1986, 1997)
Theory of vocational personality	Holland (1973, 1985, 1992, 1997)
Theory of circumscription and compromise	Gottfredson (1981, 1996, 2002, 2005)
Career self-efficacy	Hackett and Betz (1981)
Work adjustment person-environment correspondence theory	Dawis and Lofquist (1984), Dawson (1996, 2002, 2005)
Psychodynamic theory	Bordin (1990)
Social learning career theory	Mitchell and Krumboltz (1990, 1996)
Systems theory framework	McMahon and Patton (1995, 1997, 1999, 2006)
Social network theory	Granovetter (1995)
Five factor theory	McCrae and John (1992); McCrae and Costa (1996, 2008)
Social cognitive career theory	Lent and Brown (1996, 2002, 2005, 2013)
Cognitive information processing approach	Peterson, Sampson, Reardon, and Lenz (1996, 2002, 2004, 2011)
Values-based theory	Brown (1996, 2002)
Career construction theory, career adaptability	Savickas (1997, 2001, 2002, 2005, 2011, 2013)
Chaos theory	Pryor and Bright (2003, 2011)
Narrative theory	Bujold (2004)

THE TREATMENT OF CHILDHOOD AND ADOLESCENCE IN CAREER THEORIES

Despite the proliferation of so many career theories since the early 1900s, there is a dearth of literature in career theory focusing specifically on children and adolescents. This situation has persisted despite numerous calls for greater focus (Patton & Skorikov, 2007). Lent and Brown (2013) attributed the challenge to "the focus [of career development theories, which] has, metaphorically-speaking, been more on the destination than on the journey, that is, on where people end up, occupation-wise, rather than on how they get there…" (p. 557).

It is only comparatively recently – in the mid-2000s – that the field of vocational psychology moved away from having a set of somewhat disconnected perspectives on career with respect to distinct age groups. It moved towards a more holistic life-span developmental framework (Patton & Skorikov, *ibid.* p. 1) which started to show how career development during childhood and youth represents the start of a lifelong process. In particular, Lent and Brown propose an addition to the career development literature that attempts to integrate empirically-supported theories to arrive at a description of the *process* by which youth growth and exploration lead to career maturation.

Lent and Brown base their theoretical addition on Super's developmental Life-Span/Life-Space career theory and draw on work from a number of other career theorists. The authors propose a framework to organize key adaptive career-related developmental tasks over the life course. Others have alluded to similar stages. For example, Howard and Dinius (2019) explore similar staging of approaches (association, sequence and interaction stages) through childhood, but Lent and Brown's treatment is more comprehensive. Figure 2 below incorporates the key overlapping features of this combination of social cognitive career theory and life-span theory. The diagram depicts a set of relationships that are fundamentally important to this review. We will not describe the diagram in detail since it categorizes and describes a linear sequence of activities in ways that are fairly self-explanatory. Notably, it makes useful linkages between the *ages* and *stages* (labelled "phases" in the diagram) of career development that we shall return to repeatedly in this review.

The primary focus of this review is the journey in Figure 2 from career "Growth" through "Exploration" to "Establishment". In that journey, we can note the implied information needs for different ages of client given an optimal progression through each career "phase" (or stage):

- At kindergarten and elementary school age, careers are largely fantasies. The focus of learning should be on basic self-regulation and developing self-concept, identity and social skills. Students will also be working to build the essential skills they will later require to become proficient users of information (such as LMI) and competent decision-makers:

reading, writing, document use, numeracy and digital literacy. By ages 11 and 12, these skills should be maturing into positive work habits and attitudes.

- Students can be developing work interests and values by ages 11 and 12 that would indicate a need to access accurate and impartial information to support balanced exploration from this point on.

- By ages 13 and 14, interests can be firming up into provisional vocational aspirations and students will be seeking information on actual career paths they can follow to pursue different options. In education systems with streamed high school courses leading to pre-requisites for following certain career options, students and their parents will need to understand the consequences of course choices for timely realization of vocational aspirations and equally the implications of vocational aspirations for high school courses.

- In high school, at ages 15-17, in developing a wide range of essential and specialized skills, students are simultaneously still working out their self-concept ("who they are") while already implementing decisions that narrow their immediate postsecondary options ("what they will become"). Ready information, guidance and support should be available to help youth in navigating this potentially challenging landscape where exploration is very necessary but can have consequences.

- The crystallization of specific vocational goals is aligned with ages 18-21. These are also the ages associated with major transitions (school-school, school-work, school-training, with unemployment and childrearing also possible) and thus major choices. Demands for information to support decision-making will be high.

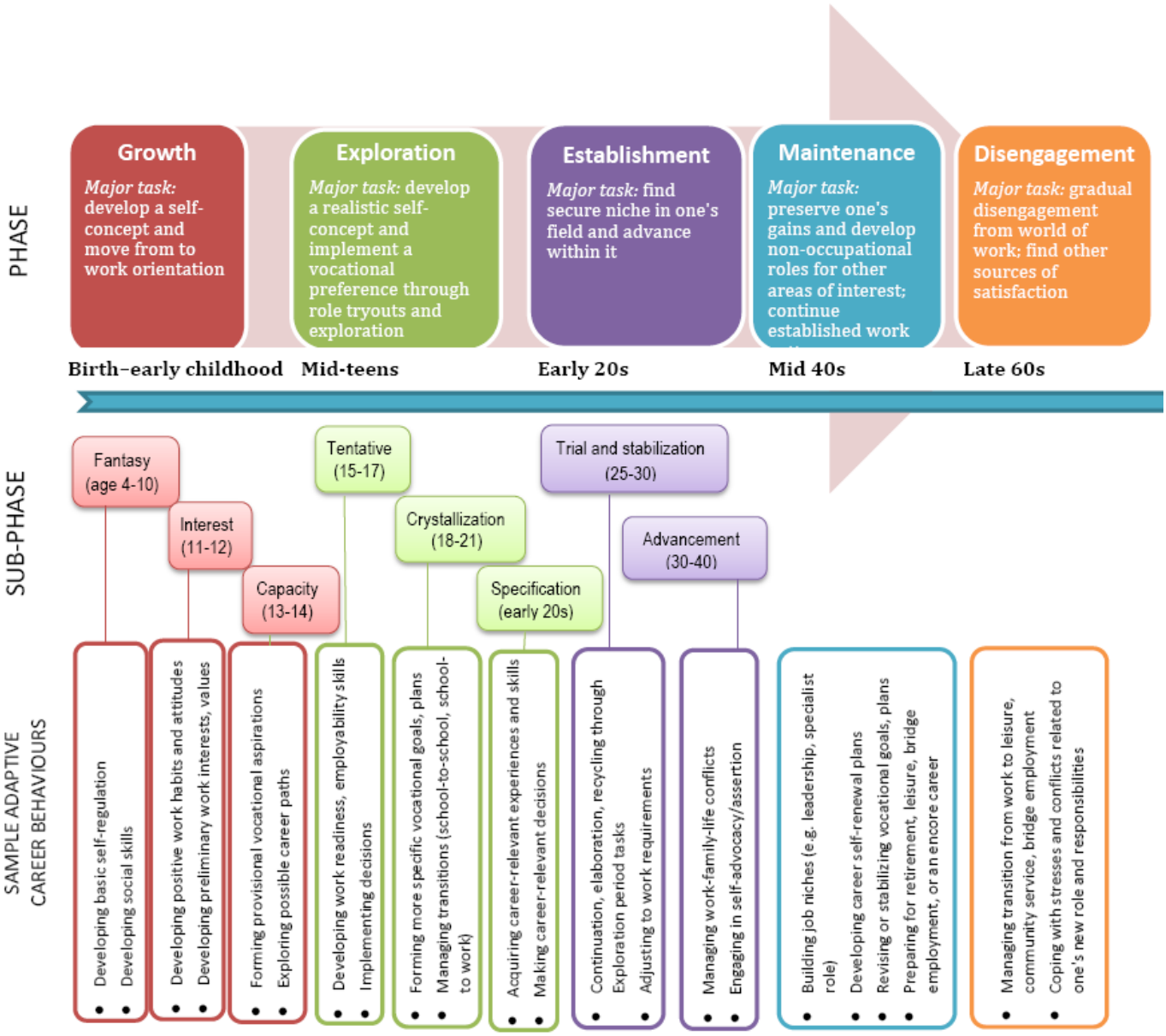
- From the early 20s, youth can be moving towards "establishment" where they have found a career path that seems optimal and work to consolidate their position within it. Information needs will be specialized, from a narrow range of sources.

Progress in this journey from "Growth" to "Establishment" requires the individual to engage in informed career decision-making as they mature from children into adults. Of course, the stages are often not reached at the earliest ages stated in Figure 2. Diversions, doubling back and recycling are very likely. Youth groups defined earlier as NEETs and PINEs are likely to enter or re-enter exploration in their 20s. Consequently, information providers cannot assume the age of those at each stage. A 12-year old and a 25-year old may both find themselves developing a new work interest and want to explore the next steps on their career path. It is unlikely – even though these two individuals share the same need – that the same information and advice presented the same way to both age groups will be equally effective.

How should career development support differ to reflect both ages and stages? It has to take into account the institutional and social context (geographical location, role of parents, educational

stage reached) of the information user as well as the capacity of the developing brain to process information. We examine next what theory has to say about how complex decisions are made, and then how this applies to career decisions in particular.

Figure 2 Ages and stages of career development, organized by career-life period[4]



[4] Phase and sample adaptive career behaviours adapted from Lent and Brown (2013, p. 560). The sub-phase is adapted from Super (1980, p. 289).

BEYOND RATIONAL CHOICE: INFORMATION "OVERLOAD" AND COGNITIVE COMPLEXITY

If rational choice prevailed, designing the supports for career decisions would be largely a matter of providing rich and accessible information and incentivizing its use. However, in the presence of complex decisions with high information needs, humans can take short cuts, requiring refinements to our understanding of how decisions are made. Cognitive complexity theory – a challenge to the rational choice paradigm – was originally proposed by Bieri (1955) and Schroder, Driver, and Streufert (1967). They argue individuals only manage information they receive on the basis of their ability to process all of the complexity of that information (Schwartz, 2005; Mullainathan & Shafir, 2013; Savard et al., 2005). Rational choice is not sufficient to explain outcomes, even in the presence of appropriate information, if that information is itself overwhelming.

Savard et al. (2005) define cognitive complexity by considering the challenge to the human cognitive system along two dimensions: level of differentiation and level of integration. Differentiation is the ability to distinguish as separate a variety of observed objects, and integration is the ability to establish links between the various dimensions or parts of the object. An individual's ability to manage and organize information and link it to previous knowledge increases with both differentiation and integration.

We can apply this theory to career decision making. Given the wealth of information available, the individual's ability to process and organize it while discriminating which of the parts is most important to their own situation is critical. Sifting through information can be overwhelming and confusing. According to one study with Canadian adolescents, the volume of information established barriers to the integration of the information. The barriers took the form of emotional reactions, such as frustration and anxiety, and unwillingness to commit the time it would take to make sense of the information they did find (Savard et al., 2005).

A study in the UK of the career- and education-related perceptions of (the equivalent of) 6th, 10th, and 12th grade adolescents found that they disregarded LMI that was not directly relevant to their *stated* interests. This points to a cognitive "barrier" that can prevent even the highest quality LMI from being assimilated by young people. Savard et al. concluded from the study results that for complex decisions individuals require detailed information as well as focused support to separate and link the relevant information. In this situation, the assistance of a counsellor would likely have increased the youths' receptivity to LMI by helping them make links that would demonstrate its relevance, leading to better informed decisions.

TWO SYSTEMS OF DECISION-MAKING

Many psychological studies since the 1950s have sought to explain human reasoning and decision-making processes in order to understand why "human thinking is so often biased" (by which is implied 'away from the rational') (De Neys, 2010). Numerous attempts to interpret decision-making as a *rational* process resulting from gathering information and weighing the pros and cons of different options, have found little support in data on youth decision-making. It does not seem that rational strategies and processes predominate among the career decisions of youth (Frederick et al., 2002; Warwick Institute for Employment Research, 2006).

Decision-making may be better conceptualized as comprising two different – or "dual" – systems or modes of thinking: 1) affecting or experiential; and 2) deliberative, with each mode characterized differently (for an excellent summary of this two-system model, see Lavecchia et al., 2014; also Kahnemann, 2003; Strough et al., 2011, p. 2-3):

- The **experiential** mode is described as the fast, automatic, intuitive, and "gut feeling" approach individuals use to make decisions. In this mode, rules of thumb, "shortcuts" – or heuristics – prevail. The ability to evaluate heuristics is thought to increase with age – thereby biases due to faulty heuristics should decrease with age.

- The **deliberative** mode employs effortful decision-making based on reasoning and purposeful analysis of information. Whereas experiential decision-making is fast and intuitive, deliberative decision-making is time consuming and conscious. The ability to engage the deliberative mode is thought to increase with age.

Of particular relevance here is the emerging relationship between age and decision making strategy as well as the role of contextual influences – *cues* – that can motivate individuals to use one or the other mode as their decision-making strategy.

