

**COLLEGE STUDENTS WITH LEARNING DISABILITIES: A DEVELOPMENTAL
PERSPECTIVE ON CONCEPTIONS OF LEARNING, LEARNING DISABILITY,
AND OTHERS IN LEARNING**

by

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ABSTRACT

A call for the design of programs focused on the development of self-awareness skills permeates the field of research and practice on postsecondary students with learning disabilities (LD). Important components of self-awareness are students' advanced understanding of learning, LD, and the social context (peers, instructors, classmates) of college learning.

This study explores students with LD's conceptual understanding of learning and LD by situating it within developmental theoretical frameworks delineating the form and content of adult reasoning. Twelve female and five male college-students with LD participated in two-hour interviews. Students' thinking about others was explored by asking participants to reason about the behaviors, intentions, feelings and traits of the characters in two scenarios depicting typical dilemmas faced by students with LD. Students' conceptual understanding of learning and LD was elicited by means of open-ended questions followed by prompts. Students' responses were scored for level of cognitive complexity and coded for conceptual content.

Overall, the students reasoned abstractly about learning and LD at a level of complexity expected from college-age population. They demonstrated well-developed understanding of others' expectations and motivations especially as they relate to the themes of self-identification, seeking accommodations, and understanding of LD. Students' conceptions of learning and LD presented qualitatively different variations on main themes. These variations paralleled the increase in complexity and were associated with experience (number of years of education). The overarching understanding of learning as acquiring knowledge transitioned from understanding learning as an external, given task to learning as an internal, personal-development process. The common understanding of LD as a difference

transitioned from a difference related to an external label and an imposed constraint, to meaning of “difference” as a special ability, an asset, and a source of identity.

These results indicate a possible progression in the evolution of the concepts of learning and LD throughout the college career of students with LD. The approach to this conceptual content and its description can inform and serve as starting points in the development of programs that foster the conceptual understanding of learning, LD, and the social-context of the educational enterprise, as a way of building these students’ self-awareness skills.

TABLE OF CONTENTS

Abstract.....	ii
Table of Contents.....	iv
List of Tables	viii
List of Figures.....	ix
Acknowledgements.....	x
Dedication.....	xii
Chapter One Introduction.....	1
General Problem.....	1
Relevant Research	7
Theoretical Framework and Purpose.....	8
Theoretical Framework	8
Purpose.....	10
Overview of Subsequent Chapters	12
Chapter Two Literature Review	13
Introduction	13
Personal Epistemology Research.....	13
Developmental Models of Personal Epistemology.	15
Implications of Personal Epistemology	
Research.....	18
Conceptions of Learning Research	19
Implications of Conceptions of Learning	
Research.....	21
Neo-Piagetian Theories of Cognitive Development:	
Fischer’s and Case’s Models	23
Order in development	24
Variability and pathways in	
development.....	29
Integrating both models	35
Implications for research with college students	
with learning disabilities.....	37

	Understanding of the Concept of Learning Disability	40
	Summary and Research Questions.....	44
Chapter Three	Method	47
	Introduction.....	47
	Participants.....	47
	Measures.....	51
	General Metric for Classifying Cognitive Complexity.....	52
	Integrating Cognitive Complexity with Conceptual Content.....	54
	Contextual Support.....	55
	Role of Verbal Abilities.....	56
	Descriptions of the Study's Conceptual Tasks.....	57
	General Interview Format.....	57
	General Scoring Process.....	60
	Content Analysis.....	60
	Pilot Study.....	62
	Understanding Others in the College Learning Context.....	63
	Conceptions of Learning.....	66
	Conceptions of Learning Disability.....	68
	Procedure.....	69
	Establishing Contact.....	69
	Interview Session.....	70
	Measures for Ensuring Credibility of the Findings	72
Chapter Four	Results.....	74
	Introduction.....	74
	Understanding Others.....	75
	Cognitive Complexity.....	75
	Conceptual Content.....	78
	Conceptions of Learning.....	86
	Cognitive Complexity.....	86

	Conceptual Content.....	92
	Conceptions of Learning Disability.....	97
	Cognitive Complexity.....	97
	Conceptual Content.....	100
	Complexity across Tasks.....	108
Chapter Five	Discussion.....	110
	Summary of Purpose and Research	
	Approach.....	110
	Summary of Findings.....	112
	Cognitive Complexity.....	112
	Conceptual Content.....	115
	Understanding Others.....	115
	Conceptions of Learning.....	116
	Conceptions of Learning Disability	117
	Credibility of the Findings.....	119
	Limitations.....	120
	Sample: Demographics.....	120
	Sample: Operational Definition of LD.....	120
	Self-selection.....	121
	Directions for Future Research.....	121
	Developmental Studies.....	121
	Focus on Self as Learner.....	122
	Implications for Practice.....	122
	Conclusion.....	125
	References.....	127
	Appendices.....	143
Appendix A	Letter of Initial Contact.....	143
Appendix B	Student Letter of Initial Contact.....	145
Appendix C	Background Information Questionnaire.....	147
Appendix D1	Understanding of Others-The Personality Diagnostic Task.....	151
Appendix D2	Understanding of Others-College Scenarios.....	158
Appendix E	Conceptions of Learning.....	161

Appendix F	Conceptions of Learning Disability	164
Appendix G1	General Scoring Metric.....	167
Appendix G2	Additional Scoring Guidelines.....	170
Appendix H	Informed Consent Form.....	172
Appendix I	UBC BREB – Certificate of approval.....	175

LIST OF TABLES

Table 1	Fischer's Representation and Abstraction Tiers, and Substages of Skill Structure Development	30
Table 2	Participants' Gender, Age, Diagnosis and Areas of Weaknesses	50
Table 3	Participants' Gender, Age, Vocabulary Range, Verbal IQ Range, Years of Education and Program of Studies	51
Table 4	Summary of Study's Measures.....	58
Table 5	A Summary of the Themes Identified in Students' Responses to "Understanding Others" Task.....	79
Table 6	A Summary of the Themes in Students' Responses to the "Conception of Learning" Task.....	93
Table 7	A Summary of the Themes in Students' Responses to the "Conception of Learning Disability" Task.....	101
Table 8	Individual and group statistics: Age, years of education and complexity levels on the three tasks.....	109

LIST OF FIGURES

Figure 1	Individual performance on the “understanding others” task in the low- support and high-support conditions by education.....	77
Figure 2	Individual performance on the “understanding others” task in the low- support and high-support conditions by age.....	78
Figure 3	Individual performance on the “conceptions of learning” task in the low- support and high-support conditions by age.....	87
Figure 4	Individual performance on the “conceptions of learning” task in the low- support and high-support conditions by education.....	87
Figure 5	Individual performance on the “conceptions of learning disability” task in the low- support and high-support conditions by age.....	98
Figure 6	Individual performance on the “conceptions of learning disability” task in the low- support and high-support conditions by education.....	98

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DEDICATION

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To the memory of my father who emphasized the importance of education, hard work,
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CHAPTER ONE

Introduction

General Problem

It was just around the 1980s when the learning disabilities (LD) field had to admit that children and adolescents identified as learning disabled did not grow out of their LD (Gerber, 2001). In 1986, the National Joint Committee on LD (NJCLD) included in a part of the definition of LD, the notion that LD could persist into the adult years:

Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span. (as cited in Hammill, 1990, p. 77)

Acknowledging the persistence of LD into the adult years, the NJCLD (1986) also issued a “Call to Action” which emphasized the need for more research with adults with LD. Since the 1980s, the research literature on adults and especially the literature on college students with LD has increased rapidly.

The increase in research focus on postsecondary students with LD was also prompted by the phenomenal rate of increase in the number of students with LD enrolling in postsecondary institutions. By the 1990s, many high school graduates with LD had experience with special education services (Brinckerhoff, McGuire, & Shaw, 2002). High school students with LD were able to take sufficient academic course work, allowing them to contemplate and seek postsecondary opportunities. The implementations of the legal underpinnings of the Americans with Disabilities Act (ADA), Section 504 of the Rehabilitation Act, the 1997 reauthorization of the Individuals with Disabilities Education

Act (IDEA) with its focus on transition planning for adolescents with disabilities, and, in Canada, the Charter of Rights and Freedoms worked to enhance the integration of individuals with disabilities in all aspects of society, including postsecondary education and competitive employment (Brinckerhoff et al., 2002; Wiener & Siegel, 1992). As a result, more and more individuals self-identify as learning disabled and seek disability support services in postsecondary educational and employment settings.

According to the American Council on Education's Resource Center (2000), in 1998, 41% of all first-time, full-time college students with disabilities self-identified as students with LD. Ten years before, in 1988, just 15% made such self-disclosure. In response to these developments, postsecondary institutions began to offer comprehensive disability support services. Currently, over 1200 campuses in the United States and Canada offer support services to students with LD (Brinckerhoff et al., 2002; Wiener & Siegel, 1992).

Comprehensive statistics on students with LD enrolled in postsecondary institutions in Canada are difficult to obtain because postsecondary institutions do not seem to implement a national, systematic way of gathering information on these students' demographics, academic performance, and graduation and attrition rates. Despite this void in Canadian statistics, an overview of individual Canadian colleges' disability services reporting suggests that there is a steady increase in the numbers of students with LD. For example, a review of the British Columbia's (BC) Ministry of Advanced Education's publications on the disability profiles of students attending BC public colleges shows that from 1996 to 2000, the number of students with a formal diagnosis of learning disability increased by 74%. The publication suggests that this group of students is the fastest growing group of all students with disabilities attending BC colleges (British Columbia Ministry of Advanced Education [BCMAE], 2001).

Researchers by necessity kept pace with these developments in the postsecondary educational system. Currently, research encompasses a broad range of topics such as students' characteristics and needs, identification and eligibility issues, efforts of individual colleges and universities to provide adequate support services, the nature of disability services in terms of accommodations and support programs, and attitudes of faculty and students regarding academic accommodations. (For a review, see Mull, Sitlington, & Alper, 2001). In this literature, postsecondary students labeled LD are described as being at risk for emotional problems, having low self-esteem and difficulty adjusting to academic life (Cohen, 1985; Mellard & Hazel, 1992; Saracoglu, Minden, & Wilchesky, 1989; Stage & Milne, 1996; Stilington & Frank, 1990), achieving less in terms of grades and having a higher drop out rate than their peers, and demonstrating significant deficits in basic academic skills not mastered during their school-age years (Hock, Deshler, & Schumaker, 1993; Stage & Milne; Vogel, Hruby, & Adelman, 1993). Researchers reported that postsecondary students with LD struggle with reading, math, spelling and writing, listening to lectures, taking accurate notes, learning foreign languages, time management and study skills. (For reviews, see Adelman & Vogel, 1998; Butler, 2004). Students with LD continue to experience cognitive processing problems (Adelman & Vogel, 1998). However, other studies have found that many students with LD in institutions of higher education are well adjusted academically and socially (Greenbaum, Graham, & Scales, 1996; Litner, Mann-Feder, & Gurard, 2005; Luna, 2002; Vogel & Adelman, 1992). This inconsistency in findings underscores the heterogeneity of this group of students. Vogel and colleagues echo a similar observation by pointing out that, in their studies, they consistently find substantial inter- and intra-individual differences (cf. Adelman & Vogel, 1998).

Although these studies overall are recognized as an important step in advancing our knowledge about the characteristics of this group of students, some authors advocate the

application of a life span approach to studying and understanding the challenges students with LD face in postsecondary settings (Price & Patton, 2003). Gerber (1994) suggests that the study of adults with LD must “emanate from an adult-developmental perspective” (p. 8). While the nature of the problems faced by students with LD in their youth may continue when they reach adulthood, the nature of the demands placed upon them changes with age. If a life span approach is not applied, scholars and professionals can overlook the essential fact that LD are expressed differently at different developmental stages and are affected by human development and growth, and the developmental tasks in which the person is engaged (Price & Patton, 2003).

Higher educational attainment is a developmental task that marks the transition from adolescence to the demands of the adult world. Postsecondary environments, while affording more personal freedom than high school environments, expect more adult-like behavior in terms of independent learning, decision-making, and critical thinking. Success in postsecondary settings requires more self-awareness, self-control, and self-evaluation. These requirements can be particularly challenging for students with LD. A major reason for this challenge stems from the differences in service delivery in high school and higher education. These differences are more than cosmetic (Merchant & Gajar, 1997; Stodden, 2001). Students with LD graduating from high school move from a protective environment, in which school personnel are legally responsible for identifying and providing appropriate services, to an environment in which the provision of services is related to students’ personal choice. It is the responsibility of the students to self-identify as learning disabled, provide formal documentation of learning disability and discuss and propose viable options for accommodating the unique needs specific to their disability (Izzo & Lamb, 2001).

A necessary condition for successfully meeting these new requirements by students with LD is the reframing of two related conceptualizations. First, postsecondary students

with learning disabilities must both accept learning as a developmental task and develop a new understanding and awareness of learning's more "technical" aspects and process constraints, which stem from the ramifications of the specific disability. Secondly, postsecondary students with learning disabilities need to both attain a new understanding of their learning disability and its consequences for the process of learning, and also incorporate this conceptualization in their identity in a non-destructive way.

An awareness of what one's learning disabilities really mean may be a critical factor in negotiating the demands of postsecondary education (Field, Sarver, & Shaw, 2003; Reiff, 2004). In their review of the literature concerning the psychosocial issues of adolescents and adults with learning disabilities, Ness and Price (1990) concluded that:

The importance of disability self-knowledge cannot be underestimated because such self-awareness and self-acceptance are critical for LD individuals. It is through such insights that LD adolescents and adults discover the tools to achieve a satisfactory adult life and learn to interact successfully with others in their environment. (p. 20)

In a study examining successful vocational outcomes of adults with LD, Gerber, Reiff and Ginsberg (1996) identified the process of reframing LD as one of the factors contributing to adults' success. Reframing LD was associated with developing an awareness, acceptance and understanding of one's LD.

Because of the importance of instilling self-awareness skills, there have been concerted efforts in the literature to offer approaches to help individuals with learning disabilities develop greater self-awareness skills, some of which relate to college students (e.g., Reiff, 2004; Roffman, Herzog, & Wershba-Gershon, 1994). In practice, although the majority of disability support service providers agree that self-awareness, self-advocacy, and independence are all important skills for college students to have (e.g., Cullen, Shaw, & McGuire, 1996; Ruban, McCoach, McGuire, & Reis, 2003), fewer providers actually

implement the approaches suggested in the literature (Reiff, 2004). More troubling, however, is the exclusive emphasis on finding out how individual students lack the skills to adapt to higher education requirements. We still have very little understanding of how students with LD understand and think about their own development in college, and how they negotiate the higher education enterprise.

A few qualitative studies provide insights into the experience of college students with LD, but the focus of these studies is on how students manage their learning disability and the impact of the label on their identity and emotional functioning (e.g., Pliner, 1999; Schander, 2001). In addition to how students understand their learning disabilities and the influence of this understanding on definitions of self, it is also important to understand how they make sense of the postsecondary environment. Self-understanding and self-awareness do not develop in a vacuum. We cannot understand the process by which these students evaluate themselves without understanding the ways in which they make meaning of themselves in the social context of college learning and how they think about themselves and others with whom they interact in the learning context. Moreover, if we were to apply a life-span approach to the study of LD in college, we need to gain a better sense of the “how” and “what” of development of these students in college.

In summary, the increase in number of postsecondary students with learning disabilities poses new challenges to service provision and necessitates the revision of the premises on which service-provision is based. One achievement of this revision is the recognition of the different expression and importance of learning disabilities at this new developmental stage, as well as the different demands placed on students with LD in the college system. Critical for meeting these demands is the reframing by students of their understanding of learning and learning disability. From a research perspective, it is important

to know how students with LD conceptualize learning and learning disability at this stage of their life, and how these conceptualizations develop.

Relevant Research

Research with general college students demonstrates that as students enter higher education, they are faced with approaches to and perspectives on knowledge and learning that are different than those they experienced in high school (Hofer & Pintrich, 1997). Postsecondary learning requires reflection, critical thinking and grasping vast amounts of knowledge. Through their interactions with the “world” of college, students have to make meaning and sense of this new reality. Higher education evokes questions such as what is the nature of knowledge, how do I know I know, who do I believe, who am I as a learner and knower, what is truth. Personal epistemology research (Baxter Magolda, 1992; Belenky, Clinchy, Goldberger, & Tarule, 1986; Hammer & Elby, 2002; King & Kitchener, 1994; Kitchener & King, 1981), which focuses on students’ beliefs about knowledge (its definition, construction, evaluation, etc.), demonstrates that students’ particular sets of beliefs and ideas about knowledge play a subtle yet ubiquitous role in shaping students’ learning and achievement in college and university. Furthermore, this research shows that these beliefs undergo dramatic qualitative changes as students move through their academic postsecondary careers. Students actively construct new understandings through their interactions with the world of postsecondary education as their current understandings are challenged by the new experiences. This active construction, coupled with the development of increasingly more complex abstract thought, is also interwoven with the process of self and identity development (Baxter Magolda, 1992; Boyes & Chandler, 1992; King, Kitchener, Wood, & Davison, 1989). College years are described as the time when students have to finish the developmental task of establishing one coherent self started in adolescence (Harter, 1999).

Late adolescents and young adults are often described as trying on various roles and identities until they find one that fits (Harter & Monsour, 1992). As students try on the role of college/university student for the first time, they become attuned to revisiting the “old” self as a learner and to developing a new view of self as a learner and student.

The present study aims to extend the lines of research described above to the study of college students with learning disabilities. The study is based on the premise that college students with LD’s abilities to understand their learning profiles, build on their strengths, understand others, confront the demands of postsecondary education, and seek support depend on their conceptual abilities to draw insights about the learning enterprise and the ramifications of their disability (Zessoules & Gardner, 1991).

Theoretical Framework and Purpose

Theoretical Framework

In attempting to study students’ conceptual understanding, it seems fitting to situate the research within theoretical models of development of adult thought and action. Cognitive developmental theory is viewed as one of the tools we can use to gain an understanding of the educational process (Bidell & Fischer, 1992; Parziale & Fischer, 1998). Education is a broad social endeavor involving cognitive development, emotional development, social interaction and a range of cultural factors. An understanding of learning disabled students’ functioning in higher education cannot be reduced to any one of these factors. Yet cognitive development is a central part of education; cognitive developmental theory can provide crucial insights into how students think about postsecondary learning. It can serve as a conceptual bridge (Parziale & Fischer; Porath & Lupart, 2002) to creating support programs that take students’ thinking as their starting point. Students’ understandings are rarely

engaged in this way, but when they are, the result for students is a more meaningful academic experience and optimized academic and social adjustment (Porath & Lupart, 2002).

Ideas from two widely researched and tested neo-Piagetian models of cognitive development are integrated to provide the theoretical framework of the study -- Case's (1992) theory of development of central conceptual structures and Fischer's (1980; Fischer & Bidell, 1998) dynamic skill theory. These models are particularly suited to the premise of this study. One of the major aims of the two models is to delineate the developmental progression of the form of thought throughout the life span. The models posit that individuals actively construct and build knowledge and understanding of the world. This construction is influenced by maturation and experience. The form of thought refers to the structure or cognitive complexity of individuals' thinking. These structures are defined as central conceptual structures in Case's theory and skills in Fischer's theory.

In Case's theory, central conceptual structures are the "blueprints" of people's understandings in different domains. They form the conceptual center to which a wide range of specific concepts are related. Thus, they are the basis for the formation of new concepts and/or transfer of central conceptual understanding to a wide array of tasks within a given domain. Central conceptual structures are domain-specific; to date, research has focused on number, narrative, spatial, and social structures. Every central conceptual structure has distinct semantic content related to these systems.

The central unit in Fischer's theory is the skill. A skill refers to a cognitive "control structure governing a specific class of actions that a person can perform in specific context" (Bidell & Fischer, 1992, p. 17). Every skill is a product both of the context and the person's activity. Fischer's model is similar to Case's in terms of the domain-specificity of skills or conceptual understandings (e.g., numeracy, social functioning) and resembles Case's notion of central conceptual structure.