Strough et al. identify emotion (the affective mode) as a key feature of decision-making. Consequently, research on decision-making in cognitive neuroscience can help in particular to explain how and why the developing adolescent brain is susceptible to modulation by emotion, social factors, and 'hot' (affective) contexts (Blakemore & Robbins, 2012).[5] Lavecchia et al. (2014) also cite growing neuroscientific evidence that the starkly different maturation rates of two of the brain's key cognitive and behavioural systems create an important gap that is largest during teenage. The nonlinear development of the brain's limbic (reward) system "overtakes" the relatively slow, linear development of the cortex (impulse control and response inhibition). Thus

[5] Generally, "hot" tasks include a salient emotional positive or negative consequence. Delay of gratification is the most typical "hot" task, particularly when it involves attractive, highly salient rewards that can be easily consumed.

teenagers can process immediate pleasure and emotion much more readily than imagining the future consequences. Put briefly, the state of development of the reward system in the adolescent brain is such that teenagers are often hyper-sensitive to *immediate* costs and benefits.

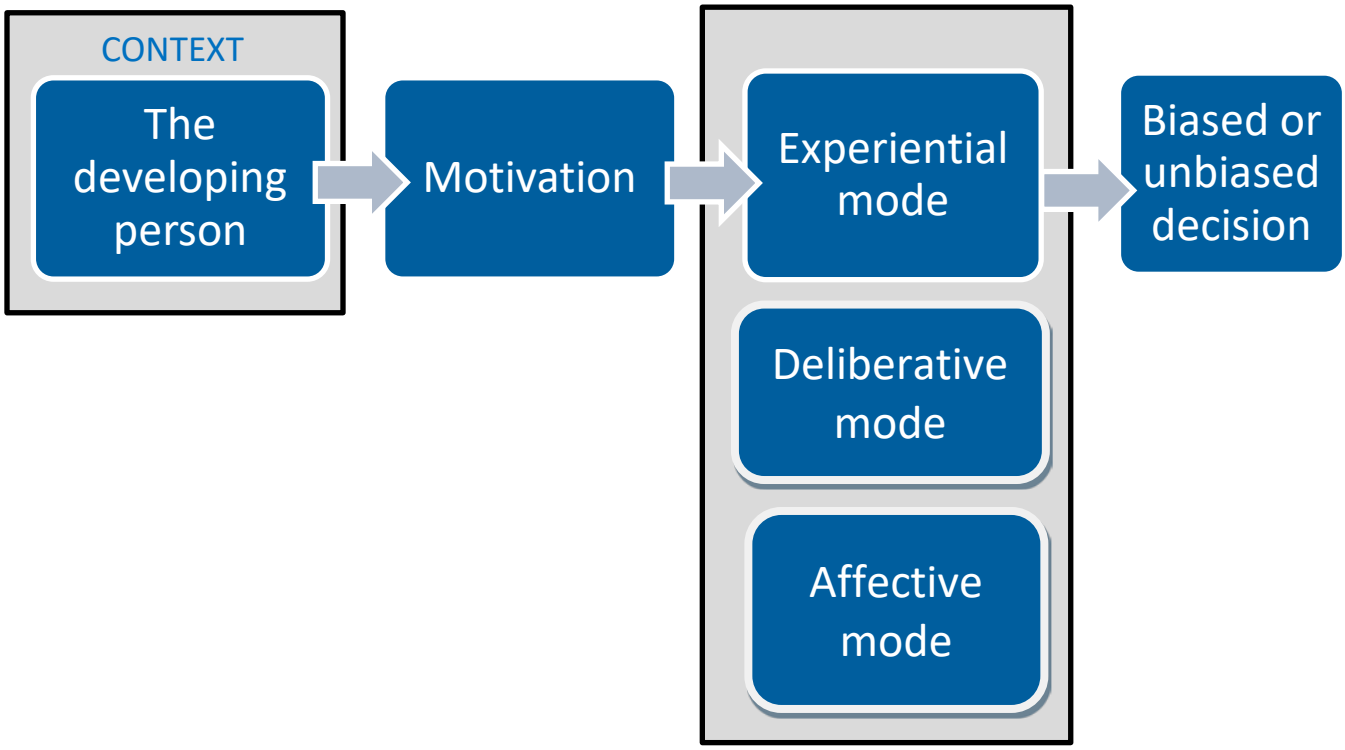
Blakemore and Robbins' conclusion is supported by a recent meta-analysis on age differences in risky decision-making. The evidence implies that adolescents take more risks than adults on 'hot' (i.e., affective, emotionally charged) tasks that provide immediate outcome feedback on rewards and losses; however, adolescents take fewer risks than children on tasks that have a sure/safe option (Defoe et al., 2015). In other words, adolescents are more likely to take risks in emotionally charged decisions when the immediate emotional reward is more obvious or pressing. One very salient example of risk in adolescence is the risk of social exclusion (a "hot" context), to which the adolescent brain is particularly hypersensitive and serves as a strong, affective source of influence in adolescent decision-making. Practically speaking, this can help to explain why identity can play a strong role in decision making. Peer effects, such as choosing to apply to university because two best friends are going or (equivalently) choosing to miss school because two best friends are doing so can be strong motivators that influence "irrational" decision-making.

Lavecchia et al. (2014) summarize their understanding of the role of identity in career decisions by reference to the two systems of decision making. While optimal career decisions involve focusing on becoming self-aware, answers to the question "what kind of person am I?" can overlap heavily with those to "what are others like me doing?" Students may trade off long-term benefits from educational investment against the immediate social costs of deviating from the norms of their social group. Designers of career interventions would thus need to look closely at how they might associate portrayals of deliberative planning for the future as positive identities for key social groups with which youth identify.

Referring back to Figure 2, we can see that critical career decisions that occur in the exploration phase are typically matched to the teenage years, at a time when there is exceptional risk of affective bias in decision-making. Furthermore, these are complex decisions requiring a great deal of information. However, excessive information also can trigger adoption (particularly among youth) of the experiential "shortcut" strategies in preference over the more deliberative strategies that the designers of career education might anticipate their users to adopt.

There has been a great deal of work in recent years to document these apparent decision-making shortcuts, in the hope that policy and programs can take them into account in their design. While acknowledging that the basis of the shortcuts (or "heuristics") and biases lies in the brain pathways that neuroscientists continue to investigate, it is worth reviewing briefly the extensive categorizations that behavioural scientists and, increasingly, economists have developed to identify those that frequently affect human reasoning. These categorizations may prove rather simpler for some information providers to conceptualize and plan for than models of brain functioning, providing a useful frame of reference for policy and program design.

Figure 3 Schematic depiction of the process of motivation and individual judgment towards biased or unbiased decision-making



Source: Strough et al. (2011, p. 61).

THE ROLE OF BEHAVIOURAL BIASES AND HEURISTICS IN DECISION-MAKING

Recently, the field of behavioural economics has begun to influence public policy in the US, the UK, and Canada, with some researchers paying specific attention to the application to student decision-making.[6] Behavioural economics is concerned with how the array of potential choices is

[6] See Lavecchia et al. (2014) Behavioural Economics or Education: Progress and Possibilities; Jabbar, H. (2011) The Behavioural Economics of Education: New Directions for Research. Educational Researcher. 40, no. 9, 446–453; Vossensteyn, J. J. (2005) Perceptions of Student Price-responsiveness: A Behavioural Economics Exploration of the Relationships Between Socio-economic Status, Perceptions of Financial Incentives and Student Choice. Universiteit Twente; Scott-Clayton, The Shapeless River: Does a Lack of Structure Inhibit Students" Progress at Community Colleges?; Dynarski, S. and Scott-Clayton, J. (2006) The Cost of Complexity in Federal Student Aid: Lessons from Optimal Tax Theory and Behavioral Economics. Faculty Research Working Papers Series. Cambridge, MA: Harvard University, John F. Kennedy School of Government.

presented to individuals. It recognizes "a collection of principles or effects…that explain observed behavioural patterns…that cannot be explained by traditional economic models." (Diamond et al., 2014, p. 19).

A recent study examined decision-making heuristics and biases across the life span, combining research from the field of behavioural economics with child and adolescent development theory (Strough et al., 2011). The authors considered especially the existence of judgment and decision-making (or JDM) biases – to be interpreted as "systematic departures from rationality, not momentary lapses of reason" (p. 58). Of relevance to this review, the authors noted that much of the research to date in JDM heuristics has focused on younger adults, primarily college students. They also acknowledge that even with this focus on a narrow segment of the life span, the literature remains "wide but thin."

Strough et al. (ibid.) identify no less than 25 heuristics and biases, with several others identified in the course of this review:

- Anchoring effect
- Attraction effect
- Availability heuristic
- Bandwagon effect
- Causal attribution bias
- Clue-seeking bias
- Complexity aversion
- Conjunction fallacy
- Correspondence bias
- Counterfactual thinking
- Endowment effect
- Framing effect
- Fundamental attribution error
- Gambler's fallacy
- Hindsight bias
- Hyperbolic discounting
- Negativity bias
- Optimism bias
- Outcome bias
- Overconfidence bias
- Probability neglect
- Ratio bias
- Representativeness bias
- Sentinel event sensitivity
- Status quo bias
- Sunk-cost fallacy

Full definitions of all 25 heuristics and biases are included in Appendix C.

The evidence to date includes several references to how age and developmental phase may have a bearing on when certain "heuristics" emerge. As examples:

- **Framing effect:** The tendency for people to make different decisions depending on how options that are objectively the same are "framed" when they are presented to them. Sensitivity to "risky choice framing" emerges in children as young as six years old and stabilizes around middle childhood.

- **Negativity bias:** A relative preference for negative information over positive information characterizes information processing more in earlier adulthood, and declines with age after that.

- **Sunk-cost fallacy:** The irrational economic decision to let "sunk costs" – an expense that occurred in the past and cannot be recovered – continue to influence decision-making exists in childhood, decreases in early adolescence, and remains stable through mid-adolescence to early adulthood. The sunk-cost fallacy is thought to decrease with age because young children lack the cognitive ability to avoid over-generalizing from a learned rule – the "waste not" rule.

In their recent literature review for the UK's higher education funding bodies, Diamond et al. (2014) examined how prospective students used information to decide whether to attend postsecondary education, what to study, and where to study, focusing specifically on the behavioural aspects of information use. According to the authors, "for providers of information about [postsecondary education], understanding behavioural principles may offer a route to enabling a more informed and reflexive approach to student decision-making" (p. 5). Based on a range of psychological studies, the MINDSPACE framework developed in the UK (Dolan et al., 2010), classified well-known behavioural influences under this easily remembered mnemonic. The table can thus be used to facilitate the adoption of behavioural theory in explaining and finding solutions to policy problems to help achieve better youth outcomes (Diamond et al., 2014) (Table 3).

Two sources have distilled the key lessons even further. Lavecchia et al. (2014) sum up the implications of behavioural economics for education policy in just four statements, which they elaborate on in their paper:

- Some students focus too much on the present;

- Some rely too much on routine;

- Some students focus too much on negative identities; and

- Mistakes are more likely to occur with many options or with little information.

The UK's Behavioural Economics Unit developed the pneumonic EAST (Easy, Attractive, Social, Timely) to describe optimal solutions to the challenges it was established to tackle.

Table 3 The MINDSPACE framework[7]

Label	Description	Application to student decision-making
MESSENGER	▪ We are heavily influenced by messenger effects – *who* communicates information to us ▪ The more the messenger is seen as *authoritative*, and demographically and behaviourally similar to us, the more likely we are to act on information provided by the messenger	▪ Even the most "perfect" information in support of decision-making is not likely to be as powerful as *who* is providing the information ▪ Peer group messengers in particular – whether personally known or not to students – are likely to be influential ▪ The use of *authentic,* trustworthy messengers is key
INCENTIVES	▪ Most of us dislike losses more than gains of the same amount, and we tend to think in terms of losses and gains rather than final states of wealth (i.e., we use *relative* references points as opposed to absolute ones) ▪ This tendency leads to predictable mental shortcuts that influence our responses to incentives	▪ Prospective students often assess the value of fees and support in relation to their current situation and that of their peers ▪ Students who view not getting a qualification as a loss will be more likely to continue in education than those who see ▪ Getting a qualification as a gain
NORMS	▪ We are strongly influenced by the social and cultural norms and behavioural expectations of our constituent group	▪ Can help explain the relatively low rates of university attendance among poorer high achieving students
DEFAULTS	▪ Our tendency to go with a default option when faced with complex decisions ▪ Closely related to habits and norms, default options are the implicit decisions we make to *not* decide – the opposite of making an active choice	▪ The default option of not entering higher education among disadvantaged students can be influenced by requiring them to complete at least one college application

[7] Drawn largely from Diamond et al., 2012.

Label	Description	Application to student decision-making
SALIENCE	▪ As a way to cope with vast amounts of information related to a potential decision, our attention is generally drawn to message that are novel and relevant to us ▪ The more the message is relevant – or **salient** – to us as individuals, the more powerful and influential it is likely to be on us	▪ Prospective students may generalise from their limited personal experience, often from peers and friends
PRIMING	▪ Our acts are influenced by unconscious cues, like certain sights, words or sensations ▪ **Priming** is the is act of using cues to influence or alter behaviour	▪ Website features that prime affective states in students prior to presenting information
AFFECT	▪ The rapid and automatic **affective** reactions we have to particular events and images, and the subsequent effect on decision-making	▪ The powerful effect of campus visits during the decision-making process
COMMITMENTS	▪ The more effort a choice takes, the more likely we will procrastinate ▪ However, making **commitments** to one's self or others can impel us to overcome procrastination	▪ Students may be discouraged from applying for financial aid because the system is perceived to be complex
EGO	▪ We act in ways that make us feel better about ourselves ▪ Decision that contribute to our self-esteem – our **ego** – are powerful ▪ However, we are more likely to change our beliefs than our behaviour when we encounter inconsistencies between our beliefs and actions	▪ Fear of rejection may discourage applications to postsecondary, especially if this rejection is not completely private

SOCIAL COGNITIVE CAREER THEORY

The work of Arthur Bandura and, especially, his self-efficacy theory has greatly influenced the theoretical and empirical research on career development. Bandura (1977) hypothesized that self-efficacy expectations – our beliefs in our own capabilities to engage successfully in a given task or behaviour – represent major mediators in both behaviour and behaviour change. Individuals who have a strong sense of self-efficacy will devote more attention and effort towards solving a problem and exhibit greater confidence and persistence in seeing the task through to completion. Conversely, individuals who have low self-efficacy expectations regarding a behaviour (or behavioural domain) are hypothesized to seek avoidance of those behaviours, perform poorly on those behaviours, and have a tendency to give up when faced with discouragement or failure.

In postulating the theory, Bandura argued that an individual's degree of self-efficacy will determine whether or not certain behaviours will be attempted, the amount of effort the individual will expend, and the length of time the behaviour will be sustained, even in the presence of obstacles. In addition to postulating the mechanism by which behavioural change would occur, Bandura (1977) specified four sources of information expected to influence self-efficacy. These sources of information are:

- performance accomplishments, meaning prior personal experiences of successfully performing the behaviours in question;
- vicarious learning or modeling;
- verbal persuasion, for example, receiving encouragement and support from others; and
- changes in psychological and affective states, such as lower levels of anxiety associated with the behaviour.

Thus, self-efficacy theory provides a means not only for understanding the sources of information through which self-efficacy expectations are learned, but also how they can be modified.

One of the most significant theoretical contributions of cognitive theory to vocational psychology occurred when Nancy Betz (a trait-factor psychologist) and Gail Hackett (a cognitive behaviourist) applied Bandura's self-efficacy construct to career choices. Bandura's recognition of the key role played by cognitive appraisal of one's own abilities and the malleability of those appraisals appealed to Betz and Hackett (1981) as an approach to help them understand the career choices of women who avoided math and science careers. Since Betz and Hackett's first exploration of the potential utility of self-efficacy to career choices, self-efficacy theory has been applied to many aspects of career-related behaviours, including, vocational choices, career

decision making and job search processes, and has spawned considerable theoretical and empirical research.

A number of tools have been developed for use to assess adaptive career decision making and career exploration behaviour, many of which have grown out of decision theory. For instance, the Osipow et al. (1976) Career Decision Scale (CDS) is an instrument derived from an empirical approach to identify specific sources of career indecision. My Vocational Situation (MVS) developed by Holland et al. (1980) has also been used widely in research to diagnose difficulties people have in career decision-making, especially those that may arise from issues related to vocational identity or shortfalls in occupational information. The Career Thoughts Inventory (CTI), developed by Sampson et al. (1996, 1998), assesses the level of "dysfunctional thinking" in career problem solving and decision making. It assumes individuals who exhibit dysfunctional thinking in either self-knowledge, occupational knowledge, decision making skills or executive processing will be impaired in their career decision making process and career problem solving abilities.

Gati et al. (1996) developed the Career Decision Difficulties Questionnaire (CDDQ) from a theoretical taxonomy of the difficulties encountered in career decision making. This 44-item questionnaire divides difficulties into those that occur prior to the decision making process and those that occur during the process itself. The prior difficulties include a lack of readiness resulting from lower motivation, indecisiveness, or dysfunctional beliefs/belief in myths concerning career decision making. Difficulties during the decision making process can be subdivided into a lack of information (about the self, about occupations and about ways of obtaining information, and information about the career decision-making process) and inconsistent information resulting from unreliable sources or internal or external conflicts.

In the mid-1990s, the introduction of the Social Cognitive Career Theory (SCCT) framework by Lent et al. (1994 & 1996) served as an important catalyst for an increase in research on the link between self-efficacy and career-decision making. In their work, Lent et al. expanded on and incorporated more dimensions of Bandura's theoretical work into their understanding of career behaviour. Their theory describes how the social or environmental contexts of the career decision making process – including aspects such as gender, race, culture, family, community, and political context – can interact with (a) the development of self-efficacy, (b) individuals' interests, and (c) goals and outcome expectations (the desired results of the intentional actions in which individuals choose to engage) and thus influence career choices and behaviours. The SCCT posits that self-efficacy determines outcome expectations. Individuals expect to achieve positive and desirable outcomes in activities at which they view themselves to be efficacious and so they will engage in actions or behaviours that they expect to produce such outcomes. In her review of the preceding twenty-five years of self-efficacy in career assessment and practice, Gainor (2006) suggested there was a "proliferation of empirical support for the usefulness of self-efficacy in understanding the career choices" (p. 173). The numerous studies Gainor

surveyed provide considerable support for the usefulness of the analytical framework derived from the SCCT in designing, implementing and evaluating interventions to facilitate career choices.

Social cognitive career theory has since the 1960s provided the theoretical backbone for many career planning systems, including the computer-assisted career planning programs that first started being introduced at this time (Harris-Bowlsbey, 2013). There is no consensus, however, on the optimal models for informing or predicting behaviour.

AGES AND STAGES FOR OPTIMAL CAREER DECISION-MAKING

The theoretical literature so far has pointed to key stages of the decision-making process linked to stages of the life course. In other words, individual's *age* is a key determinant of how he/she will approach career decision-making. This is the case even though career decisions also have clear *stages* of progression, mirroring progression through education systems and employment opportunities, and typically involve an individual making decisions that will narrow down his or her future occupation options at critical stages (such as when he/she makes the postsecondary education program choice).[8] On one hand, it seems attractive to encourage youth to narrow their options early so that they can realize their career aspirations sooner, which may motivate them to work harder in school and achieve earlier skills acquisition. On the other hand, early encouragement may require career decisions to be made at ages when young people are not ready to make them. If they make the wrong decisions, they may end up on the wrong pathway or need to backtrack when they are older to revisit key decision-making stages and choose different options. These mistakes are costly to the individual, their families, the education system and employers. Of course, other than from randomized experiments such as SRDC's Future to Discover (Ford et al., 2019) – in which enhanced career education workshops were randomly assigned from Grade 9 and found to increase postsecondary enrollment – policy decision-makers rarely get to see the counterfactual (what would happen without career support).

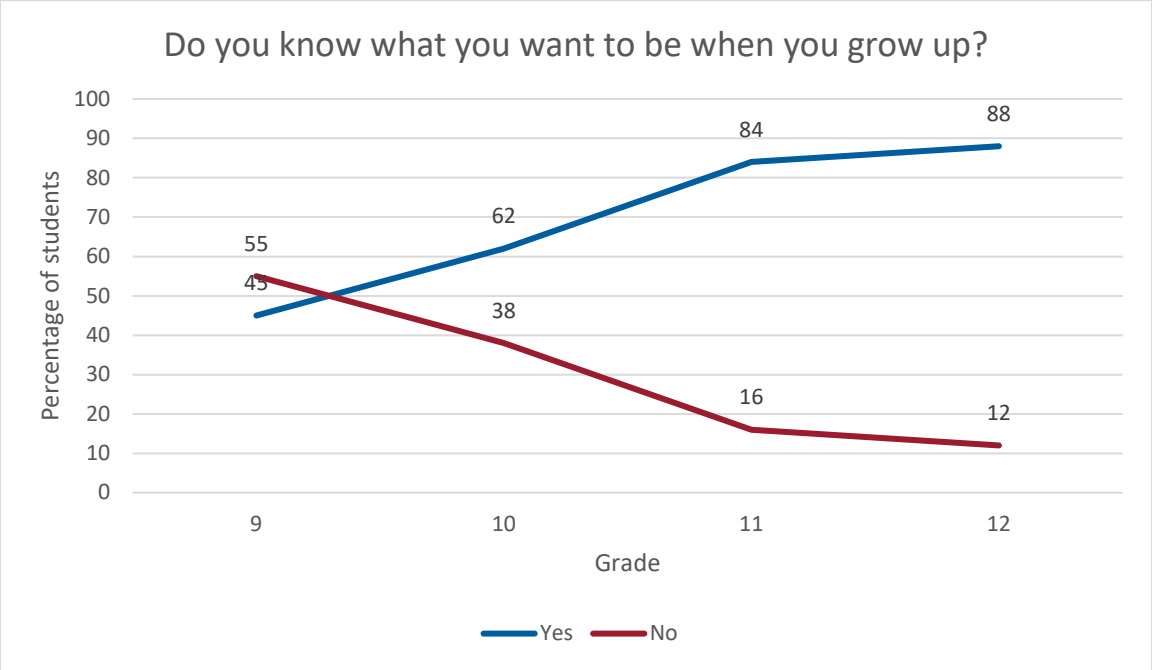
Some evidence on the timing of Canadian youths' career decisions comes from a pilot project from the Workforce Development Board Windsor Essex (2010) to support the development of a new Youth Labour Market Information Plan. Local research was conducted with youth across Grades 7 to 12 to identify differences in decision-making stages. Based on survey responses from 220 youth, the authors report on the change in career decidedness across grade levels. Despite a fairly small survey sample size, the report includes several notable findings:

[8] In its 2010 edition of *Making Sense of Labour Market Information* designed for Canadian career practitioners, the guide identifies several frameworks and tools to assess the stage of readiness for LMI a youth client may be in:

- Blueprint For Life/Work Designs
    - The Developmental Sequence of Competencies and Indicators Tool
    - Indicator Checklist Tool for High School Students Youth career decision-making in Canada
- Prochaska's Transtheoretical Model of Change:
    - 5 stages of behavioural change
    - 5 skills for behaviour change

- In Grade 9, a little fewer than half (45 per cent) of youth reported knowing what they wanted to do when they were older.
- Between Grades 9 and 11, the proportion of youth reporting that they know what they wanted to do when they were older rose roughly 20 percentage points for each grade level (i.e., 45 per cent, 62 per cent, 84 per cent). However, the change by grade level tapered off considerably between Grades 11-12, with only a slightly higher proportion of youth in Grade 12 confirming that they had made a career decision compared to those in Grade 11 (see Figure 4).

Figure 4 Differences in decision making stages related to future career choices: student survey respondents in grades 9 to 12



Source: Workforce Development Board Windsor Essex (2010) p. 6.

Of course, these results do not show the likely changes youth make to their specific career plans throughout high school but do indicate at the least a general level of *decidedness*. However, the study also asked students to report when they had made the decision about their career. One third of students reported having made their career choice prior to Grade 8, half between Grades 8 and 10, and 13 per cent in Grade 11 or later.

Further evidence on the uncertainty of Canadian youths' career decisions comes from a study by Statistics Canada which examined the career decision-making patterns of Canadian youth and the associated postsecondary educational outcomes (Statistics Canada, 2015). Based on data from

the Youth in Transition Survey collected over a ten-year period between 2000 and 2010, the longitudinal study followed the career decision-making trajectories of youth in Canada every two years, starting at age 15.[9] The study found that youth moving from ages 15 to 25 experienced a substantial degree of change in career decision-making – including career expectations and career choices. The study found important links between consistency in career expectations over time and timing of entry into postsecondary studies and subsequent levels of educational attainment by age 25.

- 90 per cent of 15 year olds have changed their career expectations by the time they reach 25. Only a small proportion (10 per cent) of youth have the same career expectations at 25 year olds as they did when aged 15.
- Boys and girls are equally inconsistent in their career expectations between 15 and 25, with 10.1 per cent and 9.1 per cent, respectively, reporting consistent expectations over the course of the 10 years.
- Indecision about career choice remains among some 25 year olds. By age 25, around one in eight (13 per cent) remained undecided about their career choice, and a further 38.3 per cent had decided to pursue a new career.
- Parental valuation of postsecondary education is related to earlier onset of career decidedness – the higher the priority parents placed on postsecondary education, the greater the consistency in youths' career expectations.
- Greater consistency in career choice over time was linked to high family socioeconomic status. Youth from low SES families were more likely to change their career choice from the age of 15 than youth from high SES families (13.6 per cent compared to 7.9 per cent, respectively), and were more likely to be undecided about their career at age 25 (16.0 per cent versus 9.3 per cent).
- Early commitment to career choice was linked to earlier entry into postsecondary education and higher levels of educational attainment by age 25. Youth who showed consistency in their career plans at age 15 or 17 were more likely to enter postsecondary studies within 15 months of graduating high school. Youth who remained undecided in their career choice up to age 25 were less likely to have entered in postsecondary education within 15 months.

[9] The data were collected every two years, from the same respondents starting at age 15 (YITS Cohort A, cycle 1). These youth were asked, "What kind of job or occupation would you be interested in having when you are about 30 years old?" They were asked the same question at ages 17, 21, 23 and 25 (cycles 2, 4, 5 and 6, respectively). The question was not asked at age 19 (cycle 3).

The extent to which youth career indecision is determined by age rather than a lack of appropriate guidance and supports is not clear. Neither is the extent to which early arrival at a "commitment" to a career will ultimately prove beneficial. Early commitment might be erroneously based on heuristics or affective choices, such as the availability heuristic, bandwagon effect, status quo bias or anchoring. For example, young people may not explore extensively before choosing a potential employer. Corak and Piraino (2011) found as many as 40 per cent of a cohort of young Canadian men had been employed by the same employer for whom their father also worked.