Both models posit that the form of individuals' thinking becomes increasingly complex in a spiral knowledge-building process. Case (1992) and Fischer (1980) described this complexity in terms of qualitatively different levels or stages of development, although the theories differ in the number and characteristics of these levels. The models integrate the two classical controversies about cognitive development, namely development as proceeding in stages and development as a continuous process. The notion of developmental level or stage is more open and local than that in traditional models of development (e.g., Inhelder & Piaget, 1958). The models emphasize the roles that context, exposure and experience with concepts and tasks, instruction, individuals' personality, emotions and motivation play in shaping individuals' development. Unevenness in development across different concepts, domains and contexts in any individual is the norm, not the exception (Case, 1998; Case, Okamoto, & Henderson, 1993; Fink, 2006; Fink & Samuels, 2007; Fischer & Farrar, 1987). The models contend that learners, and especially adult learners, vary dynamically in performance as a function of contextual support.

To summarize, the models offer conceptual and methodological tools for capturing the dynamic nature and variability found in development. In this sense, they are particularly suited for exploring college students with LD's conceptual thinking. The models' ideas of form, domain specificity and developmental progression of cognitive structures, and the role of context in capturing cognitive complexity of thinking are integrated to provide the theoretical underpinnings of the current study.

Purpose

The purpose of the study is to describe and interpret the form and content of students' thinking about learning and learning disability. Learning, however, is inherently social (Bruner, 1986; Vygotsky, 1983) and it is inseparable from social and cultural activities, social interactions and exchanges (Vygotsky). Therefore, it is important to understand how

students with LD position themselves in the social context of college learning and how they think about others with whom they interact in the learning context. In keeping with the overall descriptive and exploratory goal of the study, an attempt will be made to relate measures of social understanding to the elicited descriptions and definitions of learning and learning disability.

In Case's and Fischer's models, understanding of others has been considered, defined and documented as a part of children's and adolescents' social understanding, or central social structure (Case, 1996; Marini, & Case, 1994; Mascolo, Fischer, & Neimeyer, 1999; Fischer & Kennedy, 1997). Although conceptions of learning and conceptions of learning disability have not been examined extensively within this research (see, for an exception, a study by Bickerton (1994) on conceptions of learning), it is argued that these conceptions are also part of students' social understanding. This argument stems from current discourse focusing on the process of meaning making in the LD field (Reid & Valle, 2004). This discourse challenges scholars in the field to rethink some of the fundamental assumptions and practices in the LD field. One such assumption is the conceptualization of learning disability as a deficit residing within the learner, who needs to accommodate to the "normal" ways of learning. The alternative, proposed in these discussions, emphasizes the understanding of disability as a social construction.

In order to understand the notion of disability in mainstream culture, we must see the ways that culture "actively organizes ways for people to be disabled" (McDermott, 1993, p. 13). This position echoes Vygotsky's (1983) idea that the disabled child's experience is shaped in a very specific way depending on the particular context of social exchanges in which the child happens to develop. Vygotsky defined disability not as a biological impairment having psychological consequences, but as a socio-cultural phenomenon. Disabilities are in dissonance with socially accepted standards of performance and behavior

and thus disability is subjectively perceived as an "abnormality" only when and if it is brought into the "mainstream" social context.

Within the context of these ideas, some scholars in the field suggest that teachers and researchers need to make serious efforts to understand how the mainstream culture constructs and defines learning and learning differences, and how the interaction between culture/society and learning positions persons with learning disabilities (e.g., see Reid & Valle, 2004). The concept of learning disabilities is at the centre of the current debates and discussions in the LD field. A key point in the current debates is the idea that students with LD's understanding of their learning disabilities is constructed in the interaction with others and through the language available within their social context (Reid & Valle). Therefore, students' understanding of the concepts of learning and learning disability interfaces with not only intrapersonal but also interpersonal understanding.

Overview of Subsequent Chapters

In what follows, relevant research findings from studies in the general college literature selectively focusing on issues relevant to the purpose of the study, namely the developmental progression in students' ideas about knowledge and learning, are reviewed. This is followed by further elaboration of Case's and Fischer's models, and a review of studies relevant to the study's purpose, with an emphasis on research on social cognition. Implications of the models' concepts and methodological tools, and findings from studies within the models' frameworks for research with college students with learning disabilities are presented next. This presentation is followed by a review of the rather sparse research on LD students' understanding of learning disability. The chapter concludes with a summary of the reviewed literature and a formulation of the study's research questions. The description of the method, including participants, measures and procedure follows in the next chapter. Chapter four presents a summary of the results followed by the discussion.

CHAPTER TWO

Literature Review

Introduction

This chapter reviews research related to conceptions of learning and learning disability. It also outlines approaches to understanding others that provide the developmental methodological frame to interpreting findings. Because of the developmental framework that undergirds the study, the literature review focuses primarily on findings related to early adulthood and, more specifically, to college populations. First, areas related to general college students' development are presented. The focus is on personal epistemology and conceptions of learning perspectives. Although personal epistemology does not specifically focus on students' ideas about learning, it is considered a critical domain in students' cognitive development, and thus provides the cognitive context within which ideas about learning are formed and expressed. A delineation of Case's and Fischer's conceptual and methodological tools relevant to the present study is presented next. Findings from studies on social cognition within the models' frameworks highlight the utility of the models for answering the study's research questions. These studies are connected to literature on LD students' social functioning, and studies related to understanding of learning disability. A summary of research findings and formulation of the study's research questions concludes the chapter.

Personal Epistemology Research

Over the last couple of decades, empirical investigations of personal epistemology have been the focus of research programs with different names, such as epistemological beliefs (Jehng, Johnson, & Anderson, 1993; Qian & Alvermann, 1995; Schoenfeld, 1985; Schommer, 1990; 1998), reflective judgment (King & Kitchener, 1994; Kitchener & King,

1981), epistemological reflection (Baxter Magolda, 1992), epistemological theories (Hofer & Pintrich, 1997), and “ways of knowing” (Belenky, Clinchy, Goldberger, & Tarule, 1986). These research programs, although not united in terminology, aim at investigations of individuals’ thinking and beliefs about the nature of knowledge (Hofer & Pintrich). They all include reference to dimensions that can be clustered into two central areas: the *nature of knowledge* (what one believes knowledge is) and the *nature or process of knowing* (how one comes to know) (Hofer, 2002).

Although conceptions of learning are not the main focus of personal epistemology research, research on students’ conceptions of learning is remarkably similar to personal epistemology research in its descriptions of the reorganization of students’ views as they progress through their postsecondary careers. Because these two lines of research have paid more attention to the role of higher education in fostering higher epistemological development and learning, they have become somewhat isolated from the mainstream of psychological research on life span cognitive development, but both lines carry developmental assumptions that situate them in the tradition of cognitive development. It is reasonable to assume that there will be parallels in the development of students’ conceptions of knowledge and students’ conceptions of learning, which in turn would parallel students’ cognitive development. An investigation of these parallels has been distinguished as an important area of future research (e.g., Hofer, 2004; Schommer-Aikins, 2004). In fact, a notable exception to personal epistemology research has been the model of reflective judgment (King & Kitchener, 1994), which has been tested from a life-span cognitive development perspective. More specifically, the levels of reflective judgments have been found to map very well onto Fischer’s stages/levels of cognitive complexity in adulthood (Kitchener, 2002; Kitchener, Lynch, Fischer, & Wood, 1993).

As for the parallels between conceptions of knowledge and conceptions of learning, the literature search located only one study which tested this assumption. This study found that high school students' conceptions of learning and epistemological beliefs changed as they progressed through school, and there were connections between the two conceptions/beliefs. The most advanced category on the dimension of depth of learning corresponded to a similar level of epistemological thinking (Cano & Cardelle-Elawar, 2004).

The present study, as an exploration of students' conceptions of learning from a neo-Piagetian perspective, is informed by findings in these lines of research. Whereas the findings from personal epistemology research suggest implications in terms of the developmental changes and progressions in students' conceptions, the findings from research on learning conceptions provide a guide for an interpretation of their conceptual content. Thus, these findings provide the backdrop against which the developmental level and the content of different age-group LD students' conceptions of learning can be compared. A review of these two aspects follows below.

Developmental Models of Personal Epistemology

Most current models of personal epistemology have typically focused on the development of this construct during adolescence and early adulthood, and more specifically on college students. There is some agreement about the path of development during this period.

In general, developmental models of personal epistemology (e.g., Baxter Magolda, 1992; King & Kitchener, 1994) suggest that individuals are likely to reorganize their beliefs about knowledge and knowing in a developmental sequence. In each of these models, individuals move through a specified sequence in their conceptions of knowledge and knowing from a dualistic or absolutist perspective, characterized by a right-and-wrong,

black-and-white view of knowledge, and the belief that truth can be known with certainty to the final stage, where knowledge is perceived as constructed, contingent, and contextual, and knowing is coordinated with justification, a level termed evaluativist (Burr & Hofer, 2002). All models acknowledge some connection with William Perry's (1970) study on college students' intellectual development, which in turn aimed to extend Piaget's theory on children's cognitive development.

Perry focused on conducting annual interviews with longitudinal samples of Harvard students in the late 1950s and early 1960s, which led to development of a scheme of intellectual development during the college years. An analysis of students' responses over 4 years of college appeared to suggest a progressive reorganization of beliefs about the nature of knowledge and the process of learning. Perry's scheme indicates that when students first enter college, they view the world in black-or-white terms and believe that knowledge is simple, certain, and handed down by authority. Through exposure to different opinions, ways of thinking and doing things, most students begin to acknowledge uncertainty and come to believe that knowledge is complex, obtained through a process of reasoning, and may involve ambiguities and conflicting truths. The perceived source of knowledge shifts as well, from authority as arbiter of knowledge to self as a maker of meaning (Hofer & Pintrich, 1997).

Perry's descriptions of the ongoing reorganization of meaning making share much with the developmental progressions as described in neo-Piagetian models. The positions represent a kind of sequence of integrated structures of meaning. Similar to the models, change is brought about through cognitive disequilibrium in the context of individuals interacting with their environment, and by responding to new experience either by assimilating to their existing cognitive framework or accommodating the framework itself.

Although Perry suggested that not all students follow an invariant path of development, an idea entertained by neo-Piagetians, he did not elaborate on it.

Perry's theory has been criticized as being focused on white, overwhelmingly male, upper-class students attending elite colleges, and as missing important issues in women's development, such as silence, voice, view of self and relationship to authority (Belenky, Clinchy, Goldberger, & Tarule, 1986). In spite of these criticisms, Perry was first to suggest that students' conceptions of knowledge develop progressively, and that they are influenced by students' educational experiences. Perry was also first to acknowledge that how students viewed knowledge influenced their approaches to learning in college. He stressed that lack of congruence between the views about the nature of knowledge of the students and their instructors were responsible for learning difficulties, particularly where students saw knowledge as simple, certain and authority-based, while the instructors stressed ambiguity and conflicting truths.

The findings from all these studies, including Perry's, showed that few college students reached the upper levels of development. Higher stages of reflective judgment, for example, have been identified primarily in advanced graduate students. Alternatively, even in Perry's original study, which is often used as a "reference for characterizing first-year college students as dualistic thinkers, the condition of basic dualism was rare" (as cited in Burr & Hofer, 2002, p. 202).

Schommer (1990) criticized the developmental perspective on personal epistemology as a unidimensional description of belief stages, which, in her view, limited the understanding of how beliefs impacted students' learning. Schommer proposed a view which considered students' epistemological beliefs as a belief system that is "composed of several more or less independent dimensions" (p. 498), bringing in a multidimensional approach to describe each dimension as a continuum, from less sophisticated to more sophisticated, of

how students' beliefs may vary. For instance, according to the model, unsophisticated learners believe that (a) the ability to learn is innate; (b) knowledge is discrete and unambiguous; (c) learning is quick or not at all; and (d) knowledge is certain (Schommer, 1990; Schommer-Aikins, 2004). Sophisticated learners believe that (a) the ability to learn can be improved; (b) knowledge is complex and uncertain; (c) learning takes time.

Schommer argued that developmental theories simplify the complex nature of epistemological beliefs, referring to her studies, which have shown that there are different dimensions to personal epistemology. Further, she argued that students' cognitive growth along the different dimensions may or may not develop in a sequence, meaning that students may be sophisticated in some beliefs and still be naive in other beliefs. Schommer's work enabled researchers to explicitly identify the interrelations between epistemological beliefs and learning. This work found that ideas about knowledge are associated with how effectively students process information, interpret knowledge, and monitor their learning. Students who are more epistemologically sophisticated are more likely than less sophisticated students to use strategies that lead to higher academic achievement. Overall, the personal epistemology research is consistent in its findings that personal epistemology is salient in a number of academic experiences (Hofer, 2004).

Implications of Personal Epistemology Research

The present study aims at extending the personal epistemology research by specifically focusing on students' conceptions of learning. As argued above, developmental theories of personal epistemology highlight the notion that students' conceptions change systematically during students' academic careers. Further, there is some evidence that conceptions of learning and conceptions of knowledge follow a similar path of development. Furthermore, there is evidence that levels of epistemological thinking correspond to levels of cognitive conceptual development. Developmental epistemological models, as criticized by

Schommer, have been unsuccessful in accounting for individual differences in thinking (with the notable exception of the reflective judgment model). By situating the study within neo-Piagetian models, a context within which variability (unevenness, multiple pathways) and order (e.g., stage/level) in development of conceptions of learning can be accounted for (Fischer, Knight, & Van Parys, 1993; Fischer, Rotenberg, & Bullock, 1993) is provided. The conception of learning research line, which examines college students' conceptions of learning, also informs the study. This work can enrich the study in terms of providing an interpretive context for the content of students' conceptions of learning.

Conceptions of Learning Research

The Gothenburg research group initiated the conception of learning research in the late 1970s (Saljo, 1979). This group coined the term phenomenography (from the Greek words 'phainemenon' and 'graphein', which mean appearance and description), concerned with the description of things as they appear to us. The conceptions of learning research argued that, traditionally, research into human learning is conducted from a "first-order perspective." Emphasis is placed on the researcher's description of an individual's learning behavior. The conception of learning research instead has focused on what has been referred to as a *second-order perspective* (Marton, 1981). Attention is directed not so much at reality as it is, but more at the various interpretations people have of it.

The first influential study, carried out by Saljo (1979), involved interviews with adults who had different levels of education. After a series of questions relating to their actual experiences, they were asked the more general question, "What do you mean by 'learning'?" Transcripts of the responses were summarized into five categories of description that tapped the main differences identified among the responses. Subsequently, their labels were reformulated and extended to six by Marton, Dall'Alba and Beaty (1993).

The six conceptions of learning were ordered in a developmental hierarchy through which it was assumed students would (or should) move during their time at university. The six qualitatively different ways that students were believed to conceptualize the idea of learning were (starting at the lowest level): (1) quantitatively increasing one's knowledge, (2) memorizing and reproducing, (3) applying, (4) understanding, (5) seeing something in a different way, and (6) changing as a person. (For reviews, see Marton & Booth, 1997; Marton & Saljo, 1997). The first three of these conceptions have been described as constituting a reproductive or surface conception of learning. The latter three are seen to represent a deep or constructivist view of learning (Martin & Ramsden, 1987).

These qualitatively different ways of viewing learning are seen to underpin two basic approaches to learning: quantitative, memorizing and acquiring concepts that underlie a surface approach, and qualitative, abstracting meaning, understanding reality and developing as a person that underlie a deep approach. Students who held a surface learning approach believed that content should be memorized by paying attention to specific details so that it could be reproduced at a later stage. On the other hand, for students who held a deep approach to learning, the aim was to construct meaning (for a more extensive analysis, see Entwistle & Peterson, 2004).

Both conceptions and approaches were seen to be linked to the way in which the students perceived the context of learning, that is, if a student believed that memorization was rewarded, then the student would choose a surface approach to learning and studying. Finally, the linked phenomena of “conception,” “approach” and “perception of context” were seen to be linked to the “outcomes of learning”: the surface approach as leading to poor outcomes and deep approaches to positive ones (Marton, Dala’Alba, & Beaty, 1993).

Implications of Conceptions of Learning Research

In summary, research on students' conceptions of learning and approaches to learning provides descriptions of students' conceptions of learning, which can serve as a guide to eliciting the content of conceptions of learning of college students with LD. Within this line of research, however, there is no explicit claim about the underlying structure of students' thinking. More specifically, the process by which students make connections among their views of learning, approaches and learning outcomes, cannot be discerned.

Prosser and Trigwell (1999) suggested that conceptions of learning, approaches and outcomes are seen as separate entities in research for the purposes of analysis, but that "they should be considered to be simultaneously present in the student's awareness," rather than "independently constituted" (as cited in Haggis, 2003, p. 91). During the last almost three decades since the perspective's inception, the implications of the model in higher education, however, have resulted in a process of gradual reification. "Deep approaches to learning" becomes "deep learning," and students who hold these ideas become "engaged" (Kamber & Yan, 2001, as cited in Haggis, 2003, p. 91). Further, there are questions which still remain unanswered. Questions remain about the possibility of manipulating the relationships between conceptions, approaches and outcomes/grades, as many studies continue to report that students are mainly resistant to attempts to change the way they approach their learning. For example, a number of studies have reported an increase in surface approaches in the first year of university (see Biggs, 1987; Johnston, 2001).

Attempts to apply this perspective to other cultural contexts have yielded results which appear to contradict some of the assumptions about the "depth" dimension of conceptions of learning. Memorizing is perceived as a lower level conception in the hierarchy of conceptions—associated with rote learning, which is linked to lack of understanding—a surface approach to learning, and as leading to poor outcomes. In studies

with Chinese students, however, high achieving students appeared to conceptualize and use memorizing in ways that led to achieving understanding, which, in the conceptions of learning perspective, is associated with a deep approach to learning. Marton and Trigwell (2000) termed this finding the “Chinese paradox” (as cited in Haggis, 2003, p. 93), and there have been few attempts to change the underlying principles of the causal linear model of conceptions-approaches-outcomes. The model seems to discount the influence of cultural contexts.

Part of the problem with the conceptions of learning perspective relates to the methodology it employs. While the perspective initially used extensive interviews with students, currently most of the instruments used are surveys and questionnaires. The instruments have been criticized as tapping socially desirable responses and, more importantly, tapping not students’ conceptions, but what students say in response to a questionnaire’s items. As Haggis (2003) points out, these questionnaires are not sampling students’ learning behavior, but, rather, students’ learning impressions. Furthermore, the studies seem to emphasize the idea of meaning in learning, which is interpreted as finding adequate connections within a subject area (see Haggis). Meaning is defined on the basis of higher-education standards about the ways of knowing and learning, and more specifically, by the instructor who teaches and marks the assignments within a subject area. This is a very specific kind of meaning, which may not be necessarily either available or personally meaningful to the students. The notion of personal meaning is constrained by subject area, cultural norms, and assessment techniques. From a developmental perspective, even if the students are capable of sophisticated thinking about learning, either the development or the expression of these conceptions, or both, can be constrained by a particular subject context and standards. Learning-disabled students’ perspectives on their experiences of negotiating these standards are scarce in the literature, and given the negative picture painted in the LD

literature about their performance in college, a research agenda aiming at an exploration of their thinking about learning in higher education is worthwhile.

As the epistemological research suggests, conceptions of knowledge have different dimensions and, similarly, conceptions of learning are likely multidimensional concepts that may include not only ideas about the nature of learning but also ideas about the process of learning. Students can hold different views of learning simultaneously and, depending on their goals, can assign different meanings to the concept of learning. In the present study, the separate constructs outlined above (e.g., views of learning, approaches, products) are pulled together in the design of the interview questions inquiring about students' conceptions of learning. Further, a methodology which can capture both students' level of sophistication in thinking and the meaning the students assign to concepts, may prove fruitful in gaining a better understanding of how students think about learning. In sum, the present study pulls ideas from personal epistemology and conceptions of learning research together in order to examine the form and content of LD students' conceptions of learning. This integration is possible by situating the study within Case's and Fischer's neo-Piagetian models of cognitive development.