Possibly, higher proportions of 15-year olds than actually reported firm plans to the Youth in Transition Survey might be capable of firming up their plans, but have not received sufficient support or encouragement up until that point to do so. Or, equally possibly, many may simply not be ready developmentally for such decision-making. How early optimal decisions can be made has profound implications for career education policy, but controlled research on this topic has been scant to date.

In the absence of firm evidence on the optimal timing for decisions with respect to age, career practitioners have tended to focus on providing support in a developmental sequence that respects the age of the youngest student likely to receive it. Several examples follow which illustrate that career advice designed for delivery to a specific age group must not focus just on the normative expectations for career development activities at that age (as in Figure 2). Career advice must be offered in sufficient breadth to support youth at the same age who are at different stages. So while most among 15-year olds might be completing self-awareness inventories, those who wish to can be reviewing occupational profiles and comparing university program offerings.

One obvious age group exception are youths who are NEET, as defined earlier in the report. The provision of information and in-school support for career decisions can play an important role in supporting youths to avoid NEET status and move on to post-school careers. Career advice can help young people better understand their prospects and options in the labour market, find out about education opportunities and equip themselves for job-seeking. One approach is to provide guidance to all on a mainstream basis, as in Austria, where schools are required to provide specific courses on 'career and educational guidance' for students. Slovenia has adopted a 'Looking at jobs in a different way' project that focuses specifically on informing young people about occupations where there is a shortage of labour (Hawley et al., 2012).

Similarly, Bell and Benes' (2012) analysis of programs and policies for PINEs generally advocates for earlier and mass youth exposure to career exploration activities. The more intentional youth are during school in their contemplation of later education and education-to-employment transitions, the more effectively they can integrate in the labour market. Bell and Benes see earlier career intervention as a means to reduce the chances youth become PINEs. They associate

"a growing gulf between education and the labour market" and "the invisibility of pathways to the labour market" with "limited career education programs in high school" and call for greater continuity in career guidance in schools, which would presumably reduce the number of PINEs flowing out of the education system. For those already becoming PINEs, they argue post-secondary institutions could be doing more "to facilitate making connections between education and the labour market."

While young people can be encouraged to make career decisions early, as a rule, such decisions are rarely required by specific ages. Nonetheless, the education system more broadly does carry some implicit and explicit expectations for when decisions should be final. Most secondary school systems require students to select courses that may have a bearing on their career direction. Choice of education tracks can start from as early as age 12 (and elementary systems require decisions even earlier from their students, and parents, such as whether or not to take early or late second language immersion programming). However, enforced early division, such as Ontario's division of high school course choices into college and university tracks by Grade 9 has been subject to considerable criticism (People for Education, 2014). Cross-national analysis compiled by OECD (2013) found that dividing students, especially dividing them early, contributes to worse educational outcomes for those from low socio-economic backgrounds. OECD advises that education systems should "avoid early tracking, and defer student selection to upper secondary" (OECD, 2012). Where such choices are required, there is a risk affective decision-making will dominate and students may overemphasize the costs/displeasure and underestimate the benefits of more rigorous course choices. Career practitioners must bear this in mind as they support youths' high school course decision-making process.

There is some Dutch evidence that students who take vocational education during their secondary school education experience a smoother school-to-work transition (Middeldorp et al., 2019) than students pursuing more conventional education pathways. Despite the smoother school-to-work transitions, there are multiple societal trends reducing the popularity of vocational education and training. In Australia, vocational fields are seen as the choices of students who are male, English-speaking, from disadvantaged backgrounds, and low in self-perceived academic ability (Gore et al., 2017). School students commonly hold the impression that university education is preferable to vocational educational and training from a young age.

K-12 selection will likely narrow the options students have in postsecondary education and employment. But Canadian youth are rarely forced to make postsecondary and employment decisions by specific ages. Policy experiments, such as Life After High School, have attempted to mandate students to make their postsecondary application decisions during Grade 12. Life After High School demonstrated considerable scope to increase rates of application and of subsequent postsecondary enrollment. Youth can be at the *stage* of exploring and applying to postsecondary education or equally the *stage* of exploring and applying for employment at many ages, and

those providing career advice must provide support for these decisions to be enacted across a wide range of ages.

Bell and Benes also suggest career advice has an important role to play in the stage following postsecondary graduation. Strategies that combine career-related work experience and career development activities hold potential to assist those who leave postsecondary education without directly transferring into employment related to their credential.[10]

There is an important distinction to be drawn between "better informed decisions" and "better decisions" where the latter are defined as those decisions yielding the optimal outcomes for the individuals concerned. Occasionally, a decision that is poorly informed or even absent (when the individual perceives that he or she has no alternative option) may yield a highly-valued outcome, due to chance factors or unpredictable events that intervene. More information and knowledge may not necessarily lead to better decisions, although on average one would expect better outcomes from decisions in which appropriate and rich information on options and preferences is carefully weighed.

Those developing programs and resources to support youth career decisions thus face a dilemma. They must support career decisions for youth in different age groups, who may be at a wide range of stages in the process. Potentially, their support for each type and stage of decision must be packaged in multiple, age-appropriate ways, and (when delivery is not face-to-face) they must develop mechanisms to ensure the right package reaches the right groups with respect to age and stage.

This presents a large and complex task, made more difficult still because the literature is not yet clear on the ages that are appropriate to start considering or to finalize decisions on each stage.

IDENTIFYING WHAT STUDENTS SAY THEY NEED FOR CAREER PLANNING

If the literature is unclear on the ages that are appropriate to consider each stage of career planning and reach points of decision, it may be helpful to consider what youth themselves are asking for. In their study, Bell and Bezanson (2006) asked youth to identify their needs for career planning. They reported their needs as follows:

[10] Bell and Banes argue that employment support systems should connect quickly with youth after education to maximize the chances that potential PINEs connect directly to the labour market.

- Understand interests and abilities (82 per cent)
- Acquire information about PSE (76 per cent)
- Obtain financial information (73 per cent)
- Help with the planning process (72 per cent)
- Support with their career plans (71 per cent).

A study by Frenette (2010) on youth's information constraint assesses the knowledge of youth on educational requirements for their career aspirations. Using data from the Youth in Transition, he finds that one in four students who wanted to work in an area that requires a university degree was not aware of the educational requirements. Knowledge of the level of education required for an intended career is linked to socioeconomic background as well as academic performance. The authors also found that earlier knowledge about university requirements for a career aspiration affects the likelihood of university attendance.

A UK study sought to understand the needs of prospective students for public information on higher education. Current and prospective higher education students were asked through focus groups and surveys about how they used (and how useful they found) different information in supporting their decisions about what and where to study (Higher Education Funding Council for England, 2010). In total, 66 people participated in the discussion groups and close to 2,000 responded to the survey. The survey asked respondents to rate the usefulness of 51 information items in making their decisions about going on to higher education. Interestingly, no item received a "very useful" rating from more than 55 per cent of respondents. The authors suggest this finding may indicate that students are not always fully aware of what constitutes an important piece of information in their decision-making process, both in prospective situations where students have yet to begin their higher education studies and retrospective ones among those currently in higher education. It is also possible that the information is not that helpful. Students who indicated they were not attending and were never intending to go to higher education were not included, so conclusions could not be drawn about the kinds of information students who are undecided or have decided against pursuing further education might be most receptive to. Nonetheless, among young people who did have postsecondary intentions, the categories of information deemed most useful to the decision about where to study included:[11]

[11] As measured by the per cent of survey respondents indicating that the information would be 'very useful'.

- Student-reported level of satisfaction with the teaching and courses at the institution
- Employment rates one year after graduation, in general and specifically in full-time professional or managerial positions
- Program recognition from professional bodies
- Costs – tuition or bursary costs, or living costs such as residence fees.

A sub-group analysis identified several differences in the patterns of responses about usefulness, most notably that students in vocational programs were more likely to view career advisors as a very useful source of information and less likely to rate the national online application service for universities and colleges, or any other sources of information, as very useful. Some groups of prospective students – women and those with high academic achievement – displayed a stronger appetite for information than others. The authors concluded that given differences by student sub-group, attempts to improve information systems for student decision-making should take into account the risk inherent when making attempts to increase the utility for high users (who may need less assistance) of simultaneously reducing utility for current low-level users of information (who may need it most).

The study found prospective postsecondary students relied most heavily on information gathered directly from the institution, from the institutions' websites and through direct experience (such as a visit to the school). Only a relatively small proportion of prospective students (30 per cent) reported using other online, official sources of information (e.g., government websites, other comparison sites) when making their decisions about which institutions to attend.

In their subsequent analysis of this study, Jean et al. (2010) made a distinction between 'hot', 'warm', and 'cold' knowledge or information. 'Hot' knowledge comes from informal sources like family, friends, or other students (i.e., the *grapevine*) whereas 'cold' knowledge is acquired from formal, or official, sources. The study found that students were more likely to perceive as useful information that came from "hot" sources. However, the authors contended that the extent of available "hot" sources was not evenly distributed across prospective student groups. In particular, students from families with little postsecondary experience or whose peer groups included fewer with stated postsecondary aspirations may be more able to access testimonials from a broader peer reference group (such as quotes in an institution's prospectus or verbal comments from other students during a campus visit) as a source of information – termed 'warm' as distinct from 'hot' information. Jean et al. concluded that 'hot' or 'warm' sources are seen as more honest and trustworthy than 'cold' formal sources.

Finally, despite student expression of interest in 'one-stop-shop' models for the provision of comparable information (such as cross-institutional comparisons), the authors commented that the actual uptake or use of such a central resource would not likely be high, given the low rate of

usage of existing sites revealed in the surveys. They recommended more focused use of existing resources and established information pathways, with a focus preferably those already most used by students, such as institutional websites.

Jean et al.'s conclusion is, of course, predicated on the assumption that youth access career information voluntarily.[12] To varying degrees, however, it is possible to intervene to require youth to access career information – and if so better-designed resources to explore multiple career pathways might well have a role to play if all youth (or at least all youth who could most benefit) were required to use them.

[12] Few actually do seek out significant amounts of information: information receipt is often passive. Nearly 30 per cent of 15-year olds (respondents to YITS) disagreed or disagreed strongly with the statement "I know enough about the different kinds of occupations that exist to make a choice about my future". Fewer than 40 per cent said they had talked to a teacher to get information about work they might be interested in. Fewer had spoken to a counselor and fewer than half had talked to any source such as teachers, school counselors and outside counselors (Gluszynsky, 2011; Lennon et al., 2011).

THE ROLE OF CAREER EDUCATION IN SUPPORTING CAREER DECISION-MAKING FOR YOUTH

There are several definitions of career education in the literature. OECD (2010) referred to career education as "the process where students learn about the world of work and develop career management skills through classroom teaching and through other activities such as work experience." In Canada, the Council of Ministers of Education (CMEC) describes career education as the composite of school-based activities and experiences designed to prepare and engage individuals in their career development, while the Canadian Career Development Foundation (2015) defines teaching of career development as a process "focused on understanding labour market complexities and ensuring individuals have the critical knowledge, skills and attitudes needed to effectively navigate educational and employment choices, transitions and progression." The Ithaca Group (2019) suggests that the meaning of career education is often misunderstood, though there is some consensus on defining career education as "the development of knowledge, skills and attitudes through a planned program of learning experiences in education and training settings which will assist students in making informed decisions about their study and/or work options and enabling effective participation in working life."

The underlying aims of career education are to provide career information that allows individuals to process and understand the world of work, to enhance their understanding of the labour market and career paths, and to provide skills for career path development. When career education is effective, it guides individuals' transitions on their career paths (school-to-school or school-to-work transitions). For youth, it bridges the gap between classroom learning and the world of work. Importantly, it is also a way of efficiently matching supply of labour to demand for labour (OECD, 2004).

In the UK, Hooley et al. (2012) summarized the important components of any successful career education as:

- Provision of information
- Career assessment and tests
- Career counseling
- Career guidance provided by a non- career professional
- Curricular interventions

- Continuous study/ work-related learning
- Other extra curricular interventions
- Frameworks for reflection.

These components of good career education imply that the process is not a one time activity, not just distant or face-to-face guidance, but has multiple parts which overlap and interact to achieve an objective. As the components reflect, valuable information should be provided at different stages and age. For instance, in primary school through middle school, the focus should be on helping students understand the different routes and pathways available to them. This should include an introduction to the concept of life-long learning and the notion that there are multiple valid pathways to lifetime success (Public Policy Forum, 2013). From middle school to high school, the focus should turn to information on the labour market, and a comprehensive review of education and training options. In a relatively small-scale yet relevant study, the Workforce Development Board Windsor Essex asked local youth to identify when they wanted LMI to help with their future career decisions (Workforce Development Board Windsor Essex, 2010). 64 per cent of youth reported wanting LMI in Grades 9 and 10, with only few students suggesting it was best to provide LMI in Grade 7 (1 per cent) or Grade 12 (6 per cent).

In the previous section, Bell and Bezanson (2006) summarized youths' perception of their needs for career planning. These are in fact comparable to the main components of career education identified above. This similarity holds out hope that receiving the best practice of career education may positively impact individuals' career decisions.