Neo-Piagetian Theories of Cognitive Development: Fischer's and Case's Models

As described in the introduction, the notion of developmental level is more open in Case's and Fischer's models than in the traditional models of development. The models place an emphasis on the roles that context, exposure and experience with concepts and tasks, instruction, individuals' personalities, emotions and motivation play in shaping individuals' development. Unevenness in development across different concepts, domains and contexts in any individual is the norm rather than the exception (Fischer & Farrar, 1987). At the same time, the models also allow for capturing the order and consistency in variability.

While both models can account for both order and variability in development, they put different emphasis on them. Case's propositions relate to establishing the order and consistency in development, whereas Fischer's conceptualizations allow for capturing variability and diverse pathways in development (Case, Okamoto, & Henderson, 1993; Fischer & Bidell, 1998).

Order in Development. According to Case (1992; 1998), the development of conceptual understanding proceeds through four incremental, overlapping, and integrated stages spanning infancy to adolescence and early adulthood: Sensorimotor (0-18 months), Relational (1.5-5 years), Dimensional (5-11) and Abstract/Dimensional or Vectorial (11-19 and beyond). Each major stage has a universal sequence of three substages that become increasingly complex with respect to the number and organization of elements they represent. Transitions across stages occur systematically for a specific domain via processes referred to as differentiation, integration and consolidation of conceptual structures. In this process of hierarchical integration, central conceptual structures that were constructed during a previous stage change form and function in the higher stage. Case called this "cyclical recursion," which supports the notion that "in the construction of any understanding at any level of development, there is a progression through exactly the same sequence of structural steps as at previous stages" (Case, 1987, p. 779).

Cyclical recursion means that what individuals learn during one stage, they must revisit and reorganize at a more complex level during the next stage. There is progression in the development of thinking through the same number of small structural steps at each major stage or level and these smaller steps emerge in the same sequence within each major stage or level. Learners have to understand and master individual concepts before they can construct and understand relationships between concepts. In other words, the form of

thinking is general despite the domain-specific content it organizes; hence, the notion of central conceptual structure.

According to Case (Case & Okamoto, 1996), the conceptual element in central conceptual structures refers to the semantic nature of the relations—the meanings that individuals assign to concepts. Central conceptual structures are central in three aspects: 1) they are assumed to form the “center” of children’s and adults’ understanding of a broad array of situations “both within and across culturally defined disciplines or content areas” (Case & Okamoto, p.6); 2) they form the core elements out of which more elaborate structures are constructed and 3) they are a product of central processing; although the content they serve to organize is domain-specific, the structures reflect “a set of principles and constraints that are system-wide in their nature and that change with age in a predictable fashion” (Case & Okamoto, p.5). Thus, central conceptual structures are similar in form; this form cuts across specific domains to which they apply. For example, within a stage, the central conceptual structures for an understanding of the physical world and an understanding of the social world have the same form in both domains, but are different (domain-specific) in the categories into which the physical and social world are parsed (Marini & Case, 1994).

The construct of central conceptual structure has been tested in a number of studies. For example, Bickerton’s (1994) study on children’s conceptions of learning confirms the presence of a central conceptual structure identical to the one children use to make sense of concepts related to the social world (e.g., children’s conceptions of mother’s role). Children’s explanations change from references to external events to increasingly complex references to internal states and intentions gradually over the course of development. In addition, the form of children’s understanding in terms of complexity and the elements (states) it organizes changes as well. For example, 5- to 6-year-old children are able to differentiate and coordinate a behavioral event with one mental state (unidimensional sub-stage); by the ages

of 7 and 8 years, children are able to differentiate and coordinate two mental states to a behavioral event (bidimensional sub-stage); and by the ages of 9 to 11 years, children's understanding is more elaborated and consolidated. Their understanding is intentional and is characterized by an integration of internal and external states in a more complex fashion. This level of conceptual understanding is then coordinated with a more abstract social concept in the first substage of the next major stage, which is the Vectorial or Abstract – Dimensional stage. In Bickerton's study (1994), eighty children, evenly distributed in 4 age groups (6, 8, 10 and 12), were asked to define what learning meant to them, what was happening when they were learning, and where learning was coming from, in a semi-structured interview. The youngest children's thinking about learning was dominated by the notion of action and external events and described in terms of their concrete experiences. Eight-year-olds equated learning with personal effort. By 10 years of age, the social implications in terms of socially accepted standards and the importance of learning started to emerge in children's responses. Although children at this stage had general awareness of learning as a mental activity, the actual conception of the mind as active contributor to learning remained "dormant" (Bickerton, p. 82). By 12 years of age, learning was defined in abstract terms, and children understood the mind's active role in learning; learning was equated with understanding. The social cognitive structure at this stage is "interpretive" and corresponds to formal operational thinking in classical Piagetian theory. This stage marks the initial understanding of abstractions, which proceeds through the same number of substages as at the previous major stage, as demonstrated in a study by Marini and Case (1994).

Marini and Case (1994) demonstrated the presence of a central conceptual structure in a study on adolescents' understanding of physical and social concepts. They set out to support the idea that adolescents' understanding of the social world had the same form of complexity as their understanding of the physical world. Case's theory, like most of the other

neo-Piagetian theories, provides a metric for classifying operations in terms of their complexity (combining different number of elements), which makes the cross-domain comparison possible. Within the area of understanding of the physical world, Case's model predicts that children at the end of the dimensional stage (9-11) appear to be able to focus on two quantitative dimensions (e.g., weight and distance in the operation of a balance beam) and to understand that the effect of one can compensate for the effect of the other, but still they cannot combine the two understandings. The latter is an achievement of the first substage of the vectorial stage (ages 11-13). A similar sequence is demonstrated within the area of social understanding. Case's model predicts that, beginning at age 12, children are able to abstract a general trait in explaining and predicting human actions; by age 13 to 15, the capability to abstract a general trait becomes more complex whereby children can abstract two traits and relate them to a person's actions. At the last substage of the Vectorial stage, thinking should become more interpretive, abstract and complex. Adolescents should be able to coordinate more than two abstract terms in interpreting people's behavior.

A balance-beam task and a Personality Diagnosis Task (participants were asked to predict responses of a main character of a story, which ended with a dilemma) represented the logico-mathematical and social domains, respectively. The results confirmed the prediction that the capacity for abstract reasoning emerged about the age of 11 and 12 in both domains. Further development of this capacity was constrained by the number of elements the adolescents could combine and coordinate at the same time, and this capacity was independent of the content of the tasks. For example, most of the study's adolescents 13 to 15/16 years of age (75% of the 20 students included in each age group) passed level 2 of the predicted sequence in both tasks. A similar percentage (70%) of the 15/16 to 19-year-old group passed level 3 of the predicted sequence in both the physical and social tasks. Thus, the results showed that each task yielded an ordinal developmental sequence and the progression

through the task sequences took place at approximately the same general rate. Taken together, these results confirmed the hypothesized synchrony in the form of adolescents' thinking about physical and social concepts.

The story completion task used in Marini and Case's (1994) study to measure social cognition suggests a way to approach the understanding of others and the social context of learning of students with LD in the present study. A story about a student with LD, involving peers and an instructor and based on a dilemma concerning accommodations, would appeal to these students and would elicit narratives that can be coded for cognitive complexity.

The presence of a central conceptual structure in adults' thinking is illustrated in a study by McKeough, Templeton, and Marini (1995). The authors set out to explore low-literacy and literate adults' conceptual understanding in two domains: narrative (composition and recall) and social understanding in terms of interpreting other peoples' behavior. The sample consisted of a group of 20 adults, evenly distributed across two groups, low-literacy and literate adults. The criteria for inclusion of individuals in the low-literacy group were an average to high-average level of functioning on the Similarities subtest of the Wechsler Adult Intelligence Scale-Revised (WAIS-R) (Wechsler, 1981) and a reading level score of Grade 3 or less on the Classroom Reading Inventory (Silvaroli, 1986). All low-literacy participants attended literacy programs and the literate adults attended junior college. The mean age of the sample was 33 years. The authors predicted that low-literacy adults, due to their limited experience with the type of complex structure of the narrative usually learned in school, would demonstrate a lower level (intentional structure) of conceptual understanding in the domain of narrative. On the other hand, the authors predicted that low-literacy adults, because of their lifetime experience of social interactions, would be competent interpreters of people's actions and perform at an age-appropriate level of thinking. The study found that low-literacy adults' reasoning was intentional for both social-understanding and narrative

tasks. This finding confirms the presence of a central conceptual structure for understanding the social world in different domains (e.g., narrative and social understanding). Further, the findings support the notion proposed by Case that higher forms of reasoning, like interpretive thinking, are culture-specific and require formal learning due to their decontextualized and abstract nature. Whereas the literate adults conceptualized events within the text, the low-literacy adults' reasoning resembled "folk" psychology. On both tasks, they relied on their personal experiences to explain the reasons for the actions of the characters.

Taken together, these studies demonstrate that the underlying structure of children's and adults' understanding about the social world is a structure whereby the relations between the external world and internal states becomes gradually more complex, causally reciprocal and psychological in nature. We know little about the development of adults with learning disabilities' understanding about the social world. By applying the notion of central conceptual structure, a better understanding of their conceptualizations about the social world can be achieved. The notion of central conceptual structure allows for a meaningful comparison of understanding across different social concepts.

Variability and pathways in development. Fischer's (Fischer, 1980; Fischer & Bidell, 1998; Fischer, Hand, & Russell, 1984) skill theory conceptualizes development as a process of constructing progressively more complex skill structures. Fischer laid out general universal stage-like hierarchical skill structures, which fall into four tiers: reflexes, sensorimotor, representations, and abstractions. Within each tier, transitions from one structure to another occur through five "transformation" processes (mechanisms of development): substitution, differentiation, shift-of-focus, compounding and intercoordination. The development within each tier proceeds through four substages. Similar to Case's model, each final substage within a level becomes a unit of thought in the first

substage of the next higher level of understanding. The substages of the representations and abstractions tiers, with the approximate age range of emergence, are presented in Table 1.

Table 1. Fischer's representations and abstractions tiers, and substages of skill structure development

Skill Tier	Sub stage	Description	Approximate age of emergence (Optimal Level)
Representational 1	1	Single concrete representation	2
Representational 2	2	Mapping—Two concrete representations can be coordinated.	3.5-4.5
Representational 3	3	Representational system—Several aspects of two concrete representations can be coordinated.	6-7
Representational 4 = Abstract 1	4=1	Two representational systems - can be constructed; Same as a single abstraction	10-12
Abstract 2	2	Abstract mapping—Two abstractions can be coordinated with each other.	14-16
Abstract 3	3	Abstract system—Several aspects of two abstractions can be coordinated.	19-21
Abstract 4=A principle	4	Systems of abstract systems can be constructed; Same as a single principle.	24-26

Adapted from Fischer, Hand, & Russell, 1984

Every new skill is acquired through coordinating previously mastered skills. According to Fischer, every skill is a product of the context and the person's activity. Performance is expected to vary across tasks, domains, contexts and cultures. Many tasks evoke diverse behaviors, and, therefore, performance on them does not reveal one specific skill. Tasks in real contexts need to be carefully analyzed in order to create assessment tasks that can elicit a predominant type of behavior. Task analysis then can be used to determine the structure of that behavior or the thinking behind it. In skill theory, all skills are defined in terms of sets (elements, units) and relations between those sets. A task analysis must specify the sets and relations the person needs to control to perform the behavior. For example, to understand the concept of constructive criticism, a person needs to be able to control/understand first the multiple aspects of each abstraction (a set, unit), such as honesty and kindness, to understand the multiple applications of these separate concepts in different contexts, and then be able to coordinate (relate) these multiple aspects and applications into a higher order abstraction such as constructive criticism (for more examples, see Lamborn, Fischer, & Pipp, 1994). Usually this ability does not appear before late adolescence (Lamborn et al.).

By the means of this type of analysis and design of assessment tasks, Fischer's model has been tested in a number of studies and across different concepts in adulthood; these studies confirmed a predicted universal stage-like hierarchy of skill structures (Fink, 1998; Fischer, Bullock, Rotenberg, & Raya, 1993; Fischer, Hand, & Russell, 1984; Kitchener, Lynch, Fischer, & Wood, 1993; Mascolo, Li, Fink, & Fischer, 2002; Mascolo, Fischer, & Neimeyer, 1999; Yan & Fischer, 2002).

Applied to the developmental level of relevance to this study (after age 16), Fischer's model predicts that adolescents should be able to coordinate two or more abstract concepts in a single skill (*abstract mapping*). Adolescents can understand, for example, how

multiplication is similar to addition without confusing the two operations. In studies in the social domain, these new abilities are demonstrated in adolescents' understanding of multiple parts of their own identity and multiple social roles, the ability to differentiate and relate concepts such as intention and responsibility (see Fischer, Hand, & Russell, 1984).

Through more experience and maturation (e.g., increasing working memory capacity), adolescents become capable of interconnecting and consolidating these relations between abstract concepts (Fischer's inter-coordination and compounding mechanisms). This in turn leads to the development of a new skill structure (*abstract systems*), which emerges in the early 20s. Young adults are now able to think about multiple aspects of multiple (more than two) abstract concepts. They are able to understand the complexities of abstraction. For example, they are able to explain the general relations of several types of intention and responsibility like deceit and unintentional harm. To understand these types of intention, a person needs to understand two types of responsibility (e.g., dealing with a flaw in one's character and concern for the person harmed). These systematic changes in thinking also have been found in other domains. For example, at this age period, people can understand relativity of knowledge (King & Kitchener, 1981; Perry, 1970), the dialectical nature of the social domain (Benack & Basseches, 1989), and social contract (Selman, 1980). Starting at approximately 25 years of age, individuals can begin to integrate abstract systems into higher order cognitive skills (*a single abstract principle*) involved in understanding scientific theories such as Darwin's analysis of evolution (Gruber, 1981 as cited in Fischer, Rotenberg, & Bullock, 1993). In summary, the hierarchy of skills predicted by Fischer's model has been confirmed across studies. Recently, Dwason-Tunik (2004) provided more evidence for the predicted developmental sequence of skills in a study on children's and adults' conceptions of education.

Although Fischer offers a universal stage-like hierarchy of skill structures, his model also allows an explanation of individual differences. Similar to other dynamic models of development (e.g., Van der Maas & Molenaar, 1992; Van Greet, 1991), Fischer's model posits that growth and development of specific behaviors and brain functions do not routinely fit a standard monotonic increase but often show substantial variability, including sharp spurts, plateaus, and drops.

Studies within the Dynamic Skill Model (Fischer et al., 1997; Fischer & Kennedy, 1997; Fischer, Knight, & Van Parys, 1993; Fischer & Pipp, 1984; Fischer, Rotenberg, & Bullock, 1993; Karcher & Fischer, 2004; Kitchener, Lynch, Fischer, & Wood, 1993; Lamborn, Fischer, & Pipp, 1994) found that the shapes of developmental functions for specific behaviors and domains vary systematically under different assessment conditions. The model distinguishes "functional level" and "optimal level" in conceptual understanding. Functional level is the level at which most people operate without contextual support or practice. Optimal level marks the upper limit of the person's conceptual capacity. Fischer and his colleagues point out that an assessment of functional level underestimates potential performance (for a review, see Kitchener, 2002). Kitchener et al. suggested that as new capacities develop in early adulthood, there is some recursion to lower levels of performance on novel tasks. They claimed that people need to build and rebuild skills over time, especially when confronted with new content and new tasks.

The utility of designing different assessment conditions was tested in a study on developmental changes in reflective judgments (Kitchener et al.). The Dynamic Skill Model (Fischer, 1980) and, more specifically, Fischer's idea of assessing the role of context (with a task and probe protocol especially designed for the study) allowed capturing functional and optimal levels of reflective judgment. The data suggest that assessed epistemological level

was not a fixed characteristic of the person; rather, individuals exhibit a range of scores depending upon the content, the context and the amount of support and practice for high-level performance. The same person exhibits different levels of performance under different assessment conditions. On the other hand, the study showed that individuals do not develop the capacity for the highest levels of reflective thinking until their early to late 20s. In order for these spurts or actual development to occur, however, active engagement in the process of skill construction is necessary; not all environments support high-level, abstract thinking.

In addition to capturing differences in performance within an individual, Fischer's (1980) detailed, within-stage description of the structure of conceptual understanding allows for discerning not only the form (complexity) of thinking, but also for describing the content of conceptual understanding. These descriptions can reveal the role of individual experiential histories in shaping individual pathways in development. In this way, his method allows an assessment of the content of the skills comprising the pathways, including developmental level based on their complexity. For instance, Fischer and colleagues (Calverley, Fischer & Ayoub, 1994) tested the hypothesis that psychopathology arising from sexual abuse involves high-level skills appropriate to a person's age. With Harter's (Harter & Mansour, 1992) Self-in- Relations interview, they assessed the developmental level of self-descriptions in different social roles with 92 depressed girls between 10 and 18 years of age. Fifty-seven of the girls had experienced years of sexual and physical abuse and neglect, and only 25 of the girls had no history of maltreatment. Each girl was asked to describe what she was like ("the real me") in different close relationships (girlfriend, mother, father, romantic friend). For each of the roles, the girls had to ascribe positive or negative valence and importance to the different self-attributes. The results showed that the abused girls displayed developmental levels in self-understanding similar to their non-abused peers despite their psychopathology. But an

analysis of the content of the organization of their attributes revealed important differences. Representations of self and others center on negative evaluations rather than positive. The girls kept separate those emotions that in normal development would be integrated. For example, while most of us can integrate positive and negative interactions with parents, adults who have been maltreated may split negative and positive, and keep these experiences separate as way of emotional self-preservation or defense (Calverley et al., 1994). The presence of severe trauma and depression associated with abuse history did not interfere with the development of age appropriate skills of self-understanding.

This framework of analysis can help us gain insight into the thinking of students with LD about their own individual experiences of LD. As Calverley et al.'s (1994) study suggests distinctive pathways of organization of oneself can arise from distinctive individual experiential histories. Learning disability is central to one's definitions of self. Within this group of students, individual experiential differences have consistently been noted in previous research. Fischer's (1980) model allows for capturing the reasons for these differences.

Integrating both models. The review suggests that there is a great deal of overlap between Case's (1992) and Fischer's (1980) models. The confirmed findings of similar sequences of cognitive structures in the two models allow for "communication" between the models. Common to both models is an explication of recursive progress through which cognitive complexity increases with experience and maturity. Although Fischer's mechanisms (e.g., inter-coordination) are more fine-grained than Case's, there is a parallel to the mechanisms described by Case (e.g., elaborated coordination).

Conceptual understating of the social world, which is of relevance to this study, has been examined more extensively within Case's model than within Fischer's. Similar to

Piaget, Case was a constructivist who based and extended his ideas from current advancements in the constructivist tradition. He conceptualized children's and adults' social functioning as embedded in the social environment. His ideas were informed by the socio-cultural and socio-constructivist approaches, which support the view that to survive in an increasingly complex and social world, children have to behave as constructivist narrators, continually interpreting and constructing meaning from social experience (e.g., Bruner, 1990). More specifically, the cognitive ability to understand human action and intentions has been referred to as the narrative mode of thought (Bruner, 1986; 1990; 1996). In contrast to logico-scientific or paradigmatic thought (thought that is concerned with physical reality and deals with issues of logic, analysis and truth), narrative thought is concerned with psychological events, human experiences related to internal life (mental states, emotions, intentions). Narrative thought encompasses the ability to simultaneously recount events that take place in the physical world (i.e., landscape of action) and those that take place in the mental life of the characters (i.e., the landscape of consciousness) (Bruner, 1986).

As evident from the review of the studies within Case's framework, there is an increasing order of complexity in children's understanding of the "landscape of action" and the "landscape of consciousness." As children develop an understanding of these two "planes," they connect them in an increasingly complex way. The cognitive structure describing social cognition in adolescence has been termed "Interpretive" (McKeough & Genereux, 2003). During adolescence, there is a fundamental shift in thinking about the "landscape of consciousness" from an intentional understanding in terms of immediate feelings, intentions, and thoughts to an interpretive understanding in terms of stable psychological traits. In late adolescence, the abilities to take "a meta-position on human experience" (McKeough & Genereux, p. 547) start to emerge. Traits are higher-order concepts, or abstractions, and if we apply Fischer's terms, this meta-position suggests that

late adolescence is a period when the abilities to integrate multiple aspects of abstractions in a more multilevel fashion start to emerge.

Case's predictions about social cognition do not extend beyond adolescence. Because of the similar notion of recursive progress explicated by the models, however, it is possible to predict the development of social cognitive structures through the substages described by Fischer (e.g., abstract mapping, abstract systems, abstract principle). Alternatively, following the logic of mechanisms of development described by Case, another stage can be added to his developmental sequence. Thus, by integrating the two models, the notion of landscape of consciousness as the psychosocial content of abstractions can be added to Fischer's model. In this way, an analysis of both the form and content of young adults' social understanding and thinking can be meaningfully described.

Implications for Research with College Students with Learning Disabilities

We know very little about LD college students' social understanding in academic environments. Overall, the literature on postsecondary students labeled LD describes the students as being at risk for emotional problems and difficulty adjusting to academic life (Cohen, 1985; Mellard & Hazel, 1992; Saracoglu, Minden, & Wilchesky, 1989; Stage & Milne, 1996; Stilington & Frank, 1990). These difficulties seem to parallel the social difficulties identified in the literature on adults with LD.

Studies found that adults with LD had trouble adjusting to employment environments, maintaining jobs, and establishing independent living (Adelman & Vogel, 1998; Raskind, Goldberg, Higgins, & Herman, 1999). Adults with LD reported that they had limited social interactions and trouble making friends. They struggled with depression, negative self-concept and self-esteem, and experienced high levels of stress and anxiety, frustration and feelings of failure and helplessness (Adelman & Vogel; Shessel & Reiff, 1999). Similar to the literature on LD children and adolescents, the literature on adults with LD has attempted

to find out the underlying reasons for the identified social difficulties experienced by adults with LD. Research on children and adolescents points out that deficits in social cognition mediate problematic social behavior (Tur-Kaspa, 2002). Results suggest that, for example, the difficulties in achieving social acceptance among students with LD may be accounted for by the students' deficient interpretation of social and emotional cues in social situations (Tur-Kaspa). Generally, studies found that LD children and adolescents exhibited a unique problem in the encoding of social information and exhibited a distinct response decision pattern in their tendency to select incompetent solutions to social situations (Tur-Kaspa, 2002). Similarly, research on adults with LD found that adults with LD had problems in social perception and in reading verbal and social cues (Adelman & Vogel, 1998). At the same time, however, conflicting results have been found in both bodies of literatures, suggesting large within-group variance. Not all children and adolescents had social difficulties. Some children had adaptive social skills and knowledge about competent social solutions (Tur-Kaspa). There is growing evidence that students with LD are not a homogeneous group with respect to their social cognition (Margalit & Al-Yagon, 1994). Several factors have been offered to account for this variance, such as prior experience, affective and motivational variables, social-information processing specifics as related to different subtypes of LD, and comorbidity with other disorders (e.g., ADHD, depression). (For a review, see Tur-Kaspa, 2002).

Research on adults with LD has also found individual differences in LD adults' social functioning in terms of their adaptation to the demands of adult life. Studies found that the severity of the LD or deficits in academic skills played a minimal role in predicting successful adaptation (Gerber, Ginsberg, & Reiff, 1992; Weller, Watteyne, Herbert, & Crelly, 1994). Rather, success was associated with internal decisions and external manifestations of individuals' pursuits to take control over their lives. Internal decisions were

related to reframing the negative LD experience to a positive one and setting plans of action toward reaching personally desirable goals. Overall, successful adults with LD manifested perseverance, efficient self-advocacy skills, and good compensatory and coping skills in finding supportive social environments, and in modifying personal behaviors to meet environmental demands (Gerber, Ginsberg, & Reiff; Gerber & Reiff, 1991; Weller et al.). It is important to reiterate that the findings from this research prompted the disability service providers in postsecondary institutions to acknowledge the importance of providing support to students with LD in developing self-awareness and self-advocacy skills.

Research on adults with LD, as well as research on postsecondary students with LD, has paid little attention, however, specifically to gaining an understanding of how these individuals interpret the complexities of their social environment. We cannot have a fuller understanding of the process by which these students evaluate themselves without understanding the ways in which they make meaning of themselves in the social context of college learning and how they think about themselves and others with whom they interact in the learning context. As Case (1992) argued, children and adults, in order to function successfully in an increasingly complex social world, have to behave as constructivist narrators, continually interpreting and constructing meaning from social experience. Higher levels of cognitive complexity in understanding human behavior and intentions have been linked to adaptive social behavior and competent social-problem solving (Lamborn, Fischer, & Pipp, 1994). Furthermore, findings from studies within Fischer's framework (e.g., Calverley, Fischer, & Ayoub, 1994; Fischer et al., 1997) point to the importance of gaining a better understanding of the complex interactions among the levels of complexity of cognitive skills and the specifics of personal experiential histories. As the study by Calverley et al. demonstrates, contrary to the standard assumption that psychopathology stems from developmental immaturity, maltreated girls diagnosed with psychopathology developed

along distinctive pathways. These pathways were marked by normal developmental complexity of thinking but distinctive affective-cognitive organization. These girls, instead of being developmentally regressed, were developmentally different.

Understanding of the Concept of Learning Disability

Insight into how students understand what it means to have a learning disability became possible with the development of a formal scale, the Self-Perception of Learning Disability Scale (SPLD) (Heyman, 1990). The SPLD is a self-report questionnaire designed for students from grade 3 to 6 which taps three areas: whether students see their disability as delimited or global; whether they feel their disability is modifiable or permanent; and the degree to which they feel their disability is stigmatizing. Studies found that children who had high scores on the scale had high self-esteem, high achievement scores and perceptions of greater behavioral and scholastic competence, social acceptance and support (Heyman; Rothman & Cosden, 1995). A more recent study with high-school students (Cosden, Elliott, Noble, & Kelemen, 1999) combined the scale with open-ended questions about what it means to have LD, and analyzed the relationship of these responses to self-esteem scores. Better understanding of LD was related to lower self-esteem. These discrepant results were explained with the development of self-esteem, in parallel with the development of conceptual understanding: young children's global, overly positive self-esteem is accompanied by lower self-awareness of differences from other children. As awareness of the children with LD increases, their self-esteem may decrease, at least temporarily. It was speculated that with adolescence and increased conceptual complexity, the children would be better able to see themselves from multiple perspectives and to better integrate their strengths and weaknesses, accepting their disabilities (Cosden, Brown, & Elliot, 2002). In adults, self-understanding becomes a protective factor associated with higher self-esteem. Studies

indicate an association between success and greater self-awareness in adults with LD (Raskind, Goldberg, Higgins, & Herman, 1999; Speckman, Goldberg, & Herman, 1992).

It should be noted that the studies described above consistently documented that younger students provided very vague and general answers both to the questions in the scale and open-ended questions. Although the scale is an important step in inquiring into students' understanding of learning disability, it does not make a clear distinction between students' conceptual understanding and their feelings of stigmatization. Developmental research on children's conceptions of illness, for example, shows that in order to understand what children really "know," an interview is more appropriate than questionnaires. This developmental research seems to confirm the speculations by Cosden et al. (2002) about a developmental progression in understanding of learning disability. Children's conceptions of illness are thought to progress developmentally, parallel to developments in cognition (Bibace & Walsh, 1980). Young children tend to understand illness in global and nonspecific ways (Burbach & Peterson, 1986). For example, they do not differentiate between the symptoms and causes of illness, and view illnesses as transmitted "magically" (Perrin & Gerrity, 1981). Young children often perceive illness in a moralistic fashion, as if it is caused by misbehavior (Kister & Patterson, 1980). With advances in cognitive maturity, from childhood through adolescence, youth develop more advanced conceptions of illness. They begin to conceptualize illness in terms of specific symptoms, causes, and prognosis and to appreciate the psychological, affective, and social aspects of illness. Thus, children's illness concepts appear to develop systematically and predictably, consistent with social cognition as described in cognitive developmental theory.

There is some support for a systematic development of conceptions of illness in the college years as well. A developmental study by Oprendeck and Malcarne (1997) examined

the cognitive reasoning level in dealing with illness and psychological concepts and experiences with physical illness and psychological difficulties with 101 college students. Previous studies devoted to children's and adolescents' understanding of illness and psychological concepts provided the framework for the cognitive-developmental description of college students' understanding of these concepts. This framework was based on Piaget's theory and its stages of development - preoperational, concrete operational, and formal operational levels of reasoning. The college students were interviewed with a technique involving structured questions and continued probes to insure that students gave as much information as possible. The questions focused on identification, cause, treatment and prevention of illness and psychological problems. The authors used six hierarchically organized cognitive-developmental scoring categories, corresponding to cognitive levels in Piaget's theory, to code responses to illness and psychological questions.

On average, the students' reasoning about both illness and psychological concepts was in transition from concrete to formal operational levels. The students' cognitive-developmental reasoning levels varied, however, across illness and psychological domains and across some concepts within each domain. The reasoning levels for illness concepts were found to be significantly more advanced than the reasoning levels for psychological concepts. Female students' reasoning scores for psychological concepts were significantly higher than those of male students. In addition, the authors noted that although the students used sophisticated vocabulary in their responses, further probing showed that they did not have a thorough understanding of the meaning of the terms they used. The implications were that the students might not understand the complex explanations about the cause, treatment, or prevention of illness and psychological problems that healthcare practitioners and educators give them.

Although the study has some limitations, it does suggest that the conception of illness continues to develop in the college years. The main limitation relates to the interviewing format. Although there was probing involved, it was related to clarifications of students' responses, and most likely tapped students' spontaneous understanding. On the other hand, the results support Fischer's notion that not all environments support high-level, abstract reasoning, and practice and experience with concepts is necessary to perform at a higher level of reasoning.

This developmental research across different ages suggests that one can expect a developmental progression in students' understanding of the concept of learning disability. Because of the developmental framework of the study, this can serve as a guide for designing interview questions and scoring categories. Although designing questions about learning disability based on research on illness conceptions seem to reinforce the medical model of learning disability, it is worthwhile to glean what conceptions dominate students' understanding. Based on the developmental research, which highlights the dimensions of the concept of illness, the questions about the concept of LD focus on students' understanding of signs of LD and their expression (symptoms), causes and ramifications of LD (emotional, psychological and social), factors in overcoming disability (prognosis), as well as connections among these dimensions. Following Vygotsky's lead, through students' thinking we can understand how the disability service system and its language positions students with LD, and this understanding can guide meaningful system changes. At the same time, the interview should allow the students to express their own notions of LD. The interview assessment conditions incorporate these two aspects. The present study will attempt to capture this understanding and evaluate the underlying conceptual complexity on the basis of a semi-structured interview tapping different dimensions (e.g., causes, nature) of learning disability under different assessment conditions described in the next chapter.

Summary and Research Questions

While post-secondary education is a difficult period for all students, it is especially challenging for students with learning disabilities. These students face, along with requirements for independent learning and decision-making, a new service-provision system and environment. The learning disability literature points out that an awareness of what one's learning disabilities really mean may be a critical factor in negotiating the demands of the postsecondary environment. If students with LD are to access and participate and perform in postsecondary education, they must be personally skilled in evaluating the demands of postsecondary learning environments, their own learning profiles and the academic accommodations they may require.

The literature focused on the development of college students in general shows that how students make sense of the nature of knowledge and learning emerges as a critical area in the students' development during the postsecondary years. Studies on personal epistemology provide the cognitive context within which learners "read" the learning process and construe conceptions about learning. Students actively construct new understandings through their interactions with the world of postsecondary education as their current understandings are challenged by new experiences. Students' conceptualizations of knowledge and learning undergo qualitative reorganization as they progress through their academic careers. These conceptions are salient in their academic experiences and influence their academic functioning.

Because learning occurs in a social context, students continually interpret and co-construct meaning from their social experiences (Bruner, 1990). They try to make sense of their instructors' and fellow students' roles, actions and intentions. All in all, how students assign meaning to the concepts of knowledge and learning, themselves and others in the learning enterprise depends on the development of their conceptual abilities. How do college

students with learning disabilities fare in this process of meaning making? We know very little about their development and thinking during their years in higher education. Related to the sharp increase in enrollment of students with LD in campuses across North America, it is important to gain a better understanding of how these students conceptualize the main task that faces them – learning -- in a new social context, given the constraints imposed by their learning disability. Thus, the focus of this study is on students with LD's conceptions of learning, disability, and understanding of others in the learning context.

In order to examine LD students' conceptual understanding, the study is situated in Case's (1992) and Fischer's (1980) neo-Piagetian models of cognitive development. Within the models, conceptual abilities to draw insights about learning, learning disability, and others involve thought in the social domain. The reviewed theoretical models' methodological tools allow an exploration of the question of whether there is synchrony in development of these concepts within the social domain. While the models concur with personal epistemology research in acknowledging the role of experience in development, they also delineate qualitatively different levels of understanding at different age periods. Findings from studies within the models, together with research on conceptions of learning and developmental research on self and learning disability, informed the task analysis in the present study.

The overarching goal of this study is to describe the form and content of the thinking of students with LD about learning, learning disability, and understanding of others in the learning context of postsecondary education. The importance of this goal is determined by the fact that cognitive development, and in particular students' thinking, plays a central role in their functioning in higher education. By using cognitive developmental theory, we can gain crucial insight into how students with LD think about postsecondary learning that can serve as an important context for the design of programs focused on optimizing these

students' self-awareness skills. As revealed in the literature review, important components of optimal self-awareness seem to be students' advanced understandings of concepts such as learning, learning disability, and others in the learning context.

Building on findings from both developmental and LD research, together with the concepts and methods of Case's and Fischer's models, the following research questions are pertinent to this goal. The questions are of an exploratory nature because of the study's attempt to venture into an area largely unexplored in the LD field.

Questions exploring the form of conceptual understanding.

1. What is the cognitive complexity regarding (1) learning, (2) learning disability, and (3) others in the learning context for students with learning disabilities?
2. What is the displayed cognitive complexity on the different conceptual tasks under low- (functional) and high-support (optimal) conditions? Do students demonstrate different levels of complexity under these two conditions? If so, what are the differences?
3. What is the level of complexity across concepts? Is the form of students' reasoning similar across concepts? If not, how does the form differ across concepts?
4. How does displayed level of complexity relate to age and years of education (experience)?

Questions exploring the content of conceptual understanding.

1. What main categories emerge in students' understanding of (1) learning, (2) learning disability, and (3) others in the learning context for students with learning disabilities?
2. How do the main categories that emerge in students' understanding of learning fit with the categories of learning as described in the literature?
3. How do the main categories relate to the level of complexity of students' understanding under low- (functional) and high-support (optimal) conditions?
4. How do the main categories relate to age and years of education (experience)?

CHAPTER THREE

Method

Introduction

In this chapter, the study's participants are described first. A section on the study's measures follows this description. Within this section, an overview of Case's (1992) and Fischer's (1980) methodology is included. A subsection focused on an overview of the general interview format and general scoring process, applied to all tasks, precedes the description of the individual tasks. The tasks are described in the context of a pilot study conducted to refine the task protocols. The chapter concludes with a description of the study's procedure.

Participants

Participants were recruited by contacting disability service centers at several community colleges in the greater Vancouver region. The colleges have similar programs and student populations. The directors of disability services were contacted and given a letter (see Appendix A) describing the study's purpose, procedure and measures for ensuring confidentiality. They were asked to post on their bulletin boards or websites the letter of student initial contact (see Appendix B). A convenience sample of twelve women and five men who ranged in age from 18 to 46 agreed to participate in the study.

The developmental models that frame the study confirm that there is a developmental progression in adults' conceptual understanding, which unfolds in a sequence of steps or developmental stages. Ideally, in order to capture the developmental sequence, an attempt needed to be made to include equal numbers of individuals, representing an equal number of males and females at different ages encompassing an age range of research interest (cf. Fischer & Bidell, 1998). There were virtually no data on the incidence of learning disabilities associated with age and gender within the postsecondary LD student population. The

recruitment strategy was to approach major community colleges in the greater Vancouver region, and invite students with LD registered with the colleges' disability centers to participate in the study.

For the purpose of addressing the study's questions, the participants needed to meet the following criteria:

1. They had to be 18 years and older. The group of 17 participants had a mean age of 24.3 years ($SD = 7.03$, range: 18.17 – 46.50). Age was calculated as a difference between date of interview (year/month/day) and date of birth (year/month/day), with days rounded to months, and then rounded to years.
2. They had to have completed at least one full semester of college studies.
3. They had to be served by the disability centers at their institutions. In order to be served, students had to self-identify and submit documentation (e.g., psychoeducational report) that meets the British Columbia's Ministry of Advanced Education guidelines (for more information, see BCMAE, 2003) for diagnosis of a learning disability. The guidelines follow the DSM-IV-TR (APA, 2000) diagnostic criteria. A diagnosis of learning disability is made when the individual's achievement is substantially below that expected for age, schooling or level of intelligence based on individually administered standardized measures in reading, mathematics and/or written expression. Substantially below is defined as a two-standard deviation discrepancy between achievement and IQ standard test scores. A smaller discrepancy (between 1 and 2 standard deviations) is admissible in cases of co-morbidity of LD with other disabling conditions, but the diagnosis of LD is made based on presence of LD as the predominant disability.
4. Because of the verbal demands of the tasks, participants with at least average oral abilities were included in the study.

Participants' knowledge about their own learning disability and areas of learning weaknesses, along with information about their highest number of years of formal education, program of study, ethnic background and years of being identified/diagnosed as LD, was collected by means of a background information questionnaire (see Appendix C).

The participants were offered the option of providing copies of their LD documentation. All participants agreed and provided copies of their most current psychoeducational reports (current, according to the BCMAE, is defined as a report done within the last 5 years). Although the reports varied considerably in format and content of the assessment data, all had been accepted by the disability centers, and therefore, it was assumed that they met the BCMAE guidelines. The data on participants' diagnoses were consistent with participants' self-reported areas of learning difficulties. For the purposes of the study, both sources of data were summarized to form the participants' LD profiles. The participants' LD summary profiles are presented in Table 2. Most of the students had been identified with reading and writing disorders.

A summary of the participants' background information is presented in Table 3. All students were of Caucasian background, born in Canada. In order to be consistent with previous developmental research so that comparisons could be made, only the years of formal education (defined in the developmental literature as completed years of high school and college or university level programs, Dawson-Tunik, 2004) were calculated for each individual. At the time of the interview, if students indicated that they had some high school, additional questions were asked about ways they had completed their high school equivalency. For example, one student wrote the General Educational Development (GED) test; three other students did upgrading courses. Years of formal education were given for the semesters of upgrading courses. The academic year in college spans three 4-month semesters.

For example, if a student was interviewed in March, and this was his/her second semester in college, four months were added to his/her previous years of education. If the student had completed 3 semesters of college studies this was counted as one year of formal education. The average number of years of formal education was 13.1 (SD = 1.75 years, range: 12.33 – 15.33).