The Canadian Career Development Foundation (CCDF) distilled the components of career education proposed by Hooley et al. (2012) and suggested the following:

- Career management skill development
- Career exposure activities
- Labour market information.

The CCDF recommends that every career education program in schools should teach career decision-making skills and career self-management skills. Career management skills equip individuals with a toolkit to help them navigate successfully a challenging and changing labour market. Some exposure to the world of work while in school may help students acquire these skills, reducing the threat of the unknown posed by the transition from school to work.
A number of studies have found that "young people gain particularly valuable information on jobs and careers if obtained in a real workplace through contacts with working people" (OECD, 2010, p. 85). Valuable information from this work exposure can support career decision making

among youth. The authors point out the importance of LMI but also argue that LMI should not be provided unless youth have an effective way to process and understand this information. This reiterates the importance of supporting development of the career decision making skills of youth.

THE ROLE OF LABOUR MARKET INFORMATION

LMI is a key input for career decision-making. Broadly speaking, the provision of LMI is meant to improve the efficiency of labour markets by facilitating the matches between supply and demand, in particular by facilitating and informing the decision-making process of individuals making a career decision or looking for employment and of employers looking to hire workers or provide them with training (Vincent & Voyer, 2007). This definition of the role of LMI applies as much for youth as other individuals. In particular, LMI can help integrate new entrants to the labour market (i.e., navigating school-to-work transitions) (Vincent & Voyer, ibid).

In Canada, as elsewhere, there has been interest on the part of policymakers to invest considerable funds in collecting, collating and disseminating LMI to ensure widespread access to high-quality information about career options and postsecondary education. Yet LMI is only one component of support for career decision-making alongside advice and guidance (Bimrose & Barnes, 2010). The policy objectives for LMI in the context of personal assistance are to inform decisions on career choices and human capital investments (training, education) and to assist search for finding jobs or changing jobs. LMI is thus integral to the design and delivery of high quality careers guidance, although it can often be interpreted as the lowest cost component of the service (Bimrose & Barnes, 2010).

In parallel to investment in LMI, there has been funding for research to identify and understand the information needs of users making decisions about careers and postsecondary studies. Research by Vincent and Voyer found general consensus that there is a sufficient amount of LMI available for Canadians to make decisions but that the effectiveness of LMI is dependent upon the raw data being "mediated", or distilled, by intermediaries who convert the information into relevant knowledge. The range of intermediaries is wide, from communication vehicles/formats (e.g., websites, bulletin boards) to persons (e.g., career counsellors, employment service providers). That said, some organizations still point to LMI shortfalls in specific areas. In giving evidence to the Standing Committee on Finance 2014, the Association of Canadian Community Colleges and Polytechnics Canada indicated that there was insufficient LMI available to help students choose educational and career pathways that lead to professions where the demand for labour is high. Indeed, aside from SRDC's CareerMotion project, there has been little research on the LMI needs of PINEs.

Until recently, LMI has been "static" – meaning that it presents a snapshot of the recent or not-so-recent past – based on survey data, often aggregated and extrapolated and modeled using rational and economic rules of thumb. This can be contrasted with real-time LMI based on *actual* job vacancies posted by employers from which current data on salary, job titles, locations, skills and required qualifications, sectors and occupations is extracted. Providers of real-time LMI contend that it provides a much more reliable indication of what is *actually* happening in the labour market. Plausibly, access to both types of LMI may prove valuable in different contexts, to the extent that users interpret them correctly. This is because the types of information covered in real-time and "static" sources differ, because both real-time and "static" LMI are poor at predicting the future labour market (the one the individual really wants to know about) especially well, and because both sources (but especially real-time information) can be skewed or biased due to unobserved vacancy information.

There is consensus that youth comprise a particular subgroup of LMI users that are likely to obtain higher rates of return from their investments in LMI, and thus would benefit from proactive, targeted delivery strategies. For example, while the OECD (2010b) reported no "quick fix" to reduce the outflow of NEETs from the education system, helping youth to achieve greater alignment between the skills they acquire in school and those needed in the labour market is key. The OECD thus called for educational systems to become more responsive to information (LMI) on changing skills needs.

A Warwick Institute of Employment Research (2006) study sought to identify the key elements of LMI of value to young people. It pinpointed six key areas the information should focus on:

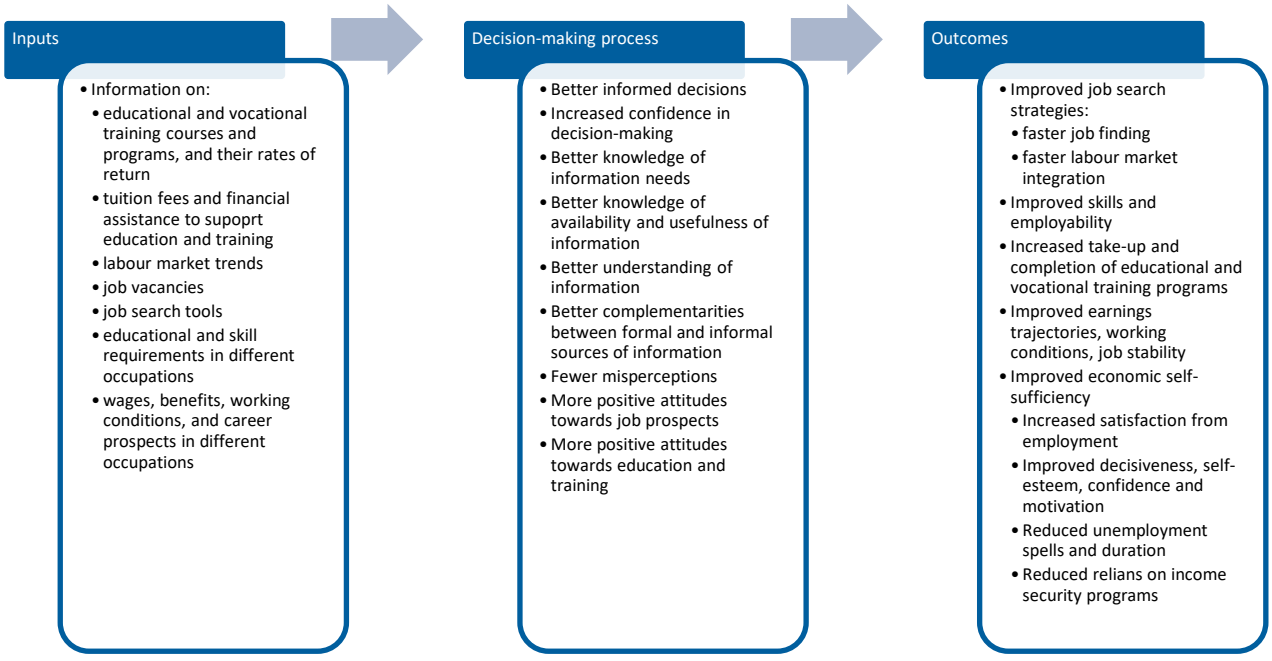
- The demand for labour
- Career progression pathways
- Geographical availability
- Trends
- Transferability of skills and qualifications
- Recruitment and selection methods
- Geographical proximity.

As these points emphasize, career- and postsecondary-related information can and should be delivered in a stage and age-appropriate manner. In elementary school through middle school, the focus should be on helping students understand the different routes and pathways available to them. This should include introduction to the concept of life-long learning and the notion that

there are multiple valid pathways to lifetime success (Public Policy Forum, 2013). From middle school to high school, the focus should turn to information on labour market, education and training options. As already reported, the majority of youth appear to want LMI in or before Grade 10 (Workforce Development Board Windsor Essex, 2010). Interpreted alongside the findings about when youth decide on what they want to do as a career, the provision of LMI is likely to be most influential on the direction of decisions in Grades 9-10 while information provided in Grades 11 and 12 would be more likely to solidify decisions.

Perhaps a heightened concern for Canadian career practitioners is the lack of highly-local LMI (Ghanam Consulting, 2012). Generating local-level LMI using existing national surveys is prohibitively expensive (Schell et al., 2010). In his review of the impact of LMI in Canada, Murray (2010) found that individual LMI users and employers called for more locally-based LMI. Murray did not specifically look at youth, but the WindsorEssex survey reported a significant percentage of youth wanting to hear about local labour market conditions (Workforce Development Board Windsor Essex, 2010). It seems plausible that young people in particular may appreciate information about resources and opportunities that are local to them. Murray did report on another study of Canadian youth which found that LMI needed to be easy to find and access. Appendix B shows the impact of LMI on different outcomes.

Figure 5 Synthesis of main policy objectives and outcomes of interest for LMI (Vincent & Voyer, 2007)



A study in 2014, conducted in British Columbia, on the barriers to employment for vulnerable youth between 15 and 29 years, showed that 19 per cent of the participants surveyed did not have information on where to search for jobs or get information about job postings. 40 per cent of participants who had some form of employment experience indicated that seeking help with information on job search helped them find a job. Also, in the CCDF's study of career education in Atlantic Canada, about 33 per cent of student participants associated their lack of preparedness for the future to limited career information provided in high school.

In a useful matrix conceptualizing how young people access LMI, the Workforce Development Board Windsor Essex (2010) identified four access *profiles* that take into account two dimensions of how youth receive LMI: whether the information is received *actively* or *passively*, and whether the environment in which the information is received is *formal* or *informal*.

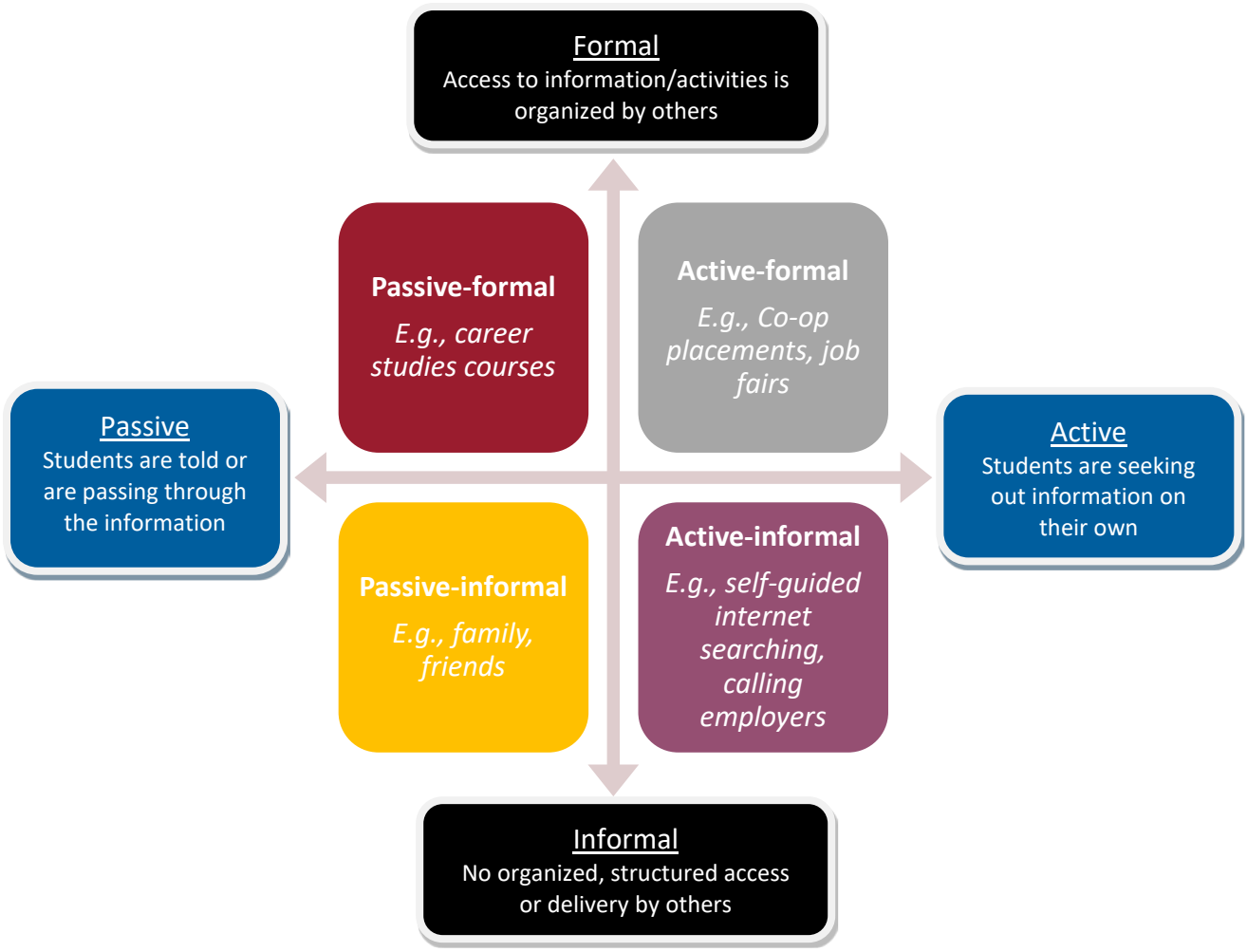
THE ROLE OF CAREER EDUCATION INTERVENTIONS

The majority of evidence on the effectiveness of career interventions comes from the US and UK. Evidence from Canada relies heavily on convenience sampling with high school and university students (Bell & Bezanson, 2006), yielding findings that may not be generalizable to the population as a whole.