Table 2. Participants' gender, age, diagnosis, and areas of weaknesses

Gender	Age	Diagnosis	RC & RS	BR & DW	WC	WE	Spelling	Memory
F	19-2	Reading & Writing	+	+	+	+	+	
F	19-4	Reading & Writing	+			+	+	
F	19-6	Written Expression	+	+	+	+	+	
F	21-4	Reading & Writing						
F	21-4	Severe LD	+	+	+	+	+	
		Reading & Writing						
F	21-9	Reading & Writing	+	+	+	+		+
F	21-11	Reading & Writing	+	+	+	+	+	
F	22-11	Severe LD	+			+	+	+
F	23-2	Reading Disorder (Dyslexia)	+	+	+	+	+	
F	25-1	LD not otherwise specified	+	+	+	+	+	
F	29-2	Reading & Writing	+		+	+	+	
F	46-6	Reading & Memory	+			+		+
M	18-2	Reading			+	+		
M	18-3	Reading Disorder (Dyslexia)	+	+		+	+	+
M	25-8	Reading Disorder of Written Expression	+		+	+	+	
M	26-6	LD not otherwise specified	+			+	+	
M	33-6	LD not otherwise specified	+			+		

RC=Reading comprehension; RS=Reading speed (fluency); BR=Basic reading; DW=Decoding words; WC=Written composition; WE=Written expression

Table 3. Participants' gender, age, vocabulary range, verbal IQ range, years of education, and program of studies

Gender	Age	Vocabulary	Verbal IQ	Years of Education	Program
F	19-2	Average	Average	12.4	Early Childhood Education
F	19-4	Average	Average	13	BA
F	19-6	Average	Average	13	UT/Science
F	21-4	Above Average	Average	12.4	General Studies
F	21-4	Average	Average	13	Child and Youth Care Counselling
F	21-9	Average	Average	12.4	Classroom and Community Support
F	21-11	Average	Average	13	Child and Youth Care Counselling
F	22-11	Average	Average	12.4	General Studies
F	23-2	Average	Average	12.8	General Studies
F	25-1	Superior	Average	15	University Transfer/Arts
F	29-2	Average	Average	14	BA
F	46-6	Average	Average	13.8	Child and Youth Care Counselling
M	18-2	Superior	Average	12.4	BA
M	18-3	Above Average	Above Average	12.4	Environmental Studies
M	25-8	Average	Average	14	Classroom and Community Support
M	26-6	Above Average	Average	12.4	Classroom and Community Support
M	33-6	Above Average	Average	15.4	Rehab Assistant

Measures

The different measures for the study were combined in a package administered in one interview session. The package included the background information questionnaire and interview protocol sheets which accompanied the administration of the interview. The interview session was divided into sections focusing on students' understandings of each concept. These sections were defined as conceptual tasks (Case, 1992; Fischer, 1980). The overall format of these tasks resembled the classical clinical interview format used by Piaget (Inhelder & Piaget, 1958) and studies within Fischer's and Case's frameworks.

General Metric for Classifying Cognitive Complexity

A central unit of assessment and analysis in this study is the cognitive complexity of individuals' thinking and interpretations of the meaning of different concepts. Case (1992) and Fischer (1980) described this complexity in terms of qualitatively different levels or stages of development. Given the age of the participants, the primary focus was on the use of abstract thought. According to the models, abstract thought starts developing in adolescence and continues to develop in adulthood. Adolescents and adults rely most heavily on their abstract skills and are most likely to draw upon these to describe the meaning of different concepts.

Abstractions reflect the ability to control intangible concepts that can be generalized across contexts, and abstractions are built upon the integration of earlier representational (Fischer) or dimensional (Case) skills. Temporary representations of concepts become differentiated and integrated into structurally more complex representational systems and finally into single abstractions.

In late adolescence, adolescents become able to interconnect and consolidate relations such as similarity, causality or opposition among abstract concepts (Karcher & Fischer, 2004). This in turn leads to the development of a new skill structure (*abstract systems*), which emerges in the early 20s. Young adults are now able to think about multiple aspects of multiple (more than two) abstract concepts. They are able to understand the complex, multiple relations among abstractions. Starting at approximately 25 years of age, individuals can begin to integrate abstract systems into higher order cognitive skills (*a single abstract principle*).

Besides these general levels of skill development (macro development), Fischer (1980) included a set of transformation rules to explain the steps by which a skill within one level/stage progresses toward the next level (micro development), such as how the skill of using one abstraction transforms into a skill relating two abstractions. Fischer proposed differentiation, substitution, shift-of-focus, compounding and inter-coordination of conceptual skills. The first three rules involve describing individuals' abilities to add an additional thought or affective valence to their interpretations or apply their conceptual skills by providing different examples of the meaning of a concept, all skills occurring at the same developmental level. Compounding is the step in which one skill fully coordinates two separate skills in a more complex way but at the same skill level. Fischer proposed that compounding requires differentiation, substitution, and shift-of-focus before it can occur. Inter-coordination occurs when two fully differentiated skills at the same level become integrated into a more complex skill that can be held together or integrated under one word, concept, idea, or thought at the next developmental level. These rules/steps are similar to the ones proposed by Case. He proposed three rules of micro development -- differentiation, integration and consolidation of conceptual structures. Thus, parallels between the models can be made.

In sum, Fischer's model offers a metric that can be used to assess the complexity of abstract thinking. The metric provides a scoring system that can be used to classify people's responses according to a complexity level within a stage in the developmental progression. The main advantage of this metric is that it can capture cognitive complexity independent of specific content, and, therefore, can be used to classify understanding of different concepts.

Integrating Cognitive Complexity with Conceptual Content

While Fischer's (1980) metric provides information about the form of performance on conceptual tasks in terms of hierarchical complexity, it makes no direct reference to its specific conceptual content. When level of complexity is assessed with the metric, conceptual content can be assessed independently, and then reintegrated with the complexity information. This assessment process is validated in Case's (1992) model in the domain of social understanding. As reviewed in the previous chapter, Case's model describes conceptual understanding of the social world, which is of relevance to the concepts targeted by the study. Because of the similar notion of recursive progress common to Case's and Fischer's models, it is possible to assess the development of social cognitive structures through the substages described by Fischer (e.g., abstract mapping, abstract systems, abstract principle), and to analyze their specific social and psychological content. More specifically, studies within Case's model (e.g., McKeough & Genereux, 2003) propose that the content in social conceptual understanding relates to the narrative mode of thought (Bruner, 1996). Narrative thought encompasses the ability to simultaneously recount events that take place in the physical world (i.e., landscape of action) and those that take place in the mental life of the characters (i.e., the landscape of consciousness) (Bruner, 1986). The conceptual content of social cognition in adolescence has been termed "Interpretive" (McKeough & Genereux, 2003). During adolescence, there is a fundamental shift in thinking about the "landscape of consciousness" from an intentional understanding in terms of immediate feelings, intentions, and thoughts to an interpretive understanding in terms of stable psychological traits. In late adolescence, the abilities to take "a meta-position on human experience" (McKeough & Genereux, p. 547) start to emerge. The present study adapts McKeough's (McKeough, Templeton, & Marini, 1995) approach to analyzing the content of the students'

interpretations on all three conceptual tasks, and, therefore, content comparison across concepts can be made.

Contextual Support

As described in the literature review, Fischer (1980) argued that an individual's competence would vary depending on the conditions under which it is assessed. The degree to which environmental factors (such as prompts, practice, and the nature of the task) support high-level performance is a primary determinant of observed variation in the range of scores. In Fischer's terms, there is a developmental range in performance, delimited by the level of spontaneous performance without support (functional level) and the performance level that an individual can consistently perform when he/she is given opportunities for support and practice (optimal level). Fischer and colleagues (e.g., Lamborn, Fischer, & Pipp, 1994) argue that most developmental measures of conceptual understanding measure how a person functions on a day-to-day basis without practice or support; thus, they underestimate potential performance (Karcher & Fischer, 2004; Lamborn et al.). Fischer's model offers a methodology that allows for distinguishing the "functional level" and "optimal level" in conceptual understanding by designing low and high support assessment conditions. The support is defined as a contextual support that involves prompting of a skill. The low and high contextual support conditions are designed to differ in the amount of interpersonal support that the interviewer provides the interviewee for responding more complexly.

In this study, following Fischer's (Fischer & Karcher) guidelines, the degree of support was varied by means of probing questions, or probes. Probes were conceived as means of directing the attention of the interviewee to the key elements (e.g., words/phrases) of his/her spontaneous responses in the low support condition. The interviewer then guided the participant to define, coordinate and use those elements. Prompts asking the students to give examples from their college experiences were additional means by which the students

were assisted in conveying their fullest understanding of a concept. In some studies contextual support was provided by the interviewer demonstrating/modeling examples of high-level performance and by giving the interviewee opportunities for practice (e.g., Lamborn et al., 1994). In the present study, the degree of support was varied by constructing probes and, in one of the tasks (“Understanding Others”), by modeling an example of high-level understanding.

The Role of Verbal Abilities

Another limitation of the developmental measures, especially when employed with older participants, is that many are guided by the content of responses rather than by the underlying developmental structure of responses (Fischer & Karcher, 2004). Interviewees may state abstract words (such as discrimination) that appear to reflect complex understanding but that in fact reflect a large vocabulary that masks a structurally less mature understanding. Thus, individuals’ abilities as thinkers can be overestimated based on their verbal abilities. Griffin (1992) suggested that judging people’s responses should be based on the “bare bones” of the responses. She defined a “bare bones” response as one that meets “the criteria for the postulated structure in a minimally articulated form” (p. 204). Paying minimal attention to the surface language structures such as the levels of grammatical, syntactical and vocabulary sophistication, and devoting more attention to the overall structure of the meaning can accomplish this. It was ensured, by means of Griffin’s “bare bones” approach, that students’ responses were not overestimated based on sophisticated language use.

A standardized measure of vocabulary was not implemented in the study because of possible future, needed assessments. Usually, college students with LD require several updated assessments throughout their educational career. Any assessment may influence future interpretation of results (e.g., possible regression to the mean). However, the students

provided copies of their reports, which contained information about their vocabulary level and verbal IQ (see Table 3). It is widespread and acceptable clinical practice to use verbal abilities as an index of intellectual potential because of their importance for school. College students with LD present a distinctive group of adults with LD. Colleges set specific admission criteria in terms of grades, especially in English language. Currently, most of the colleges require a B in English 12 as a condition to enrollment in college programs, and thus it was expected that if the students were admitted into college programs they would present average verbal skills, which was confirmed in their assessment reports.

Descriptions of the Study's Conceptual Tasks

General Interview Format

For the purpose of answering the study's research questions, conceptual task interviews comprising questions adapted from other studies and questions specifically designed for the study were used to elicit the thinking of college students with LD about the concepts of learning, learning disabilities, and understanding others in the college context. All conceptual tasks were administered under low and high support conditions. A summary of the study's tasks, including information about the studies whose measures guided the task design, is presented in Table 4.

Table 4. Summary of study measures

Conceptions of Learning	Conceptions of Learning Disability	Understanding Others
Adapted and re-designed based on neo-Piagetian studies (Bickerton, 1994; McKeough & Genereux, 2003; McKeough, Templeton, & Marini, 1995) and conceptions of learning research	Designed for the study based on issues central to LD research	Adapted Marini's (1994) "Personality Diagnostic Task (PDT)" Two college scenarios designed for the study following the overall PDT structure

The questions in the low support condition were generally of the format "What does _____ mean to you?" designed to elicit day-to-day, unstructured responses about the meaning of concepts. The students were encouraged to say as much as they needed to in order to explain a meaning of a concept.

The questions in the high support condition were designed in such a way that 1) they primed/directed the participant to key elements in his/her low-support response, and 2) they encouraged the students to explain any relationships they perceived between different words/phrases/concepts. After the priming, four probes aimed at assessing levels of cognitive complexity were given. These probes were numbered 1, 2, 3, and 4 to correspond to the developmental levels in Fischer's developmental sequence. One equalled a single skill (e.g., abstract thought unit); 2 = two skills mapped in relationship to each other; 3 = three or more skills interrelated into one thought unit system; 4=two unit systems interrelated into one higher order principle. The first three probes were divided into 2 probes, labeled "complex

(skill) a” and “complex (skill) b,” which connoted the transformation rules/steps within a developmental level.

Probe “a” tried to tap into how students were able to differentiate, for example, different abstractions, to substitute one abstraction for another or shift focus from one abstraction to another at the same developmental level; “b” tapped compounding or relating abstractions that were not yet fully inter-coordinated and integrated at the same developmental level.

Overall, the probes were aimed at supporting the students to demonstrate their optimal abilities to form abstractions. For example, probe “1a” asked the students to define the word/s and probe “1b” asked for an application of their understanding. The students were prompted to give examples based on that definition. Probe “2a” corresponded to abstract mapping level and the first transformational rule within this level. The students were asked to reason about relations of similarity, opposition or cause between two abstract terms. Probe “2b” asked the students to reason further about the relations between abstractions. The students were also prompted to give examples from their college experiences that could describe the relations between abstractions. Probe “3a” corresponded to the abstract system level. The students were asked to relate pairs of abstractions in more complex, multiple relations and “3b,” similar to the other “b” probes, prompted students’ ability to apply their understanding (see the individual tasks’ interview protocols in Appendix D1 through Appendix F). There was only one probe 4 (i.e., without “a” or “b”) because Fischer did not extend the developmental sequence past level 4. Developmental research shows that cognitive development is relatively even and stable after 25 years of age (e.g., King et al., 1989).

General Scoring Process

Although the focus of the study is on adulthood, the scoring includes the last substage of childhood in addition to adolescence and adulthood stages (see Appendix G1). In structuring the interviews, no high support probes related to this developmental level were given. It was assumed that most of the college students with LD's thinking would reflect capabilities that develop after the late childhood substage. McKeough, Templeton, and Marini (1995) found, however, that low-literate adults (their study's definition of LD seemed to fit the operational definition of LD) demonstrated intentional reasoning, which is typical for late childhood.

A number is assigned to each step in Fischer's (1980) skill sequence (see Appendix G1). These numbers were used in the scoring of the students' responses. All tasks were scored according to this general metric. For each task, the overall patterns of students' performance were explored. The two highest levels attained were considered. The final score represented the second highest score. Two total scores, high and low support scores, were the indices of cognitive complexity.

Content Analysis

According to Fischer's and Case's (1992) models, researchers, who score the interview protocols for their complexity level, should deliberately avoid basing scores on the particular conceptual content. Whereas scoring for complexity involves *reading through* the content to find the elements of a structure, content coding involves *reading the content* (Dawson-Tunik, 2004). The purpose of the content coding is to find out how meanings change across complexity levels or vary within developmental levels. The researcher examines the meaning of what is being said rather than how it is said (structure) (Dawson-Tunik, 2004).

In planning the content analysis, I followed the approach recommended by the developmental models framing the study. According to Dawson-Tunik (2004), the first step in content analysis is to identify broad thematic strands that organize concepts. The conceptual domain under investigation determines this step. If the domain has been investigated previously in research, preliminary thematic strands are generated based on previous research findings. Because the interview questions and probes were adapted from research on conceptions of learning and learning disability, these questions framed the broad thematic strands for the analysis. At the same time, thematic strands can emerge from what a study's respondents tell about a conceptual domain.

The analysis of the interview transcripts was done in the following sequence of steps:

- 1) Each interview protocol, after being parsed into conceptual tasks and scored for level of complexity, was divided into sections corresponding to the broad thematic strands. For learning these were definition, goals of learning, and approach to learning. For learning disability, the strands were definition and signs.
- 2) After reading and re-reading the protocols, additional strands were generated. These were "types of learning," "the learner," and "personal judgments;"
- 3) For each strand, by means of reading and re-reading the protocols, phrases were generated to represent topics/ideas which were hand coded and then again, after re-reading, the topics were sorted into common themes and examples of common themes. This inductive procedure resulted in a set of examples for a certain conceptual task and developmental level. A couple of questions guided this procedure, which were also adapted from Dawson-Tunik (2004): (a) What was common across the set of examples at a particular developmental level?, and (b) What was unique about the set of examples at this level when compared to the set of examples at the level immediately below this level?

The individual tasks are described below as embedded in the context of a pilot study. The tasks' interview protocols are included as appendices. References to the respective appendices are made throughout the text. The order of the presentation follows the order of the administering of the tasks, which is explained in the "Procedure" section.

Pilot Study

A pilot study was undertaken with three college students diagnosed with reading disabilities, two females and one male, ages 21, 24, and 33 respectively. The goals of the pilot were to determine: the optimal time necessary to complete the interview, the optimal number of probes that would capture optimal performance, the ecological validity of the college scenarios, the accessibility of the language of the tasks, and the utility of the scoring.

All three students had completed at least one semester in college. The students were enrolled at local community colleges; one was registered in a college level program, one in developmental studies or upgrading courses, and the third in trades diploma courses. With all three students, the full interview protocol was followed as planned. The results from the pilot study and the decisions to revise some parts of the interview tasks are discussed under each conceptual task below. For scoring all tasks, two raters assigned a score according to the metric. I was the main rater. I have an extensive background in test and measurement, in addition to extensive training and experience in administering psychoeducational assessments. I have acquired, over the course of my masters and doctoral programs, knowledge and expertise in different theories of human development. I am currently employed as a coordinator of disability services at one of the community colleges in the Vancouver area. In the past 7 years, I have had extensive experience working with college students with LD. Half of the students who participated in the final study were registered with the disability center I work at. The idea for the study was born out of my day-to-day

experience working with these students. The second rater was an instructor with a Ph. D. in Psychology who was very familiar with neo-Piagetian research. The rater was blind to the purpose of the study, students' LDs, age, gender and education. The pilot study was also used to train the rater in applying the scoring metric. During the pilot, inconsistencies in the scoring were noted, and were resolved through additional training. This prompted the addition of more guidelines for scoring. They were adapted from Dawson-Tunik (2004) and focus on underlying logic of the text. These guidelines are summarized in Appendix G2. After the study was done, this rater and I scored 8 randomly selected interview transcripts. The interrater reliability ranged from .82 to .94, which is consistent with the reliabilities found in other studies done within Case's and Fischer's models.

Understanding others in the college learning context. This was the only task where contextual support was provided by the interviewer demonstrating/modeling an example of high-level performance and by giving the interviewee opportunities for practice. Also, instead of spontaneous responses, participants were asked to interpret stories in the low support condition of the "Understanding Others in the College Learning Context" task. The stories from the Personality Diagnosis Task (Marini & Case, 1994) were used.

According to Marini and Case (1994), the cognitive abilities targeted in the Personality Diagnosis Task were: 1) the ability to infer/abstract dispositions, traits related to intentions, and feelings and 2) the ability to analyze a story problem and predict a protagonist's most likely response/behavior. The general format of the task included a dilemma, a prediction of the story's main character's behavior and a mood-altering event. For each story, there were questions related to predicting the main character's responses to the dilemma. As described in the review, the Personality Diagnosis Task was created to test the presence of a central conceptual structure across different domains (physical and social)

in adolescence, and thus had to tap the cognitive complexity sequence within this stage of development. In Marini and Case's study, each story was structured to correspond to a respective substage in Case's (1992) theory. For adolescence, these substages were prevectorial, univectorial, bivectorial and integrated bivectorial, corresponding to the number of traits that can be related, coordinated, and integrated. To be classified as passing level 1, participants had to make a connection between a character's disposition (trait), as revealed in the first part of the stories, and the way the character would solve the dilemma presented at the end of the story. To be classified as passing level 2, participants had to take into account two traits or aspects in the character's behavior and to resolve the dilemma based on their interpretation of the character's traits. At level 3, the participants had to make reference to two traits and to the potentially mood-altering event included in the stories prior to the introduction of the dilemma.

There were eight stories in the original PDT task, two for each substage. Six stories were included in the pilot for the present study, corresponding to the last three substages (see above), which specifically target abilities to form abstractions (traits). In Marini and Case's (1994) study, for each participant, her/his overall patterns of passes and failures were considered. The two highest scores were taken into account, and a total score corresponding to the second highest score was awarded.

During the pilot study, the students understood the PDT task well, and provided responses corresponding to either the bi-vectorial or integrated bivectorial substages. Thus, in the interest of decreasing interview time, only two stories (2B and 3B) corresponding to the bi-vectorial and integrated bivectorial substages were given during the study interviews (see Appendix D1). The students' responses were scored using the study's scoring metric.

For the *high support condition*, after a student finished interpreting the stories, I asked him/her to explain the reasons for his/her responses. I drew students' attention to their descriptions of the stories' main character's traits. I also modeled a high level response by focusing on explanations and predictions of the story's main characters' behaviors in terms of stable traits. I also primed the students by telling them what the goal of the next task (interpreting typical college scenarios) would be and by drawing similarities between the PDT stories and the college scenarios. I advised the students to follow a similar way of responding when presented with the questions included in the college scenario task. After that, the students listened to the two scenarios designed for this study.

The scenarios were written to reflect typical college situations. In the literature review, self-awareness, self-advocacy, and independence were noted as important skills for college students to have in negotiating the demands of postsecondary education. It is the responsibility of the students to self-identify as learning disabled, provide formal documentation of learning disability and discuss and propose viable options for accommodating the unique needs specific to their disability (Izzo & Lamb, 2001). An awareness of one's learning disabilities is a critical factor in accessing academic accommodations. The most frequently requested academic accommodations, which research shows greatly benefit students with LD, are note taking and extended time on exams (Fink, 2006; Mull, Sitlington, & Alper, 2001).