Many key impacts are hypothesized to be attributable to career interventions, including improved career prospects, reduced frequency, and duration of unemployment, steeper earnings trajectories and reduced reliance on income security programs. Canadian evidence is lacking for many of these claims. In their systematic review of the evidence, Bell and Bezanson summarize the most researched outcomes of career interventions:

- **Learning outcomes**: increased motivation to continue learning after high school and lowering of school drop-out rates at both the high school and PSE level, plus increases in career maturity and career certainty – the latter being particularly important for girls – and increased academic success.
- **Labour market outcomes**: counselling helps young people integrate LMI into career decision-making. Unsupported provision of LMI appears to have only a limited impact on career decision-making. Youth need access to professionals who can help them understand and apply LMI to their career decision-making process.
- **Social equity goals**: career development interventions help equalize opportunities for disadvantaged youth (because they can reduce their rates of dropping out rates from education) and lowered attitudinal barriers – particularly those that are gendered – that can limit the range of career choices explored by girls.

Figure 6 The dimensions of youth "access" to LMI (adapted from Workforce Development Board Windsor Essex, 2010)



In a recent review of the literature on evidence-based career interventions in the US, Whiston et al. (2017) assessed evaluations of career interventions with a meta-analysis. They concluded that over the past 30 years or so, career interventions have been moderately effective. Although it is impossible to disentangle fully the effects of different modes of delivery, the authors highlighted the importance of "critical ingredients" pointed out by Brown and Ryan Krane (2003). According to Brown et al. (2003), interventions that include written exercises, individualized interpretations and feedback, labour market information, modeling from experts, and support from social networks are much more effective, with a combination of these elements being more effective than individual components alone.

Whiston et al. (2017) also concluded that career interventions were more effective in middle schools and recommended early implementation of interventions, before or during middle school years. They argued that research on career interventions across different subgroups is scant although different races and ethnicities face different barriers in career development. Utilization or involvement in career education is low among some minority groups.

THE ROLE OF INTERMEDIARIES

Parents

Parents often provide information, directions, guidance, or advice to their children's career decision-making at various stages of life. Parents' own experience and knowledge of the labour market and their understanding of the personality of their children may help them in processing career information and tailoring advice to the needs of their children as well as in easing their children's adoption of a suitable career path. Since parents are often the number one influencers of youths' career decisions (CCDF, 2003; Hiebert et al., 2001; CCDF, 2015), parental values, beliefs, educational background, and socioeconomic status, will have a bearing on the resulting career decision making.

Using longitudinal data from the Youth in Transition Survey, Statistics Canada (2015) shows that youths' career expectation consistency (i.e., the stability of the expectation of future occupation over multiple waves of the survey) is positively related to parents' valuation of post-secondary education (Statistics Canada, 2015). Workman (2015) identifies that parental influence on career decisions spans a period from at least middle school to post-secondary.

Limited evidence to date suggests that parents with low expectation, those who have no or inaccurate LMI, or those who do not have skills in making good career decisions may struggle to guide and support their children's career education (Hughes & Gration, 2009). Parents may also play a detrimental role in the children's career education, exploration, and decision-making. According to Keller and Whiston (2008), some parents exert pressure on their children and cause anxiety when there is a difference in career preferences between parents and children. Optimally, parents need to balance what they think is a good career path and the preferences and abilities of their children. Providing career education to parents and involving parents as one contributor to children's career education may help to mitigate the potential detrimental effect of parental expectations.

Career Counsellors, Teachers, Peers, and Other Advisors

Besides parents, research finds students often seek career advice from peers and trusted adults such as teachers (Hutchinson & Bentley, 2011; Nugent et al., 2014). There are both formal and informal career supports from teachers and counsellors.[13] Some provinces include career education as a part of the core curriculum and equip a proportion of teachers to teach career courses. There are also career counsellors who specialize in guiding students in their career decisions. Outside of formal class and counselling settings, teachers also provide career information or advice informally. They can be important sources of trusted information on education choices post-high school and on the world of work. A study by Bloxon et al. (2008) found that students commonly seek advice and help from career counsellors for matters related to career planning. Career counsellors were the secondary source of in-person career advice for students after parents.

Youth also share career information and advice among their peers. It is unclear whether this is beneficial since some information may be inaccurate or based on isolated examples. In the post-secondary setting, there is evidence that peer mentoring has valuable benefits on academic progress (Crisp & Cruz, 2009). Research on peer mentoring interventions also finds peer mentoring is effective in promoting post-secondary persistence (Pellegrini & Scandura, 2005). The limited empirical evidence on the role of peer mentoring is generally consistent with social cognitive career theory.

[13] In this context, counsellors refer to all career advisors.

CAREER EDUCATION RESOURCES IN CANADA

The career development system in Canada is perhaps best characterized as decentralized, as a result of the division of responsibilities between federal, provincial/territorial and municipal levels of government for matters related to education, training, and labour. Certainly, there is no national career development strategy (Bell & Bezanson, 2006). Citing an OECD review *Career Guidance and Public Policy: Bridging the Gap, 2004*, Bell and Bezanson note that decision-making on career development services is often undertaken at the level of the school board or institution, although several jurisdictions have established policies for Provincial-wide or Territory-wide career development service implementation in an attempt to ensure a more coherent delivery of career development programs and services to youth.

Despite the absence of a national strategy, the Blueprint for Life/Work Designs (Jarvis & Richardt, 2000) was considered Canada's national learning outcome framework for a good portion of the past two decades. Blueprint depicts the competencies needed to improve throughout life to prosper in career and life in the 21st century. Several jurisdictions in Canada adopted the Blueprint for Life/Work Designs as their provincial/territorial framework for learning outcomes in their career development K-12 core curriculum, and some agencies still use it. Blueprint has been adopted and adapted up to the present day in Australia, England, Saudi Arabia, and Scotland.

The life/work skills identified in the Blueprint represented the result of many years of developing, piloting, revising, and implementing this life/work skills framework. They include 11 core skills or competencies, sorted into three areas (see Table 4, below):

- Personal Management
- Learning and Work Exploration
- Life/Work Building.

Table 4 Competencies in the Blueprint for Life/Work Designs

Competencies by Area and Level and Learning Stage

COMPETENCIES	LEVEL I	LEVEL II	LEVEL III	LEVEL IV
AREA A:	**PERSONAL MANAGEMENT**			
1. BUILD AND MAINTAIN A POSITIVE SELF-IMAGE	1.1 Build a positive self-image while discovering its influence on self and others.	1.2 Build a positive self-image and understand its influence on one's life and work.	1.3 Develop abilities to maintain a positive self-image.	1.4 Improve on abilities to maintain a positive self-image.
2. INTERACT POSITIVELY AND EFFECTIVELY WITH OTHERS	2.1 Develop abilities for building positive relationships in one's life (I).	2.2 Develop abilities for building positive relationships in one's life (II).	2.3 Develop abilities for building positive relationships in one's life and work.	2.4 Improve abilities for building positive relationships in one's life and work.
3. CHANGE AND GROW THROUGHOUT ONE'S LIFE	3.1 Discover that change and growth are part of life.	3.2 Learn to respond to change and growth (I).	3.3 Learn to respond to change and growth.	3.4 Develop strategies for responding to life and work changes.
AREA B:	**LEARNING AND WORK EXPLORATION**			
4. PARTICIPATE IN LIFE-LONG LEARNING SUPPORTIVE OF LIFE/WORK GOALS	4.1 Discover "lifelong learning" and its contributions to one's life and work.	4.2 Link life-long learning to one's life/work scenarios, both present and future.	4.3 Link life-long learning to one's career building process.	4.4 Participate in continuous learning supportive of life/work goals.
5. LOCATE AND EFFECTIVELY USE LIFE/WORK INFORMATION	5.1 Discover and understand life/work information.	5.2 Locate, understand and use life/work information.	5.3 Locate, interpret, evaluate and use life/work information (I).	5.4 Locate, interpret, evaluate and use life/work information (II).
6. UNDERSTAND THE RELATIONSHIP BETWEEN WORK AND SOCIETY/ ECONOMY	6.1 Discover how work contributes to individuals and the community.	6.2 Understand how work contributes to the community.	6.3 Understand how societal and economic needs influence the nature and structure of work (I).	6.4 Understand how societal and economic needs influence the nature and structure of work (II).
AREA C:	**LIFE/WORK BUILDING**			
7. SECURE/CREATE AND MAINTAIN WORK	7.1 Explore effective work strategies.	7.2 Develop abilities to seek and obtain/create work.	7.3 Develop abilities to seek, obtain/create and maintain work.	7.4 Improve on abilities to seek, obtain/create and maintain work.
8. MAKE LIFE/WORK ENHANCING DECISIONS	8.1 Explore and improve decision making.	8.2 Link decision making to life/work building.	8.3 Engage in life/work decision making.	8.4 Incorporate adult life reality into life/work decision making.
9. MAINTAIN BALANCED LIFE AND WORK ROLES	9.1 Explore and understand the interrelationship of life roles (I).	9.2 Explore and understand the interrelationship of life roles (II).	9.3 Link lifestyles and life stages to life/work building.	9.4 Incorporate the "balanced life/work" issue in life/work building.
10. UNDERSTAND THE CHANGING NATURE OF LIFE/WORK ROLES	10.1 Discover the nature of life/work roles.	10.2 Explore non-traditional life/work scenarios.	10.3 Understand and learn to overcome stereotypes in life/work building (I).	10.4 Understand and learn to overcome stereotypes in life/work building (II).
11. UNDERSTAND, ENGAGE IN AND MANAGE ONE'S OWN LIFE/WORK BUILDING PROCESS	11.1 Explore the underlying concepts of the life/work process.	11.2 Understand and experience the process of life/work building.	11.3 Recognize and take charge of one's life/work building process.	11.4 Manage one's life/work building process.

Each of the eleven competencies has been further categorized into four developmental levels roughly corresponding to Elementary School (Level I), Middle School (Level II), Secondary School (Level III), and Adult (Level IV). Within each level of competency are a number of general learning objectives, referred to in the Blueprint as indicators. These objectives are grouped within four learning stages of acquisition, application, personalization, and actualization.

The final two rows of Table 4 depict competencies related to developing one's career pathway: exploring, understanding and managing the life/work process. As for how these competencies are acquired, Connelly et al. (2013) suggest that the current reality of support and instruction for career pathway exploration in Canada "is an uneven patchwork of programs that may not be meeting students' needs" (p. 14). In their review of career education programs, they categorize career education programs as following one of four skills development models:

- Employability skills
- Essential skills
- 21st century skills[14] e.g. Career Cruising
- Fullan's "Six C's for student, social well-being"[15]

Thus, students experience different instruction and levels of access to support depending on where they live, whether they are in school (and who they are assigned to for career guidance) or school leavers or making school-to-work transitions.

Career services are offered mainly in schools (albeit with little consistency in what comprises such access in schools from province to province or even from school board to school board) and in public employment service centres. Connelly et al. consider such services in general to place too much focus on information provision and on support for immediate decisions, placing insufficient emphasis on longer-term career management skills. However, there is very limited firm evidence to base any conclusions, given limited research on the range of career planning resources and services youth can access in Canada and even less on the effectiveness of these and other interventions (Bell & Bezanson, 2006).

The national scan of careers curricula offered at school board, provincial, and federal levels included in the Connelly et al. report revealed an uncoordinated set of programs and policies at various levels aimed at providing youth with information, guidance and exposure to the world of work. From one setting to another, it would be very hard to predict the resources actually available to help youth in their career decision-making and integration into the labour market.

A study by Bell and Bezanson (2006) reported findings from the Youth in Transition survey that among 18-20 year olds, high school drop outs were least likely to have participated in a career-planning course, with just half having reporting they had taken a course. It is of course quite likely high school drop outs would be most in need of guidance.

The authors found only one provincial survey of access to career counselling in schools, which found roughly one third of students – and most of those PSE-bound – reporting that they had accessed career counselling. Students most often reported their frustrations with guidance

[14] Twenty-first century skills are generally conceptualized as: "an integrated approach to skills, technology and learning that recognizes that computer-based devices are a central and critical part of contemporary life and that knowledge of them is key to both education and employment." (Connelly et al., 2013, p. 12).

[15] These six Cs are: Character education; Citizenship; Communication; Critical thinking and problem solving; Collaboration; and Creativity and imagination. Fullan, M. (2013). Great to Excellent: Launching the Next Stage of Ontario's Education Agenda.

services in terms of the lack of connection between their course choices and career paths and in terms of too narrow a focus on university as the preferred postsecondary learning option (Bell & Bezanson, 2006). The review of sources of career information below, therefore, is better able to describe the range of types of resources than it is able to quantify their availability and use.

RESOURCES IN THE K-12 EDUCATION SYSTEM

Mandatory career courses have been added to the core curriculum in a growing number of jurisdictions in the past 10-15 years, with Alberta, BC, Newfoundland and Labrador, Ontario and Francophone schools in PEI having implemented a mandatory careers curriculum. There is evidence nonetheless that even in these provinces, provision is patchy. It appears that a combination of logistical and attitudinal factors have constrained the extent of actual delivery, leaving questions about the perceived value of mandatory courses (Connelly et al., 2013).