To ensure the ecological validity of the scenarios, two scenarios, one related to note-taking and one to exam accommodations, were written. Following the PDT task's general format, each scenario included a dilemma and required predictions of the main characters' behaviors. Questions asking the students to predict the main characters' actions, traits, cognitions and emotions were designed. The scenarios, in contrast to the PDT task, however,

were less structured and more open-ended, reminiscent of projective-type tasks. The scenarios were designed for the participant to identify with the main character, and, depending on the participants' gender, male/female names were used. The premise was that this task's format would prompt the students to relate the scenarios to their past personal college experiences (see Appendix D2). In the pilot, while responding to the questions related to the scenarios, all of the students spontaneously connected the scenarios to their own personal college experience. The students in the pilot talked about self-identification, seeking support, stigma, academic accommodations, the role and responsibilities of the student with LD, the responsibilities of the instructor, etc. These were all issues which tapped into one of the study's goals --gaining a better understanding of how students with LD make meaning of themselves in the social context of college learning and how they think about themselves and others with whom they interact in the learning context.

The responses to the scenarios were scored in two steps. First, students' overall performance was analyzed and scored for complexity according to their ability to interpret characters' personality, intentions and emotions. In the second step, the responses were parsed into separate statements, and submitted to a thematic analysis, using an inductive approach to determine the major themes of meaning in understanding of others.

Conception of learning. For this study, building on neo-Piagetian research, and in light of the purpose of the study to describe students' abilities to form and think with abstractions, the questions are formulated in a general sense (see Appendix E): "What does learning mean to you? How would you, in your own words, define learning?" In this way, students' abilities to take "a meta-position" (McKeough & Genereux, 2003) on the experience of learning could be elicited.

For the *low support condition*, the students were encouraged to say as much as they needed to in order to explain the concept of learning. For the *high support condition*, there were questions and probes designed to support the students to express their fullest understanding. As personal epistemology research suggests, students' views about knowledge are complex and multidimensional. Similarly, it was argued that different dimensions of learning were simultaneously present in student's awareness. These dimensions, as revealed in the students' conceptions of learning research, were students' general views of learning, their views about the process (approach to learning), goals and outcomes of learning. (For the specific questions and probes, see Appendix E.)

During the pilot, this part of the interview proved quite cumbersome for one of the students who was very verbal. The inclusion of all of the prompts to provide examples meant constant interruptions of her responses. The whole interview took more than the planned 2 hours-and-a-half. All three students spontaneously provided examples to support their statements, which made the inclusion of the prompts for giving examples repetitive. For example, when the students were asked, "What is it like to have a goal like this one? Why do you think this goal is important?" they spontaneously gave examples from their lives and college experiences, which made the prompts redundant. In the study, while, overall the interview protocol was preserved, the prompts were given when the students did not refer spontaneously to their college experiences.

The scoring of the students' responses from both conditions was done following the general metric described above. For the responses in the high support condition, a thematic content analysis was performed to facilitate subsequent comparison between this study's predominant categories of students' conceptions of learning and the conceptions described in the conceptions of learning research.

Conception of learning disability. The design of questions for this task was informed by research with students with learning disabilities focused on students' understanding of their own diagnosis of LD. Similar to the conceptions of learning task, the questions about LD were formulated to address the multidimensional nature of the concept. The dimensions included in conceptions of learning disability were: meaning, symptoms, causes, consequences (e.g., "What happens when one has a learning disability?") and prognosis (e.g., "Can you fix a LD?"). These questions were aimed to capture whether and to what extent the students had internalized the medical model of learning disabilities prevalent in the mainstream culture (e.g., see Reid & Valle, 2004). It was also important to gain a better understanding of how the students defined learning disability for themselves and the ways their definitions were similar to or different from the mainstream definitions. The students were guided to critically reflect on their experiences of being identified as disabled by asking them the questions, "What part of who you are is the LD?" "Do you agree with the ways LD is defined by society?" (see Appendix F).

For the *low support condition*, all of the questions followed the general interview format outlined above. In the *high support condition*, the questions became more directional in two ways: first, to elicit the structural complexity of students' thoughts; and second, to allow for further elaboration of content in addition to structural complexity, by stimulating students to reflect on their college experiences of learning with a LD. Not all dimensions (e.g., signs, causes) were probed in this condition. In the pilot, the students got highly involved in this part of the interview as if they had found a forum where their voices could be heard (which was one of the purposes of the project as described in the letter of initial contact). They talked about their own experiences, which revolved around topics such as the reactions of others towards students with learning disabilities and their own personal past and present learning experiences. They also spontaneously gave suggestions for the improvement

of disability support services and for programs to teach self-advocacy skills. Therefore, in the study's interviews, only probes related to defining meaning and making connections were included, and more emphasis was put on prompting the students to reflect on their own experiences of being college students with LD (see Appendix F).

Similar to the scoring of the other conceptual tasks, the students' overall performance under each condition was analyzed. Using the scoring metric, the two highest scores were noted and the final score was the second highest score. In the high support condition, students' statements were also submitted to thematic analysis.

Procedure

Establishing Contact

In the letter of initial student contact (Appendix B), which was posted on the college disability centers' websites and/or bulletin boards, in addition to statements about the purpose and procedures of the study, explicit statements about the total amount of time for participating in the study and assurances of how the identity of the students would be protected were included. The students who participated in both the pilot and the study contacted the researcher by phone. This way, the disability service providers did not know who of the students agreed (did not agree) to participate in the study. The phone contact was also used to screen the students in terms of their verbal abilities. Because of the select population (e.g., college students), not surprisingly, all the students had oral abilities which were deemed sufficient to allow their participation in the study. A mutually convenient time for the interview session was set. For all of the interviews, I traveled to the colleges where the students were enrolled. The students arranged, through their local college libraries, bookings of study rooms where the interviews took place.

Interview Session

The study involved one interview session. The participants were interviewed individually. On average, each interview took 2 hours-and-a-half to complete. The students rarely requested breaks. The interview session was divided into the following parts:

Introduction to the session: This part included establishing rapport, introducing the study and seeking informed consent. The study's interview process resembled closely the disability services centers' intake process. In order to receive services, learning disabled students have to self-identify and approach the centers to request services. The centers usually hold individual intake interviews with the students to discuss their needs and necessary academic accommodations. Thus, the study's interview atmosphere was familiar to the students. Furthermore, half of the students who participated in the study knew me from my work as a disability coordinator, and five of them worked very closely with me in the past. In this sense, the study carried a minimal risk of being harmful to the students. The students were given the informed consent form and I read it to them (see Appendix H). In the consent form the students were assured that if they did not want to answer any questions they were free to do so without any jeopardy to receiving further disability support. Another measure to ensure minimal risk was giving the participants referral lists of counselors for personal counseling. At the beginning of the interview, the participants were told that if for some reason the questions created a negative emotional experience, they would receive a referral list of counselors in case they wanted to seek personal counseling after the study was finished. After the signing of the informed consent, the students were given the background questionnaire. I encouraged them to take their time to read it and to ask questions if some of the questions were unclear.

Conceptual task interviews: The rest of the interview session consisted of the three conceptual tasks given in the order below. The order of the tasks was not alternated.

Fischer's (1980) work provided guidelines for structuring the order of the conceptual tasks. The students' day-to-day experience thinking about concepts such as learning and learning disability was most likely limited. The term "learning" is part of the common language, and teachers or instructors often assume that the meaning of the word is obvious and not in need of discussion with the students. Similarly, the use of the label "learning disability," although a part of students' everyday life, is rarely discussed conceptually; it is usually "taken for granted." Fischer points out that individuals require support in terms of building conceptual skills, especially when they are confronted with new concepts and new tasks. It was assumed that, most likely, these conceptual tasks would be a new experience for the students, and thus they would require support in building an understanding of what the purpose of the tasks was. It was perceived that the order of the tasks should start with content that was close to students' everyday experience, and with an example of what expected performance on the tasks should look like. Thus, the interview session started with the "Understanding others" conceptual task. The next task was the "Learning" conception task. The expectation was that after the first task the students would have a better awareness of the goals of the study. Indeed, the learning conception task provided an experience with the general format of the questions and probes. In a way, the task primed the students to the key elements to be taken into account when verbalizing their conceptual understanding. The session finished with the concept of learning disability task.

All tasks were administered in 1) low support condition, and 2) high support condition order (see Appendices D1 through F). The overall administration consideration for the low support condition was that there was no priming of key components. The interviewer used as few supporting prompts as possible. I posed questions and waited for responses. However, I interrupted a student by asking additional questions when there was a need to elicit additional meaning if the response seemed unclear or short. The students needed to

understand that they had to provide focused responses and did not need to talk on and on. After the participants seemed to have exhausted their response to a question, I continued by asking additional questions. On the other hand, I tried not to cut the participants off before they felt like they were done.

The interviews were digitally recorded. The students were told that because of the extensive verbal information to be collected in the interview, the recording was necessary. They were told that they could stop the recording, ask questions or decide to withdraw from the interview at any time without jeopardy to receiving services. They were told that each recording would be given a code number and a pseudonym. The students had the choice of choosing their own pseudonyms. They were told that only the researcher and her supervisor would have access to the files; that once the files were transcribed verbatim, they would be burnt onto disks and kept in a locked cabinet. All print materials would be coded and kept in a locked filing cabinet as well.

As a token for their participation in the study, the students received two movie passes for \$10 each. They were told that even if they chose to withdraw at any time during the interview, they would still receive movie passes.

Measures for Ensuring Credibility of the Findings

In order to ensure the validity of the findings, several criteria were implemented: 1) the interview format allowed the students to express their thinking at the fullest. Although there were probes, I made sure not to influence students' answers so that the responses would be reflective of students' own thinking. 2) I ensured that the transcripts reflected the intended meaning during the interviews. I sought students' feedback continually. The interview format with probes of the type "What does this mean?" allowed a continual check of the students' intended meaning. After the themes for each conceptual task were generated, I contacted three of the participants who scored at the abstract systems level, to seek their input about the

categorization/naming and the descriptive content of the themes. It was reasonably assumed that these students could provide feedback not only about the themes at the abstract system level but also about the themes found at the lower levels of cognitive complexity.

CHAPTER FOUR

Results

Introduction

The analyses are aimed at an exploration of the two groups of research questions: one related to the form of students' conceptual understanding, and one related to the content. The findings are organized by conceptual tasks. The presentation of the results follows the order of the administration of the tasks: first, the findings related to the form of students' conceptual understanding of others are summarized, followed by the findings related to understanding of learning, and finally, the findings related to understanding of learning disability. Under each conceptual task, in order to maintain a logical flow and ease of presentation, first, students' scores, individually and as a group, under low and high support are presented. Second, after the findings related to the form of students' reasoning, the conceptual content for each concept is described. The chapter concludes with a comparison of the form or the level of cognitive complexity of students' thinking across all three concepts.

Because in the high support condition the students were asked to elaborate on elements (words) they used in their spontaneous responses, the focus of the analysis of the conceptual content of the interviews is on the students' statements in the high support condition. In the low support condition, the highest level of students' spontaneous responses was recorded. In the high support condition, the various levels of skill produced by the probe questions, together with the examples the students used to support their statements, resulted in an overall statement, which was scored for level of complexity according to the scoring criteria. In addition, all statements were analyzed for the presence of main themes that exemplify the content at a particular level. The presentation of conceptual content is

organized by conceptual tasks, tiers (levels), and themes. A summary of the reasoning at each tier is presented with main themes first in a table format, and then elaborated in the text. In this study, main theme is defined as the representation of the most frequently occurring or similar statements across interviews scored at a particular developmental level. By means of reading and re-reading the protocols, phrases were generated to represent topics/ideas which were hand coded and then again, after re-reading, the topics were sorted and given a formulation of a main theme. After the summary, excerpts (without the complete probes) from the interviews are presented. Whenever possible the students' statements are quoted fully, with their main elements and supporting arguments, explanations and examples.

Understanding Others

Cognitive Complexity

Scoring of the interviews for complexity displayed in the “Understanding Others” task yielded scores from 7 to 10 for the low support condition ($M=8.59$, $SD=1.42$), and between 8 and 12 ($M=10.18$, $SD=1.43$) for the high support condition. Thus, in both low and high support conditions, the form of students’ reasoning ranges from abstract mapping level to abstract systems level. In the low support condition, the abstract mapping level of thinking is characterized by the ability to interpret the stories’ main characters’ behavior in terms of at least two abstractions. The participants were able to interpret the story characters by relating trait descriptions, emotions, and intentions, and were able to use these relations to predict story characters’ future actions. The differences in scores between abstract mapping level and abstract system level lie in the underlying logic of students’ interpretations. While at the abstract mapping level the logic of relating abstractions was somewhat linear and additive, at the abstract system level it was hierarchical and multilevel. Students were able to compound different characteristics into one more general personality trait which subsumes different, often opposing traits, and were able to predict characters’ behavior from multiple points of

view. For instance, students scoring at complex abstract mapping level can differentiate among two or more single generalized traits but do not intercoordinate them into a more general person's description, as in the following interpretation of story 3A:

She (Cathy) is somewhat generous because she was helping a friend but she also seems kind of demanding because she demanded her skates be sharpened, and then, easily frustrated because she had her pants wet and torn, and then she was angry at the person. (a score of 9). (LB)

Whereas, at the abstract system level, the ability to intercoordinate different traits into a more general quality is evident:

It sounds like she (Cathy) is a very helpful person; however, it seems as if she keeps on being pushed to her limit. She is going out of her way to help people, even when she is still being rushed to get home. She is waiting in lines trying to nicely say she still needs her things. So in all honesty, how she would react would probably be polite, however, still short-spoken. (a score of 11). (CW)

In the high support condition, all of the students consistently increased their scores. Building on the priming and opportunity to discuss and practice with the stories in the low support condition, in the high support condition, the students were able to bring their skills in coordinating different personality traits to a more abstract level. Comparisons of the mean-scores by means of a related-samples t-test, indicated that the difference in the scores was statistically significant, $t(16) = 12.91$, $p < 0.01$.

When participants were required to interpret the thinking, feelings and actions of the college scenarios' main characters (protagonist, classmate and instructor), what became immediately apparent was the tendency to emphasize and connect characters' intentions, feelings, personality traits.

What do you think Mary's classmate did? Why?

The classmate probably told the instructor, even though she doesn't know what the circumstances are, that Mary was intending to record the lecture.

What kind of a person is Mary's classmate?

A know-it-all. If I can't do it, why should someone else be able to? She probably has low self-esteem because she needs to talk about other people to make herself feel good.

What was Mary's classmate thinking? Why?

Probably that she (Mary) is being defiant, and that she is breaking the rules. Saying, "If I can't do it, why should she?"

What was Mary thinking? Why?

I'm imagining that Mary, because she doesn't seem like a defiant person, has other arrangements with the professor. I am sure she would again say, "I'm suffering from taking notes, I'm attempting to take

the notes, as well as recording, I'm not recording to exploit, but just for my own personal use, because I have a hard time taking notes."

What was Mary feeling? Why?

She probably felt alienated, maybe a little upset, because the other student is taking on the role of basically being her mother, even though she doesn't know what is going on. I would imagine she would feel alienated, disappointed, and maybe that she would not want to record the lecture now, because she is wondering what other people might be thinking. She might suffer her own grades just to feed into what the other people were thinking. (CW)

This type of response was common for most students. As a group the students performed at either abstract mapping or abstract systems levels. Only the correlation between years of formal education (but not age) and the interview conditions were statistically significant, $r=.63$, $p<0.01$, for the low support condition, and $r=.61$, $p<0.01$, for the high support condition. Figures 1 and 2 illustrate the differences and the relations. Note that in order to preserve clarity of the presentation, both age and years of education variables are presented as ordinal variables in the figures, regardless of differences in the intervals between participants' age or years of education.

Figure 1. Individual performance on the "Understanding Others" task in the low-support and high-support conditions by years of education.

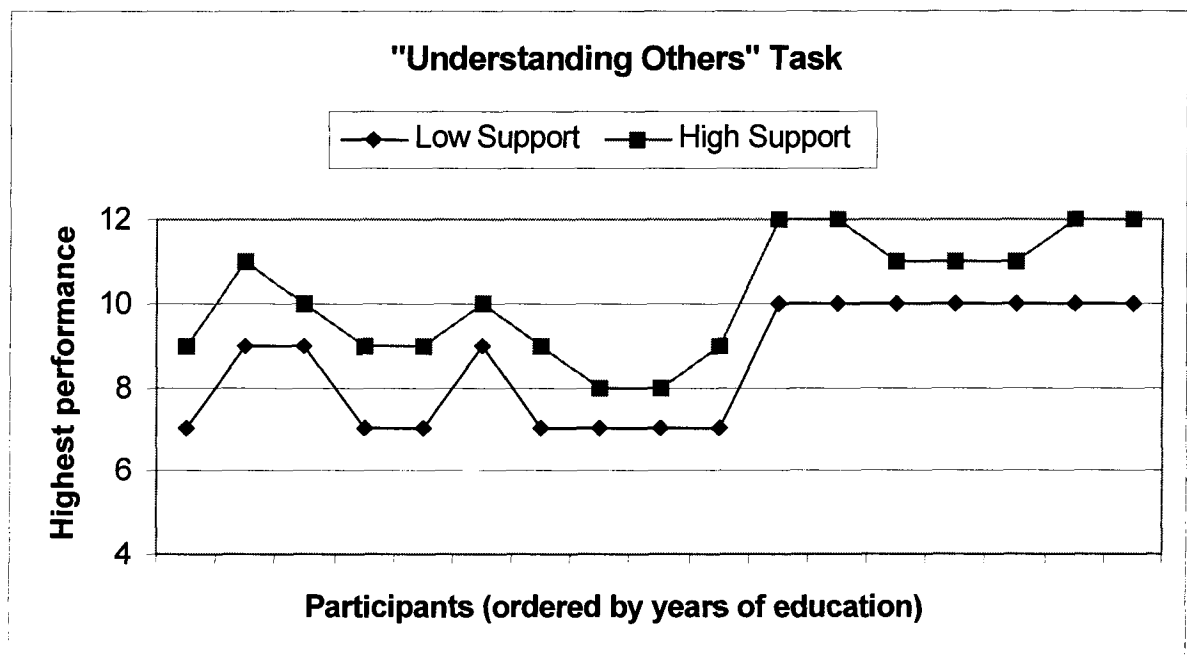
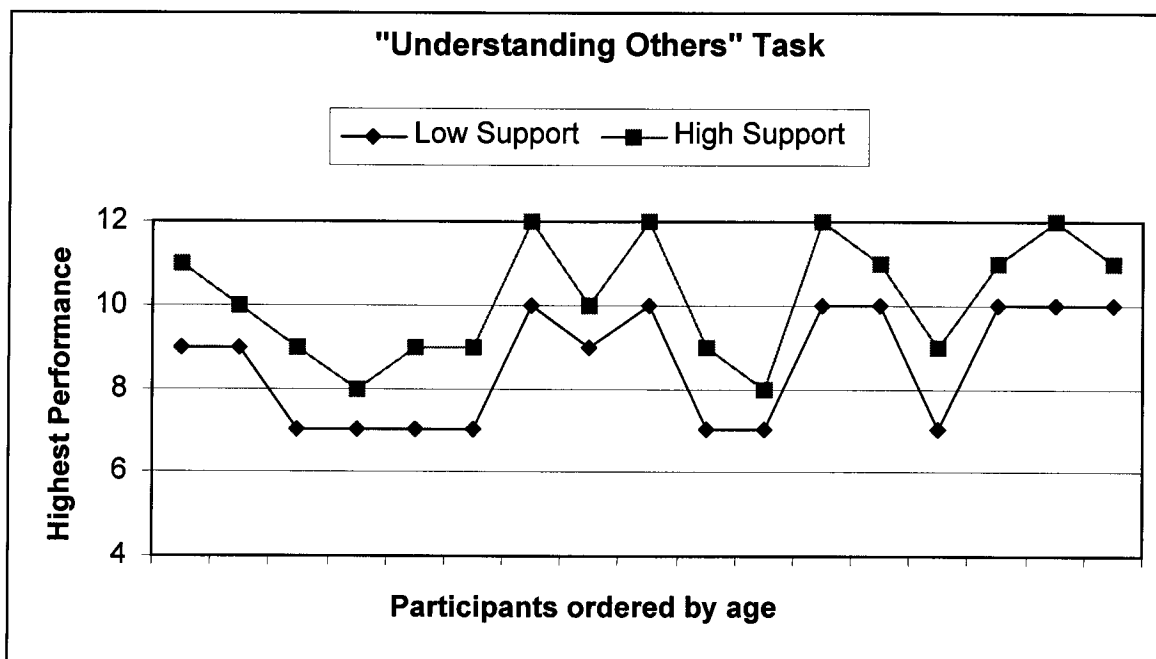


Figure 2. Individual performance on the “Understanding Others” task in the low-support and high-support conditions by age



Conceptual Content

The scenarios provoked very similar themes, which differed qualitatively on the different levels of complexity displayed by students. The themes which emerged at the abstract mapping level, took on a different quality at the abstract system level. While the students who scored at the abstract mapping level seemed more confined to solely interpreting the college scenarios, the students who scored at the abstract system level went beyond the scenarios to provide a systemic view of issues like self-identification, stigma or negative stereotype associated with being different from other students in an attempt to seek academic accommodations, and reactions from instructors and classmates to students with LD seeking accommodations. An advanced summary of the themes that emerged from students' responses is presented in Table 5.

Table 5. A summary of the themes identified in students' responses to "Understanding Others" task

Complexity Level (Total N)* Main Themes (Total N)**	Theme N***	Abstract Mapping (7)	Theme N***	Abstract Systems (10)
Self-identification (14)	7	Apprehensive to self-identify because of fear of being judged as seeking special treatment	7	Apprehensive to self-identify because of fear of being judged as seeking special treatment. Explained reasons for no self-identification: young college students with LD do not want to be perceived differently
Seeking services (7)			7	Would depend on a clear formulation of one's educational goals; the clearer defined goals, the higher the possibility of seeking services because of the realization that services/accommodations are critical to one's success in college.
Use of the label "LD" (7)			7	If they self-identify, afraid that the use of the label would be associated with a negative stereotype of LD being equated with stupidity.
Lack of understanding LD/misconceptions of LD (17)	7	Others do not have knowledge about/awareness of what LD is	10	Others do not have knowledge about/awareness of what LD is. Even if there is, a public awareness could harm rather than help individuals with LD. Lack of understanding the system of accommodations as leveling the field rather than giving advantages. Instructors lack an understanding of LD, and even if they do have an understanding, they do not individualize their teaching.
Personality of the instructor (17)	7	Instructors need to be approachable; Instructor's personality is a deciding factor in the choice of courses	10	Portrait of an ideal for students with LD instructor: approachable, helpful personality and structured teaching style.
Support system high school vs. college (5)	5	High school provides a lot more one-on-one support; more personable than college's support		

*Total N=Total number of students scoring at this level

**Total N=Total number of students per main theme across levels

***Theme N=Total number of students per theme within level

At the *abstract mapping* level, the issue of self-identification emerged as a common theme across all performances at this level. A predominant statement was that students such as the ones described in the scenarios did not initiate self-identification because of fear of being judged by others and fear of being perceived as students who seek special treatment. Few participants made references to their own experiences recalling that fear of being judged was a deciding factor in not identifying themselves to their instructors.

I think most typically people who have learning disabilities have the same characteristics as Mary. They are shy, intimidated by everything, get put down very easily. They kind of sit back and let it happen. They won't approach because they are too scared that people judge them. (HJ)

I find it hard to approach a teacher and then ask for benefits that no one else gets. That's a problem of mine. I find it hard to go up to a teacher and maybe they don't know me because of the class size, they don't know my face to a name, and then try to get them to give me an advantage, or what they see as an advantage above everybody else. And then to explain to them your situation, and then it is almost as if you are trying to gain pity from them. (LB)

When interpreting a classmate's behavior, the students in this group expressed the belief that the majority of people without learning disabilities lack an understanding of or hold misconceptions about learning disabilities.

She (classmate) doesn't understand, she thinks it's a form of cheating; someone else is having an advantage. If I took my spell checker in high school, people thought I was cheating and it was unfair I could use it. Especially if the teacher pointed it out. I had a math teacher, who said, "See how much quicker it is to do the exam, she is using a calculator." And now the whole entire class is mad because I got to use a calculator and they didn't. They didn't get why. They knew I was on the honour roll and stuff, so they thought it was unfair that honour roll students get to use that. Unless they have a learning disability themselves, or know someone who has a learning disability, they would not understand. (BW)

Lots of people say to me, "You have a learning disability - oh you just have dyslexia." Right, but it is actually not only dyslexia. Exactly, if someone says, "I have a learning disability", "so you have dyslexia", well no, "well then you don't have a learning disability." A lot of people don't know the history about learning disability, how it is passed down, or where you get it from, or that you are not totally different. People ask me if it is contagious. Are you kidding me? (ND)

This theme carried over to students' interpretations of instructors' behaviors in the two scenarios. While the participants acknowledged the importance of the responsibilities of the students in the scenarios in terms of self-identification and advanced planning in meeting her/his needs, they also emphasized the importance of instructors' personality in

accommodating students with learning disabilities. Referring to their past experiences, the students considered the personality of the instructors as a deciding factor in their choice of courses.

The first day I go into the teacher I usually tell them, well depending on the classes, what I have difficulties in. Depending on how they kind of react to that or how they approach me about that, or how they are willing to deal with me, will depend on how I judge them. I'll determine if this is going to be a suitable teacher for me because some of my teachers I've had, I go up to them and tell them I've had struggles writing papers and stuff, and ask if they be willing to help me or will be willing to put time in making sure that I can do this. Some of the teachers are just like, "No, you are on your own. You are in college now. You should be able to write this." Right away, it's like well, if you are not willing to work with me then I am not willing to either. I look for if they are pretty much willing to help me in any way they can possibly. Set up extra time if I need it, or go over a couple of things that I don't understand, or re-phrase something, or give me more specific instructions than they would give to other students because if they give me too broad of a topic I'm kind of lost. (HJ)

A theme that emerged at this level, which was not present at the abstract systems level, was the comparison of support between high school and college. An analysis of the participants' background forms showed that all students who scored at this level were served in the high school special education system. The participants' comments emphasized the fact that in high school they received a lot more support than in college.

The thing is to people like me had a block in high school to go get help and to work on things. When you go to college there is nothing, you don't know where to start. You get a pamphlet and that is it. It is really, I mean I don't want to say, but you do get babied more or less all the way through school. There was always someone there to help you along, like when you go here see this person; we will help you make an appointment, etc. It makes you more confident because most people who have learning disabilities are shy about it. We don't like to advertise it. College is scary for a regular person to enter. It's so different. For someone with a learning disability it is 10 times more overwhelming. Your teachers don't really get to know you as well, well some don't. Take for instance my classes, there is one teacher I barely ever talk to, but then there is one teacher I talk to all the time. That is the one that helps me out a lot. When I was in high school you knew every teacher and every teacher knew you. I understand college is going to be different, but it is a big jump. (ND)

You have so much support in high school, and all of a sudden you don't. Like as soon as I walked into – my teachers knew automatically how to teach me, how to help me, they actually went out of their way to help me succeed. In college they didn't. It is almost as if you have to self teach yourself. (SM)

The themes of self-identification, others' understanding of learning disability, and instructors' personality were further elaborated at the *abstract systems level*. A notable difference in the reasoning at this level was the ability of the participants to reason about

these themes from multiple perspectives and the tendency to always justify or explain the reasons behind their answers.

The students who scored at the abstract systems level also commented on the fact that students with learning disabilities would be apprehensive to self-identify because of fear of being judged. However, in contrast to the students scoring at the abstract mapping level, they went further to explain where this fear was coming from. Recalling past experiences, they highlighted the fact that when they were younger, they felt the need to belong, to be the same as other students, and to be accepted.

But for me it has been the belief that people are willing to help me when I am struggling, and willing to accept the help. For me that is the thing that I've had to overcome. Yes, I have a disability, I do need help, this can help me, these are the ways. But I also know for students to come in the first year just out of high school, they are not going to be that strong. They are still going to be worrying what their peers are thinking about them. They don't want to look different. They want to be like they don't want to look different. Especially in high school, same thing happens for those who just come out, or are in their early 20's. (JL)

To seek services, according to the students, was also related to a clear understanding of one's goals in pursuing postsecondary education. If the students with learning disabilities do not have clearly defined goals, and if they are in college because their parents want them to get a college education, they would be less likely to understand that accommodations may be crucial for their success in college.

Even for students who have disabilities, if they go there because mom and dad say to, they are not going to want the help because they don't know what they are going to want. They don't know what they want. I probably say that is even more important for people with disabilities. If they know they have a disability find something that you might possibly want to pursue. You have to be willing to make yourself look. But that is the thing: for those who are just coming out of high school, they don't want to look totally different. (JL)

The students commented that they defined their educational goals only after repeated struggles with failures. With more experience both in school and life, they realized that seeking and receiving help was a critical factor in their success in school.

Age makes a difference. I personally do because of my age, I'm 25, I had a lot of time out of the educational institutions and was able to take the things that happened outside of schooling into account

and make my decisions from that. I also had the time to do so. I think a lot of kids these days, have a lot of pressure from their parents and from society that they need to know what they are going to do for the rest of their lives by the time they are 16! I am a totally different person than when I was 16 or 17 when I was supposed to be making those choices. As you know everybody is different, but for me it was that I needed to really, really experience the hardships in life in order to realize what I had to do for myself, and to give me the drive to really want something. It was a little bit of time to realize that I needed to go back to school I need to find a way to make it work for me. When I finally decided to go back to school, through the coercing of my Mom and my family telling me to get tested and get the support that I need. Now it is great. (CHW)

At the same time, some of the participants were able to take other factors into account, in addition to age, when discussing the issue of the association between age and seeking accommodations.

Age is not always a factor. There are younger students who are really goal orientated too. I think there are a lot of factors that you have to look at: Age, who's paying for you to go (if Mom and Dad are funding sometimes the students don't try as hard), and what is the background. Maybe it is just the state of mind. I think you can meet someone who is 19 or 20 who is just as interested in the end result as someone who is maybe 35 or 40. But the difference is that the 19 or 20 year old hasn't had the other 15 or 20 years of life to show them how important education is. (KT)

The decision to self-identify was also related to the extent to which students perceived it necessary to "use" the label to receive accommodations. More often than not, the label "LD" was associated with negative past experiences, and the need to prove oneself as "smart" and "capable." It was not unusual, especially for the students identified as learning disabled in their early school years, to call their intelligence into question. They were afraid that if they identified themselves, they would fall into the stereotype of learning disability being equated with stupidity.

For the longest time, in college, I didn't tell anyone that I was dyslexic because I didn't want the label. From my perspective, I'm very competitive about my grades, and I have to be. For so long in elementary school I was told, "You're never going to be able to read. You're never going to make it to university." I was told it was a form of retardation when I was younger, and I remember thinking, "Wow, I'm retarded." What a terrible thing to say! But then to turn around and get grades like this. It's very difficult because my GPA right now is 3.33, which is high, and I worked very hard for that. So in turn I tell someone that I'm dyslexic, "Yeah right! How do you have this great GPA." It's difficult, because it's almost like you have to prove that you're dyslexic. You almost have to sit there and go, "This is what I see, what do you see?" I think that's such a waste of my time. I don't think I have to prove my disability to anyone. You're never going to change anyone's mind. (KT)

The students, using the scenarios as a starting point, also touched upon the theme of others' perceptions and understanding of LD. Several participants made the observations

that, in general, college students and instructors had limited understanding of LD and/or misconceptions of its expressions in behavior and learning. They described a phenomenon when an increased public awareness of LD, in particular dyslexia, could harm rather than help individuals with LD. It seems as if this “awareness” had led to a devaluation and minimization of their serious learning difficulties and day-to-day struggles.

It's almost like it's fashionable to be dyslexic. It's almost like we all need an excuse for something. Like, “I need an excuse because I'm overweight” or “I need an excuse for this” or “I don't do my homework because I'm dyslexic.” And it drives me nuts! It is almost like a buzz word now, to sort of say, “Oh, I must be dyslexic.” And you just think, “Hah! You don't even get that.” In fact, in work experience, because I would work with change and cash, and you would do things like you'd switch numbers, or sometimes, when you're really busy I would say sentences backwards because not only do I see it a certain way, but it'll come out a different way. You'll get that, “Oh, did you have a dyslexic moment!” And you get very defensive, and my first response, it's consistent, and it's, “I actually am dyslexic.” “Oh...Really? I'm really sorry.” And I think yeah, you should be, because I've been dealing with this for eighteen years. Well, I was actually diagnosed younger than that...Dyslexia is still not seen as a disability. It's internal. It's not like “Oh, I broke my hand. I can't use my hand.” There's certain things that you get defensive, at least I do. You get very defensive and you get really sort of, angry. (KT)

Because dyslexia isn't physical and you can't see it (sometimes I even forget) people don't treat me like I have a disability. With someone who has a physical disability there is a separation and they can understand that boundary. But I don't understand that boundary, so sometimes I push myself to the max and take on lots, saying, “No no I can handle that”, and then I fall apart. So when I tell others they will look at me and say, “She is outgoing, social, confident, and part of mainstream society. So why should we feel sorry for her?” Of course because I am artistic as well, and I was really into theatre and dance and drama and art. It's, “Oh what other little special thing is she trying to put out there. Or, I think I am dyslexic too, I think I reverse letters all the time, why don't I get that? Or everyone has those problems so why are you getting this help. It's not really a big deal. You just need to try harder.” They'll start to break down my character. “You don't look like you are suffering.” A lot of people think that when you suffer then you should get charity. (PM)

Others' understanding of LD was further interpreted by placing it within the overall context of service provision. The students highlighted the fact that others did not understand the purpose of accommodations as “leveling the field” for students with LD by removing the barriers to academic performance.

That is the problem (re scenarios) you want to be hidden; you don't want everybody to know. Go about it in a nice discreet way. In school (before college), the moment I was put into the learning assistance everyone was laughing at me. So, no one cares if you are stupid and not in learning assistance. The moment you are in learning assistance, it doesn't matter how well you do, it's instantly a factor, and it's instantly relevant, even though it shouldn't be. Nothing has changed because I am getting help. But it's instantly everyone associates it with, I had people come up to me and say, ‘You can use the laptop’, and I'm just getting out the same ideas you are getting out now. That doesn't matter how you do it. It's almost that you constantly have to prove that you are smart but at the same time you need help. It's a balance conflict. If you don't do it, you keep your pride up, but you start failing class. But then if you do it, you have to constantly prove to everyone I am better, I can do this, I am equal. It turns into an internal fight. The moment you leave the room for an exam everyone is

staring at you, wondering what else do you get that I don't? I know a lot of it comes out of 'they want it too'. But that defeats the whole purpose because it's not supposed to make anyone better, it's supposed to help balance. But no one understands that, that is where the problem is. There is a lack of understanding of 'why'. Everyone knows you need help but WHY do you get this? They fail to question why. (MAT)

Related to lack of understanding of the purpose of accommodations was the issue of instructors' understanding of LD. Most of the students expressed the opinion that instructors do not understand LD, and if they do have some understanding of how LD is manifested in the classroom, they tend to apply this understanding to all students with LD, without individualizing their teaching.

A lot of teachers don't believe in this kind of stuff [LD]. They don't believe how much the world has changed that people with learning disabilities or disabilities at all, normally wouldn't even think about coming into college. But now with all this help and this technology the outlook and the image on people with learning disabilities is changing. Because now they say "I can do it." There are success stories. I don't think that professors have really waded into that yet. They still say, "You don't know how to spell and you're in college? Really, why are you doing that?" It is important for others especially professors to understand learning disabled students. It is important to take every individual person who has a learning disability differently, because they are all different. Totally not stereotype ... I know that learning disabled people can compensate, so if they can't write as good, be hard on them to figure out another way that would be easier so they can get their story out. So, basically don't babysit them. It's in there it just has a hard time getting out and being passed on. People my age know what I need, what I want, and how to get it. If you ask me I'll tell you. Most of the time people have an idea even if they are not right on, some people are not mature enough in their lives as me, but they'll have an idea, "I can't spell, but I can sure as heck tell you what I mean. Or can I use the computer instead." Be open to the new technology and the new help. Open for suggestion. For the most part you have to understand the world that we live in and people are different. (CW)

The students went beyond the scenarios to paint an image of what an ideal "LD" instructor should be. At the core, according to the students of the generalized "ideal" instructor, should be personality and teaching style. The instructor should be approachable because (as noted in a number of ways above) students with LD are apprehensive to seek help. Instructors whose teaching style is organized and structured would be an ideal match to students with LD's learning style.

It is important to have a personality, and a way of explaining things that is going to absorb, be linked to the students. In my program, where my teachers know me by name, they spend time with me after and before, they are interested in our social lives and academic lives. You're in groups, you're talking and you are on a totally different level. I really think that it affects your marks too. What is also important is organization; teachers must be organized, especially for people who have learning disabilities. I had a teacher who flew to one corner to the next corner. I could not follow, she would be talking about one thing and then say, "Let's put that on hold and talk about this for a second." You're wondering what is going on. It is very important. So many people in that class were saying, "What is going on, I don't

know where she is going with this, did she even explain that, she didn't even go back to that." Organization and flow of lectures is really important. Have an end goal and achieve it. Have a flow of things. (CW)

But it really is important for me to get to know my professor as a person, and also understand how they teach and what they expect of me and vice versa. Students with learning disabilities need to be able to approach someone, because they have to ask for certain things. In order to learn anything you've got to be able to ask questions. So if you are constantly being shot down because someone is mean or whatever or sarcastic. How can you build up on someone's confidence if they are constantly being shot down or always feeling that they are stupid? What I look for in a professor is someone who is approachable, for sure. I also have to understand someone's learning style. You need to understand what a teacher's learning style is: how they teach, if they are really all over the place and you have to try to attempt to get the point out of this big cloud of information or if they are very structured and you can follow them along. (CHW)

In the remainder of the interview, the central themes of self-identification and others' understanding of LD were revisited when the students' reasoned about the concepts of LD.

Conceptions of Learning

Cognitive Complexity

Scoring of the interviews for complexity displayed in the "conceptions of learning" task yielded scores from 5 to 10 for the low-support condition ($M=7.53$, $SD=1.77$), and between 6 and 11 ($M=8.76$, $SD=1.75$) for the high-support condition. As suggested by these results, participants consistently increased their scores when probed. Comparisons of the mean scores in a related-samples t-test indicated that the difference was statistically significant, $t(16) = 11.65$, $p < 0.01$. Correlations with age were significant for both low-support and high-support conditions, $r=0.57$, $p < 0.05$, and $r=0.53$, $p < 0.05$, respectively. Similarly, level of cognitive complexity increased with years of formal education, $r=0.69$, $p < 0.01$ for the low-support condition, and $r=0.65$, $p < 0.01$, for the high-support condition. Figures 3 and 4 illustrate these differences and relations. Note that in order to preserve clarity of the presentation, both age and years of education variables are presented as ordinal variables in the figures, regardless of differences in the intervals between participants.

Figure 3. Individual performance on the “Conceptions of Learning” task in the low-support and high-support conditions by age.