For example, even in schools with mandatory careers courses, 26 per cent of counsellors surveyed by Malatest for a 2009 Canada Millennium Scholarship Foundation reported no careers courses being offered. The reasons, according to the survey respondents, included: 1) understaffing of career guidance offices yielding insufficient staff to meet commitments to career course provision, and 2) very low incentives for the course delivery. In addition, surveys of students' perceptions of mandatory career education have revealed low demand for the courses as delivered. Half of students report they would not take the courses if they were options. Close to three-quarters considered the courses to be of low importance and "a waste of time."

Possibly the curriculum focus of mandatory career courses in Canada may be off target. Connelly et al. report the bulk to be on self-regulation, soft-skills development, self-reflection, and job searching.

In addition to these K-12 curriculum with career education, schools also provide individual and group counseling. School counselors and related guidance personnel are often responsible for these counseling sessions (Shepard & Mani, 2014). These career counseling positions are dependant on school sizes. The larger the school size, the more the number of counselors and vice versa. Counselors also play other roles apart from giving career directions, which creates variability in the promotion of career development among students.

Other types of high school career development programs include:

- Technical/vocational education and training (VET) programs;
- Pre-apprenticeship programs;

- Cooperative education;
- Dual credit programs;
- Specialist diplomas;
- Pilot projects (e.g., Future to Discover, Life After High School, AVID).

Table 5 gives a summary of the main resources of some of these pilot projects and their effectiveness.

Table 5 Summary of key features and findings of the FTD and AVID programs

Project	Future to Discover	Advancement Via Individual Determination
Components	Post Secondary Ambassadors	Enrollment of qualified students in elective course
	Career Focusing Component	Post-secondary teachers/ special teachers
	Future in Focus	Field trips to colleges and universities and academic related events
	Future to Discover web site	
	F2D Magazine	
	Lasting Gifts	
	Learning Accounts	
Effectiveness on post secondary outcomes	Increased high school graduation rates and lowered high school drop-out rates Significant improvement in application to and enrolment in post secondary schools, annual earnings at ages 23-24. When combined with Learning Accounts, significant impact on postsecondary graduation	Did not have any significant effect on post secondary enrolment

Enthusiasm is growing for increased provision of experiential learning in Canada, which involves public and private sector employer support for hands-on learning in the K-12 and postsecondary systems. Internships, co-op programs, community service learning placements in places of employment allow youth to apply the knowledge and skills they have learned to a real-life project. The advantages for young people include the ability to try out their careers of choice early, and gain valuable work experience that strengthens their marketability and thus improves career prospects at graduation. It provides a connection between education and employment that help youth to see first-hand the skills demanded in their career of choice and consider how well they are acquiring them.

RESOURCES IN THE POSTSECONDARY EDUCATION SYSTEM

Career services – Typically these represent on-campus career development services that help students, alumni, faculty and staff prepare for successful careers and, often, connect employers with matched students and alumni employees. There has been remarkably little evaluation of their effectiveness, nor even of their success in outreach to and participation of students.

Dual credit programs – These are PSE programs that engage students before they graduate high school. The students participate in apprenticeship training or post-secondary, college or university courses while in high school, earning both high school and post-secondary credits for the same course. There is limited evidence from Canadian provinces to date on their effectiveness as a form of career education, although the decision to take them necessitates at least some element of postsecondary planning on the part of high school students. US evidence suggests access to dual credit courses promotes retention of students within the education system and decreases higher education time-to-completion (Haskell, 2014; 2016).

RESOURCES OUTSIDE THE EDUCATION SYSTEM

Out-of-school programs targeted to sub-populations of eligible youth

This type of service provision by non-governmental organizations is typified by non-profit organizations or social enterprises that target services to identified disadvantaged groups (e.g., Pathways to Education, Raise the Grade). Native Friendship Centres, immigrant and disability services societies often provide career services to the populations of youth they serve. The effectiveness of these targeted initiatives depends largely on the effectiveness of their approach in matching services to needs. They hold the potential – given their detailed knowledge of their clientele – to tailor support appropriately for the career decision making needs of their targeted sub-groups. Inevitably, as they serve concentrate pockets of youth who volunteer to participate

outside of mandatory school time, it is difficult to assess their overall contribution to career education measured across the whole population.

Out-of-school programs available to all youth

Career service provision by non-governmental organizations without a specified target population are often organized and supported by government (representing federal and provincial collaboration as is the case with Work BC Employment Service Centres) while others operate independently. Career services are bundled with other employment services and, as with services in schools, there is little evidence from which to document typical user experience. Rarely do centres specialize solely on serving youth, although the Toronto youth job centre and Calgary youth employment centre represent exceptions. Evaluations – where conducted – rarely single out career services. A recent high-level evaluation of Manitoban clients of federally funded employment programming (ESDC, 2012) found about a quarter approached service providers to seek help on selecting a career pathway and the majority reported they were highly satisfied with their access to assistance.

ONLINE CAREER RESOURCES FOR YOUTH

Watts (2002) describes four phases in the development of information and communications technology (ICT) in career guidance: the mainframe phase (1960 to late 1970s), the microcomputer phase (1980s to mid-1990s), the web phase (1990s to early 2000s), and the digital phase (current). Over the past two decades, in particular, the development of the Internet has delivered a massive increase in access to career information and sources of advice. The combination of consumer demand for highly customizable supports and the need to find cost-efficient ways of delivering services has encouraged the development of many hundreds of career resources online.

While a substantive body of research has considered the effectiveness of career guidance in more traditional formats, and despite the emergence of career websites as long ago as the mid-1990s, there has been little research investigating effective approaches for the online communication of careers information (Hooley, 2012). Knowledge of whether and how career web sites can (help to) meet the objectives of career guidance, for whom they are effective and under which circumstances is still in the early stages of being developed. Literature on information-seeking behaviour of adolescents generally support *integration* of online career resources and labour market information into more traditional career interventions.

IMPLICATIONS FOR THE CURRENT STUDY

EMPIRICAL METHODS USED IN EVALUATIONS OF CAREER EDUCATION

Randomized control trials (RCTs) are often considered the golden standard to assess the impacts of career education. In an experiment, the control group sample receives services currently provided and adopts the role of the counterfactual experience (what would have happened in the absence of the treatment) for the program group who receives the treatment. Notably the treatment is often the offer of the intervention, since participation can never be assured, even with mandatory participation. Frequently, a key test of the intervention is how attractive it turns out to be to program group members such that they receive a substantial dose of its services. With independent random assignment of individuals in large samples into the program or the control group, the difference in observed outcomes between the program and control groups can be attributed to the impacts of the treatment, i.e. RCTs hold the prospect of controlling for other factors that may also influence the outcome, since both program and control groups experience them but only the program group receives the treatment. Even though a well-run RCT should be able to estimate the true causal effects of a career education treatment, large scale long term studies of career education using RCTs are very rare. Most of the empirical evidences on career interventions are short-term effects. In 2002, Hughes et al. (2002) commented that "*short-term evaluation studies should be extended where appropriate, to include client research and to enable a longer-term analysis of key findings and trends.*" In 2016, Hughes, Mann, Barnes, Baldauf and McKeown conducted a literature review of careers education interventions that lamented "*The research literature over the last 20 years on the impact of careers education on student outcomes is largely considered weak and fragmented, due mainly to the complexity of differing elements being identified and reported in differing ways. Overall, there are significant shortages in quasi-experimental and experimental studies in the career development field.*"

The more common quantitative methods in the literature of assessing the effects of career education are non-experimental or quasi-experimental. Multivariate modelling with a quasi-experimental design is commonly used to narrow down intervention's effects. For example, Bullock-Yowell et al. (2014) studied a career decision making intervention with unemployed youth using a quasi-experimental design and analysed the data collected through MANOVA. Their results showed that the one-hour workshop did not have a significant effect on negative career thinking among the treatment group. Similarly, Baig (2012) used MANOVA to analyze the significance of career courses on college students' decision-making skills as well as the roles of

gender, family pressures and financial pressures on the outcomes. Baker (2002) also used an ANOVA and MANOVA to analyze the ASVAB career program.

Other studies have also used the difference in difference approach to assess the effects of career interventions. For example, Ferrari et al. (2010) applied a repeated-measures analysis of variance, which is analogous to the difference-in-difference method, to evaluate the effects of an intervention to foster time perspective and career decidedness in Italy. Lavecchia et al. (2019) assessed the impact of the Pathways to Education pilot project by using a difference-in-difference approach to analyse longitudinal data. They found positive but heterogeneous impacts of the program on youths' key career pathways outcomes such as postsecondary enrollment.

Other studies have used multivariate regressions to analyze the effects of interventions on some outcomes, controlling for some background characteristics such as gender, race, socioeconomic status, and prior achievements. An evaluation of the impact of career guidance on employed adults by Killeen and White (2000) applied sample matching to create a counterfactual comparison group. A matched comparison group sample controls ostensibly only for observed differences between intervention recipients and the selected members of the comparison sample. It can control for unobserved differences only to the (unknown) extent these are correlated with observed differences. Lapan et al. (1997) estimate the impacts of a career intervention on the school experiences of high school students using hierarchical linear modelling (HLM) to control for both the characteristics of the individual and the characteristics of the group.

Since SRDC's BC AVID and FTD pilot projects are large scale RCTs with rich data on the evolution of career influences, expectations and career decisions among high school students over the crucial years of their career development, simple comparison and contrast of the pathways between participants of various career education and resources are likely to demonstrate some strong empirical evidence not common in the literature.

THE EMPIRICAL STUDY DESIGN AND METHODS

Both BC AVID and FTD had a similar study design. Both are randomized controlled trials of interventions involving career education as part of the treatment that collected data on high school students receipt of career support through Grades 9 (AVID) or 10 (FTD) to 12. Both had a similar survey data collection design. Both started with a baseline survey of participating Grade 8 (AVID) or Grade 9 (FTD) students which included a series of questions of occupation aspirations and postsecondary aspirations. The latter were asked of parents also. Students were surveyed again in Grade 12 (AVID project participants completed a Grade 11 survey as well). In Grade 12, they were again asked about their postsecondary plans. Finally, participants were surveyed for the last time five and half years into the project, and they were asked about their postsecondary education (including the field of study) and their employment (including their

occupation). The studies included individual level linkage to the detailed secondary and postsecondary education and program group participants' program participation records. From these rich data, it is possible to investigate empirically how career education affected the pathways from early occupational aspirations and postsecondary plans to the actual realization of postsecondary study and occupations.

The literature review suggests that many students develop a better idea of their career aspirations and postsecondary plans from Grades 9 to 11. Therefore, some students' reported occupation aspirations at Grade 8 or 9 are likely vague (don't know was a permitted survey response) while others had more concrete career and postsecondary plans. The difference will be reflected in both the precision of the occupation aspiration reported at Grade 8 or 9 as well as the consistency of postsecondary expectations between the earlier and later high school surveys. Therefore, the current empirical study plans to derive a series of indicators of the career clarity based on the answers to the earlier and later surveys and apply a "difference-in-difference" model to study how various career education interventions helped to improve career clarity. The empirical study will pay particular attention to potential factors, such as disadvantaged socioeconomic characteristics, that may hinder the impact of different interventions.

The first few years after Grade 12 represent a period of realization and adjustment in whatever career plan was developed in high school. Some students may have a concrete career plan that does not fit with their abilities, interests, or circumstances. Such cases may experience substantial deviation from their planned participation, field of postsecondary study and actual occupation. Therefore, the empirical study will derive a series of indicators to capture the degree to which each participants achieved realization of their high school career plan based on the answers to the Grade 12 and five-and-a-half year surveys. Again, the empirical study will apply a "difference-in-difference" model to study how various career education interventions help to improve the realization of career plans. The empirical study will pay particular attention to factors, such as disadvantaged socioeconomic characteristics, that may hinder successful realization of the original career plan.

As a first step in the data analysis, the SRDC team is coding the opened ended questions recording occupational aspirations, postsecondary education expectations, field of study, and actual occupations from the various surveys. SRDC is using established coding schedules, such as the National Occupational Classification and the Classification of Instructional Programs. SRDC will calculate summary statistics based on the coded responses to reveal the pattern of evolution of aspirations, plans and their realization over time. Next the research team will derive appropriate indicators of variation in these time-varying attributes for analysis. Finally, it will use multivariate analysis to demonstrate the effects of various career education interventions and explore the conditions under which different interventions are effective.

CONCLUSION

In this first deliverable, SRDC has reviewed the literature on youth's career decision making and career education to inform our upcoming empirical exploration of the long-term effects of career education interventions using SRDC's BC AVID and Future to Discover projects. In general, researchers have developed understanding of how youth make career decisions but the literature is still in its infancy. There is limited evidence on the effects of youth career education on the long term evolution of their career decisions. Also missing from the evidence is how career education helps especially vulnerable youth facing multiple barriers in their transition to the labour market. We summarize the implications of this review as the following:

- Social cognitive career theory is an important paradigm from which to consider career development because it sheds light on the importance of environmental and contextual factors. These factors should be accounted for in the project's empirical specification. For example, parents, career counsellors, teachers and peers are all groups that can influence career decision-making among youth.

- Because of behavioural biases and heuristics among youth, career decisions are not always rational even if relevant and valuable career education and information are available. The empirical analysis should consider the effects of these biases and heuristics in interpreting the results.

- Age or stages of career development are important as they determine brain maturity, which affects decision making.

- Institutional and social factors also influence the decision-making process.

- Multivariate models and longitudinal models would help in the analysis specification, though the focus should be to take advantage wherever possible of the advantages of the randomized control trials embedded in the datasets in assessing the long-term effects of career education on career path development.

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APPENDIX A: INFLUENCES ON PINEs

Despite the absence of specific research on Canadian PINEs, Bell and Benes (2012) draw on the international literature to draw several tentative conclusions about the barriers facing PINEs:

- **Polarized growth in the labour market**. If polarization of the labour market due to skill-biased technological change is genuine as posited by authors such as Autor (2010), then it can be characterized as comprising knowledge sector jobs (those that require PSE credentials or highly refined skills) at the top and entry-level jobs (those that do not require PSE credentials or considerable work experience) at the bottom, with fewer opportunities arising in the middle. This produces an "hourglass labour market" in which increasing numbers of young graduates get stuck at the entry-level. As the number of PSE graduates in Canada has increased, the influx has driven up qualification expectations in both knowledge *and* entry levels. The result, Bell and Benes posit, is more underemployed PSE graduates become caught in precarious entry-level jobs that are not commensurate with their education or career aspirations, i.e., PINEs.

- **Recessions** impact youth more than older workers. In part this is due to "last in the door, first out of the door" employment practices. Youth will naturally have less experience, less seniority and weaker ties to employee protection programs but recessions can exacerbate these shortfalls. Often government programs aimed at ameliorating unemployment during economic downturns target youth without credentials, overlooking PINEs. Youth, who may have followed advice on sound educational investment and the necessity of obtaining a postsecondary credential, can then shortchanged and discouraged after achieving the credential in recessionary periods. Opportunities to obtain credential-related jobs with earnings progression are limited and they systemically miss out on service provision. LMI represents one type of support that is available to help such youth find opportunities, or re-train appropriately.

- **Media stereotypes** of youth born in the early 1990s ("Generation Y") being needy and demanding may put off some employers from hiring youth. Labour market information can help change youth expectations (to the extent this is needed) and employer perceptions of those expectations and the capabilities of new graduates.

- **Earning while learning has declined**. While PSE credentials support labour market integration, those who combine work while studying have shorter school-to-work transition periods and earn more post-studies than their study-only counterparts. Canadian students who want to earn while they learn have found this more difficult since the 2008 recession (as student unemployment rates have risen) especially with respect to part-time and summer employment. There are no reliable counts on unpaid internships but according to the evidence given to the Standing Committee on Finance 2014 by the Canadian Intern

Association, the Canadian Labour Congress, the Canadian Federation of Students and the University of Toronto Students Union, there are up to 300,000 unpaid interns per year in Canada. This may change as the economy continues to rebound, but those who did not earn while they learned in recent years will have less work experience and as a consequence face longer school-to-work transition periods, putting them at risk of becoming PINEs.

- **Minority graduates are typically more highly represented among PINEs**. In Canada, rural and remote youth are the most likely to face poor labour market attachment while Aboriginal youth and youth with disabilities have the lowest rates of labour market integration. The proportions specifically among PINEs have yet to be established, but it is plausible that labour market discrimination may have a bearing. In any case, minority representation will be a consideration in designing programming and policies to improve youth labour market attachment.

- **Lack of use of career services and safety nets.** Postsecondary students may not be taking advantage of career services to plan their future transitions sufficiently early. Some may not be aware of, nor see the need to use, existing career services early enough, which others may have trouble locating appropriate support. There is no consistent model of career services nor a national youth school-to-work strategy in Canada. Bell and Benes refer to literature that promotes both as critical to supporting the integration of new entrants to the labour market. Using 2010 data from OECD, the authors also note that financial security for job search may also be an issue for new entrants as less than 12 per cent of Canadian graduates are eligible for employment insurance benefits.

APPENDIX B: THE IMPACT OF LMI

A recent review of evidence in Canada on the impact of LMI concluded that while employers and workers acknowledge the role LMI plays in increasing their knowledge about the labour market and supporting career decision-making, little is known about the effect LMI itself has on key labour market outcomes (Murray, 2010). The impact of LMI can be difficult to measure for several reasons (Vincent & Voyer, 2007; Murray, 2010):

- **Self-selection bias**, whereby LMI is used by highly motivated individuals. These individuals self-select into using it on the basis of unobserved characteristics, so the effects of the LMI are difficult to disentangle from the effects of the high motivations held those who use it.
- **Reverse causality**, whereby the use of LMI leads to getting a job which in turn increases access to LMI.
- **Dosages are small**, typically. Any given individual consumes only a small amount of LMI at any given time, so it is difficult to capture significant longer-term economic outcomes or conduct cost-benefit analyses.
- **Bundling**, whereby it is difficult to disentangle the effect of LMI per se from the effect of its delivery format and source.

No studies have assessed the impact of LMI per se on labour market outcomes. There is similar gap in research assessing the impact of LMI within labour market programs like job-search assistance and career counseling, although some SRDC experiments, like CareerMotion and Life After High School, have been implemented to determine whether a package including LMI targeted to different age groups of youth can solve a particular policy problem. The problem is teasing out the impacts of different components of a career development intervention to ascertain which components are most effective, and for which types of youth.

Much empirical evidence on LMI instead concerns the usability of products, with usability defined as readability, accuracy of information, ease of access, and amount of use (Canadian Research Working Group in Evidence-Based Practice, 2010). Murray (ibid.) considers Canadian evidence on LMI as "growing" but not yet large, and much of it derives from surveys of user needs.

IMPACT OF CAREER INTERVENTIONS WITH A LMI COMPONENT

The majority of evidence on the effectiveness of career interventions comes from the US and UK. Evidence from Canada relies heavily on convenience sampling with high school and university

students (Bell & Bezanson, 2006) yielding findings that may not be generalizable to the population as a whole.

Many key longer-term impacts are hypothesized to be attributable to LMI including improved career prospects, reduced frequency and duration of unemployment, steeper earnings trajectories and reduced reliance on income security programs. Canadian evidence is lacking for many of these claims. In their systematic review of the evidence, Bell and Bezanson summarize the most researched outcomes of career interventions:

- **Learning outcomes**: increased motivation to continue learning after high school and lowering of school drop-out rates at both the high school and PSE level, plus increases in career maturity and career certainty – the latter being particularly important for girls – and increased academic success.

- **Labour market outcomes**: counselling helps young people integrate LMI into career decision-making. Unsupported provision of LMI appears to have only limited impact on career decision-making. Youth need access to professionals who can help them understand and apply LMI to their career decision making process.

- **Social equity goals**: career development interventions help equalize opportunities for disadvantaged youth (because they can reduce their rates of dropping out rates from education) and lowered attitudinal barriers – particularly those that are gendered – that can limit the range of career choices explored by girls.

A landmark in recent Canadian research on the impact of LMI is the summative evaluation of HRSDC's LMI products and services in 2005. The study relied mainly on regression analysis using survey and administrative data and found inconclusive evidence regarding the impact of LMI on unemployment duration in the short run. Murray's (2010) review of the state of knowledge includes the HRSDC study and other studies such as SRDC's randomized trial *Navigating the Labour Market*. Murray concluded that there was no evidence to link LMI to labour market outcomes. Nonetheless, SRDC's trial did suggest that short LMI exposure increased labour market knowledge among adults and other's evidence suggested that personalized assistance could increase the beneficial effects of LMI (Murray, 2010). As Bell and Bezanson, 2006 also point out, studies on the effectiveness of career interventions on young adults and out-of-school youth in particular represent significant gaps in research.

While it is important to measure impacts of LMI, to justify the major public investment in its creation, at least as important is research into how people process LMI. According to Vincent and Voyer (2007), more research in Canada is needed on what LMI people need, what LMI they use, how LMI is processed and converted into knowledge, constraints and limitations on making decisions, the effects of different types of LMI on decision-making processes and outcomes, the role of engagement in career planning, pre-cursors to decision-making (including the

development of planning skills) and the role of adding social support and/or feedback into the decision-making process.

How youth *process* LMI is currently an emerging area of study. Initial evidence points to optimal outcomes when youth consume LMI via multiple delivery approaches simultaneously, such as Web site access with counsellor guidance. This is the conclusion of a review of meta-analyses of career development interventions with and without a counselor by Savard et al. (2005). LMI users, including students, need to have LMI that is *digestible* (Schell et al., 2010) and a counselor may help with that. Key to this process is the work of the career practitioners (guidance counsellors and educators inside and outside of school) who introduce and guide youth through their career exploration and decision-making activities. Evidence cited earlier noted few students voluntarily access counselors.

APPENDIX C: BEHAVIOURAL HEURISTICS AND BIASES

The 25 heuristics and biases identified by Strough et al. (2011) are defined below.

- Anchoring effect – The tendency to rely too heavily on the first piece of information offered (the "anchor") when making decisions. During decision making, anchoring occurs when individuals use an initial piece of information to make subsequent judgments. Once an anchor is set, other judgments are made by adjusting away from that anchor, and there is a bias toward interpreting other information around the anchor.

- Attraction effect – When a new but "irrelevant" option affects preferences between existing options. In nearly all such cases, introducing a less attractive option enhances the attractiveness of the option it most resembles.

- Availability heuristic – A mental shortcut whereby decisions are based on immediate examples that come to mind. Events or situations with similarities to the decision in question are judged as more frequent and possible than others. Greater credence is given to this information and humans tend to overestimate the probability of similar things happening in the future.

- Bandwagon effect – The tendency to do (or believe) things because many other people do (or believe) the same.

- Causal attribution bias – Collectively refers to one of a number of systematic errors that people make when evaluating or try to find reasons for their own and others' behaviours including:

    - Ultimate attribution error (the ultimate attribution error arises as a way to explain an outgroup's negative behaviour as flaws in their personality, while explaining its positive behaviour as a result of chance or circumstance. It is also the belief that positive acts performed by ingroup members are as a result of personality. Should an ingroup member behave negatively (which is believed to be rare), it is attributed to situational factors).

    - Fundamental attribution error (similar to ultimate attribution, overemphasizing the role of dispositional factors in explaining others behaviour while ignoring the influence of situational factors).

    - Actor-observer bias (an extension of the fundamental attribution error that stems from over-valuing dispositional explanations of others' behaviours, while

under-valuing dispositional explanations and over-valuing situational explanations for our own behaviour).

    - Hostile attribution bias (a tendency to interpret others' ambiguous behaviours as hostile, rather than benign).

- Clue-seeking bias – The tendency for a participant to look for clues when looking at an array of choices to determine the "right" choice.
- Complexity aversion – Dealing with a complex array of choices is costly and humans find it difficult to process all options equivalently. This means the value of each menu of options decreases with the number of choices.
- Conjunction fallacy – A formal fallacy that occurs when it is assumed that specific conditions are more probable than a single general one. This often occurs when humans choose a more representative sounding example than a more common one.
- Correspondence bias – The tendency to draw inferences about a person's unique and enduring dispositions from behaviours that can be entirely explained by the situations in which they occur.
- Counterfactual thinking – The tendency to create possible alternatives to life events that have already occurred (when it is of course impossible to change the past).
- Endowment effect – The tendency for humans to ascribe more value to things merely because they own them (also known as divestiture aversion).
- Framing effect – A cognitive bias in which people react to a choice, often involving a risk, in different ways depending on how it is presented. Commonly examples include positive and negative framing: "We have a 90 per cent course retention" versus "Of every 10 students taking the course, one will fail".
- Gambler's fallacy – The mistaken belief that if something happens more frequently in one period it will occur less frequently in another, or vice versa.
- Hindsight bias – The inclination to see a past event as having been predictable, when there was little or no objective basis for predicting it.
- Hyperbolic discounting – Time-inconsistent discounting: making different choices due to a delay to the consequences of the choice that goes beyond the effect of time on the value of the outcome. E.g. choosing $20 this birthday when the alternative was $40 next birthday.

- Negativity bias – When things of a negative nature influence decision-making more than things that are equally intensive but positive.
- Optimism bias – The belief held by someone who thinks a negative event is less likely to occur to them than others in equivalent situations.
- Outcome bias – The tendency to judge a decision by its eventual outcome instead of judging it based on the quality of the decision at the time it was made.
- Overconfidence bias – When a person's subjective confidence in his or her judgments is reliably greater than the objective accuracy of those judgments.
- Probability neglect – The tendency to disregard completely probability when making a decision under uncertainty. This is unlike hindsight bias or the gamblers fallacy where probability is considered but incorrectly used.
- Ratio bias – The tendency for people to judge a low probability event as more likely when presented as a large numbered ratio such as 300/1000 than as a smaller-numbered but equivalent ration such as 3/10.
- Representativeness bias – The tendency to estimate the likelihood of an event by comparing it to an existing prototype that already exists in our minds. The prototype is what we think is the most relevant or typical example of a particular event or object. Decisions based on representativeness, increase the likelihood of errors especially overestimating the likelihood that something will occur. Just because an event or object is representative does not mean that it is more likely to occur. Representativeness is similar in its effect to the gambler's fallacy, the regression fallacy and the conjunction fallacy.
- Sentinel event sensitivity – Is present when humans are overly swayed by emotionally charged events that may not be at all relevant.
- Status quo bias – A preference for the current state of affairs, which is overly privileged as a reference point, such that any change from the current situation is perceived as a loss, and insufficiently explored to determine whether it could represent a gain.
- Sunk-cost fallacy – The tendency to increase investment in a decision, based on the cumulative prior investment, despite new evidence suggesting that the cost, starting today, of continuing the decision outweighs the expected benefit.

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