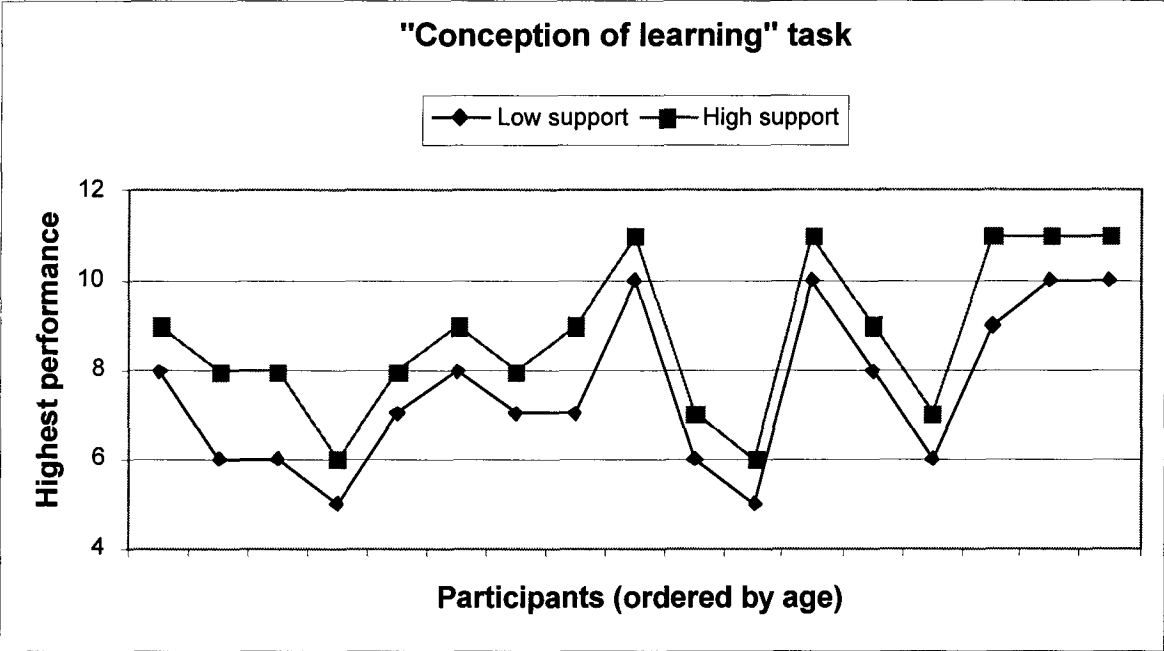
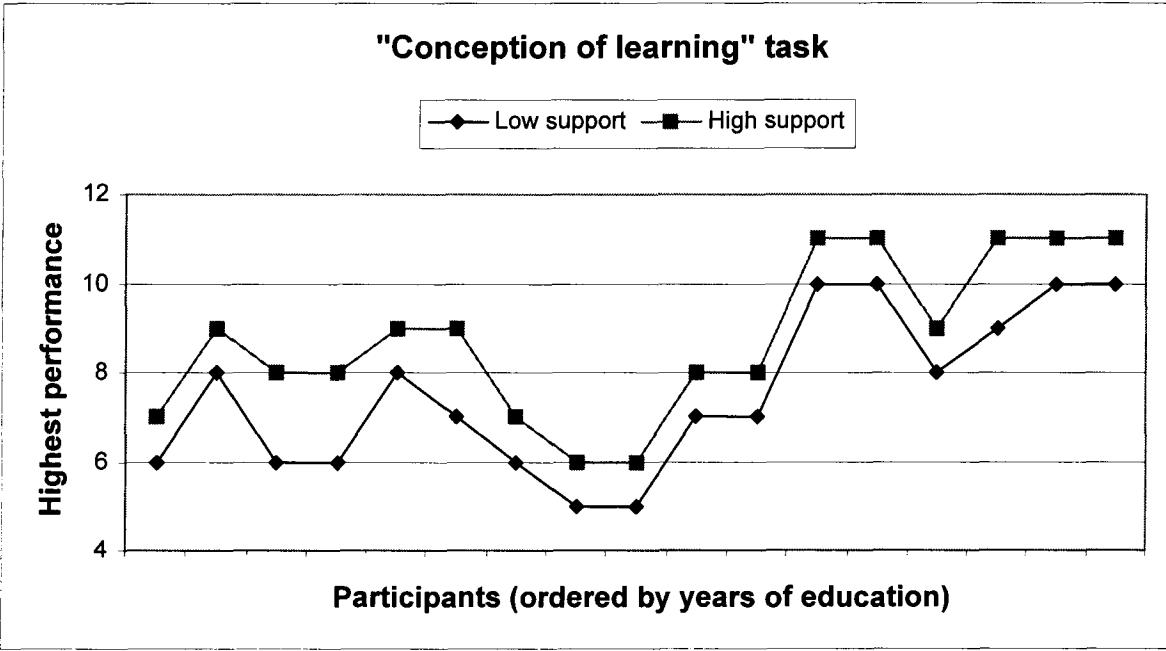


Figure 4. Individual performance on the “conceptions of learning” task in the low-support and high-support conditions by years of education.



Students, who score at the *single abstraction* level of conceptual understanding, use “first-order” abstractions (Dawson, 2004). They are capable of spontaneously describing learning in terms of generalizations of concrete behaviors:

Learning is being introduced to new ideas, and finding out things for the first time that you’ve never known before. Just like the saying “learning something new everyday,” at school you learn a hundred new things a day. (BD)

In the high support condition, the responses of two of the students, who were at the single abstraction level in the low support condition, remained at the single abstraction level despite gaining more complexity when probed. For example, when asked to provide shorter words describing learning, one of the students, after saying “learning is being taught new word,” said “new, school, spelling.” When probed to elaborate on “new,” the student went further to say “learning new things, new skill, knowledge. You are learning all your life (SM).” The student was able to add more abstractions but they were at the same level of complexity. This is what Fischer called substitution or shift between abstractions. Similarly, when the other student was probed to explain what “learning is information that you didn’t know before (BW)” meant, said “learning new things, new skills, ability (BW).” Both students, when explaining the goals of learning, used simple abstractions as generalizations of concrete actions. For one of the students the goal of learning was “graduating with something for an applicable job,” which is “like for a nurse, learning about that stuff, biology, that would be cool. I was very proud to go to college. It meant that I was going to succeed, I was going to do something better than work at a little job (SM).” For the other student, the goal of learning was “finished product, trade” which is further explained with the example:

At first, I went to college because I wanted to work in the Library but then I decided it is a two year program and then you can only work in the Public Library, and you can only start part-time, and you only get a little bit above minimum wage. If you want to work in a School Library you have to get your teaching degree first, so I decided to do that. Then I would try that and either get my library degree or take it by night school or see how I like teaching first. (BW)

For one of the students, approaches to learning were acts such as “reading instructions, doing each step, understanding, memorizing (BW).” When probed “Can you see a way in which understanding and memorization are similar, different, or cause each other?” the student answered with an example:

In history, I need to memorize a lot of the names of persons and places and you have to learn what their significance is because you have to write a paragraph on them for your exams. Memorization only gets you half the marks. (BW)

Both students, when asked to relate abstractions responded by giving examples. For instance, when I probed one of the students of how “learning new skill” and “understanding” related to each other, the student responded with:

In my English essay, I originally went to the Learning Centre because I didn’t understand the article I was supposed to read and do an essay on it. I found someone who is actually really helpful, and I’ve been going there for the past year, to go over my essays as stuff. I just always thought of English as something you understand because they never really taught us the grammar and how to organize it. It was either something that you knew how to do or you didn’t, there is no way of getting better. But then, I actually understand what I am doing, so I had to go and learn all these different things, what a comma is, different places to put commas, where you use semi colons, also past and present tense. I found that I actually started to like it. I hated doing English all through, in elementary school, that was my least favorite subject. And by the end of the first course, I was actually considering doing it as a minor, which I am now doing. My elementary school teachers always told me mom that I was never going to graduate from high school because my English was so bad. (BW)

The other student had to relate “graduating with something for applicable job” with “new skill.” To the probe, the student responded with:

Well, I would have to upgrade my courses from what I graduated with. This is another thing too – in order for dyslexics to graduate we get all the easy courses, right. At high school we succeeded because the courses were easy, but we have to take harder courses in college. Why couldn’t we take the biology or chemistry in school where we would get the help? They think we keep giving them the easy courses so you can graduate, but then they expect you to go to college and upgrade in college. But I am saying why couldn’t I take all the high school courses that I needed in high school? Why did I have to take the easy courses, just because it was easier for everybody else around? Why couldn’t they let us take the harder courses in high school, and teach us how to get through the harder courses properly so that we would know how to get through the hard courses in college properly (SM).

Although this example is insightful in its own right, the student did not focus on the probe to relate abstractions. Both students seemed to struggle with the probes asking them to compare and relate abstractions. There seemed to be an attempt to relate two elements/abstractions, as in the first example, but the relation was not consolidated to

produce an integrated response at the next level of complexity. For instance, an evidence of a connection between the two abstractions would be reasoning along the lines of how and why understanding of the rules of punctuation (e.g., where to put a comma) would lead one to become better at writing.

Students who scored at the *abstract mapping* level of conceptual understanding used second-order abstractions (Dawson, 2004). These abstractions coordinate or modify simple abstractions (Dawson). The students at this level, compared to the students at the previous level, were better able to define abstract words, to give examples, which showed that they understood and applied the definitions of words across situations. The students added a layer of explicit explanations.

Ten students scored at this tier. Among them, all substages within this tier were represented. For instance, at the first substage, one of the students, when probed to explain what he meant by “overall learning is learning,” and probed to define it and to compare it to another word given in his spontaneous response, “learning by experience,” the student compared and related learning in school with learning in life, which showed that he could employ relation of similarity: “Overall learning is learning; it’s very fluid. You learn by experience, you learn by putting it in practice, in your everyday life, you learn by doing it, by succeeding or failing and the same is at school (JD).” Another student employed relation of difference when probed to relate definitions of words: “I think of it differently than knowing something. Knowing something is to stating facts, I know this, I can say this, A is B. Learning is actually understanding what you are going for. To say if $A = B$ then maybe A can also equal C kind of idea. Or $C = A$, maybe A can be D and still work. It’s to grasp it, to understand it, not only to know it (MAT).”

At the next substage, relations between abstractions became clearly expressed. For example, “base knowledge” is essential to meaningful, long-lasting learning—one needs to

learn not only the facts (memory) but also to connect them to each other (understanding) in order “to see the bigger picture.”

Learning is something that very few people can gain independently without getting passed down. So, it is really hard for me to go and learn something that no one else has ever learned. Everything always has to get passed down, and everything gets so refined, and so specific that it seems that there is almost too much to absorb in each class. So everything that you learn adds onto another thing, and maybe if you don't understand something, which is a given, it is going to all fall apart. For me, I need to really, really understand it to convey it back in language or in writing. So if they just tell me a vague example of it, and then they expect me to connect the vague example to a larger picture, that is really hard for me to do. I just have to have a really solid understanding of the basic elements of it to construct the larger picture of it. That is what I mean: By me having a real base of knowledge of anything, to be able to add to a larger picture, it is almost like that base is your knowledge, and anything off of that is maybe sporadic (LB)

At the final substage, the abstractions became not only differentiated but also integrated, and more consolidated. Students continued to employ relation of similarities and differences. The number of the elements increased. In the underlying logic of the students' statements one could clearly distinguish antecedents and consequences. When probed, relations among goals and approach were explicated, but still there was no common link among all instances of abstractions to result in a higher order description, namely a system of abstractions.

Academically learning is taking logical information and relating it to life, because most of the time you're learning about something and you are going to be putting it somewhere. For example, I'm going to be a Child Care Youth Counsellor. I'm learning a way of being. Kind of, as a psychologist or a doctor, you would be learning in academic structures the way you are going to be in your field. And social learning in the real world is mostly doing and making mistakes. I mean you don't give a book to your kid on how they are going to grow up, read about it and I'll see you in twenty years. Everyone has got to experience everything and make mistakes and that's the kind of person they become. The goal in academic learning would be to know your area of expertise. I think it's important to have an idea of where you want to be – half what you want to be and half where you can be. You're learning to refine skills. Some of it is to learn to forget. Some people learn so much stuff they never ever even use. It's just part of the curriculum that they have to know. Another part would be you're learning to change yourself – to head towards that career where you want to be. A lot of people go to college to figure out exactly who they are. Finding your balance between your career goals and your reality of what you can do (CW).

At the *abstract system* level, while the demonstrated abilities for complexity from the previous stage were preserved, the most notable difference was in the way of relating the abstract concepts. The concepts were differentiated and integrated at the same time, revealing

multilevel reasoning. Higher order concepts were used to subsume or summarize different strands of thinking (e.g., educational perspective; process of life).

I think learning is not necessarily something that only happens within an educational institution. I love absorbing knowledge from anything: from conversations with people you learn, from reading you learn, from just your everyday experiences, from the things you take in visually, you learn. From an educational perspective, you learn new things everyday. So, learning is just a general absorption of knowledge, from however an individual takes it in. ... With individual learning, separate from the educational learning, you learn things that you specifically want to take in, whereas in a university you absorb new stuff that you never even thought of existed, which kind of leads to a more worldly individual because you are able to take these things that you wouldn't have really have picked originally. You would be able to learn that there are different ways of living, and there are places that do things differently, that might be right or wrong, or whatever. This develops an individual into a more worldly state. You can actually approach things from multiple aspects because you learned different angles and you apply things. (CHW)

I know learning is an on-going process. It never stops. One of the things I realize is I am always going to learn and I don't know everything. Learning is also fun, that will probably be one of the biggest things that has happened to my process of what I consider learning. I will admit when I was in high school learning was always academics. But the thing I am learning is the process of life. What does it take to live life, in whatever level you are going to be capable of doing it. ... Learn to enjoy that gritty, hard pain in the butt block of life because when I do that my life becomes far better. That's also learning, in reality, that's learning. That is why I say if a learning disability student knows what they want, they are not aimlessly wandering around the college with courses ... But if I keep that in mind when it comes to learning, it is not the end product, it is what the journey is. This is what is good because if I learn this I become a better person, in the people who I help, as well as my life far better, instead of always looking at yourself and the negative stuff. It's because I look at the end result. Well if I look at the end result I become a better person now. If I can sort of look at what brought me there, that sort of makes me put it in a brighter, fuller picture. (JL)

Conceptual Content

Following the lead of the study's theoretical models, in this section, the form (structure) of students' responses is reintegrated with the content of the responses. The backdrop of the analysis was the conceptions of learning research, which determined some of the themes. An advantage of this approach over the learning conception research approach is the opportunity to capture simultaneously different dimensions of the learning concept as they are presented in students' awareness and expressed in their responses. A summary of the themes with their descriptions is presented in Table 6.

Table 6. A summary of the themes in students' responses to the "Conception of Learning" Task

Complexity Level (Total N)* Main Theme (Total N)**	Theme N***	Single Abstraction (2)	Theme N***	Abstract Mapping (10)	Theme N***	Abstract Systems (5)
Definition (17)	2	Assimilation of new information	10	Intake of information but also understanding and application of knowledge	5	Absorbing information, new knowledge but also understanding, application of knowledge plus on- going personal development; learning as growing not only intellectually but also morally.
Goals/outcomes (13)	2	Skills for future career; avoid getting stuck in dead-end jobs	8	Acquisition of skills to prepare you for a future career and also skills for interpretation of knowledge and skills for applying knowledge to life.	3	In formal educational environments one acquires skills for a future career and also skills to apply knowledge to life plus skills to think from multiple perspectives
Approach (12)	2	Unelaborated relation between memorization and understanding	7	One needs to learn not only the facts (memory) but also to connect them to each other (understanding) in order "to see the bigger picture."	3	Complex understanding of the relation between memory and learning. It is important to understand the material in order to memorize it. Being able to recall information is an essential criterion that learning has occurred.
Types of Learning (10)			6	Learning in life and learning in school	4	Learning in formal and informal contexts
The Learner (13)	2	Somewhat passive recipient of information	7	Engaged, active participant, motivated	4	Active participant, able to assume multiple perspectives worldly individual
Personal judgments (16)	2	Being proud	10	Heightened reflection on one's goals and intentions. Knowing one self's learning style.	4	Becoming a better person

*Total N=Total number of students scoring at this level

**Total N=Total number of students per main theme across levels

***Theme N=Total number of students per theme within level

A single theme that can best capture reasoning at the *single abstraction tier* is “learning as assimilation of new information” as in “*it [learning] is information that you didn’t know before*” (BW). Overall, a holistic analysis of students’ complete protocols, which included their answers to the questions related to definition, goals and approach to learning, shows that learning is identified as a mental act wherein the learner assimilates new information. The learner is a somewhat passive participant in the assimilation of knowledge - knowledge is given to the learner to learn (e.g., “being taught”).

Learning new information is useful for future life, serves instrumental goals (avoid “little,” dead-end jobs) or goals for acquiring skills for a future career. Personal judgments (proud of oneself) also appear at this level.

The goal of learning is just like graduating with something for an applicable job. Like for a nurse, learning about that stuff, biology, that would be cool. I was very proud to go to college. It meant that I was going to succeed, I was going to do something better than work at a little job. (SM)

This process of assimilation is enriched if one likes, has an interest in a particular knowledge area (course subjects).

I’ve never disliked learning. I loved history; history is one of my favorite subjects, communications, and psychology. You learn new things...” (SM)

An understanding of memorization and understanding as two approaches to learning is present but they are explained in a concrete way, not yet generalized across learning situations.

In history, I need to memorize a lot of the names of persons and places and you have to learn what their significance is because you have to write a paragraph on them for your exams. Memorization only gets you half the marks. (BW)

At the *abstract mapping tier*, a central theme that seem to dominate all of the responses is “learning as understanding and application of knowledge” as represented in:

Overall learning is learning; it’s very fluid. You learn by experience, you learn by putting it in practice, in your everyday life, you learn by doing it, by succeeding or failing and the same is at school. You rather understand the concept and apply it, or you don’t understand it and you don’t apply

it. [Learning] is kind of finding the way that works for you. So taking something, say a task, edit it to understand it in your own words. (JD)

The notion of intake of information is also present but is related to the notion of understanding.

To me it is when your mind is growing, and you are learning new things that you did not know before. It also when you have a better understanding of things. I know I am learning when I can figure out things. It is just understanding how things work. It is almost like when something clicks in your head, and it just clicks and flows more than you being stuck there. (ND)

The notion of learning now is more differentiated; some of the respondents compared learning in life with learning in school.

I see a difference between learning and the real world and learning in real life is how you get the information. Learning in college is really easy. Here's the textbook, here is what I am saying, here is what you need to know and understand and this is what you have to learn. Life is a little harder because do I need to learn that or that or that over there? Life is a little more complex, it is not labeled. In college everything is nice and labeled, nice and structured. Where life is kind of well you can't really put it anywhere. One lesson is here and the conclusion is five years from when you started. You won't know to connect the two unless you think about it. (MAT)

In addition, there are more references made to self, which shows heightened reflection on one's goals, intentions and learning style. There is the acquisition of skills to prepare you for a future career but also skills for interpretation of knowledge and skills for applying knowledge to life.

I came to college to become a Community Social Service Worker. The thing that has always grabbed my attention is working with people, being able to assist people instead of selling products or something. My goal is to learn the skills and ability to be in my profession. Learning the ability to take the time to process information, the thought, or idea and be able to apply it, problem solve the situation - knowing how to work through it, just even having the ability to find the answer. With my courses, I have done a lot that I am going to have to go back and re-study that again. That's a big part of it - you may not know where the answer is, but you should know where to find it. In college I learned what is such as my learning style. I never realized before that I have such a huge problem with short-term memory. I never had an awareness about my learning abilities, what my strengths and weaknesses were. (CB)

Interest here is also cited as central to the learning process. It is active engagement - motivation that connects the goals of learning with the approach to learning. In this way, the relation between memorization and understanding is better explicated than at the previous tier.

If you're going to learn something you aren't really interested in, I won't do really well. You have to be motivated, you have to want to learn. I find when the subject is interesting it is easier to remember. If it is something boring it's harder to put in your memory. (JD)

Personally, I wouldn't like to write a paper on nursing that would be completely useless to you. If you were to ask me to write a paper on Biotechnology or something like that then I maybe would be a little more interested in it and willing to show a little bit more depth of my knowledge and do a little bit more research. This way it lets you keep your material a little bit more. (LB)

At the *abstract system tier*, the themes from the previous tiers are also present, but they take on different quality. Reasoning is more reflective and evaluative. Now the students place learning within the larger system of society's educational standards. The students reason about it from multiple points of view—personal, individual, and social. Learning can occur in formal and informal environments. In formal environments (e.g., educational institutions) students learn the skills to think from multiple perspectives. A new theme that dominates the responses is learning as on-going personal development; learning as growing not only intellectually but also morally. In addition to the statements of the two students scoring at this level presented under the cognitive complexity section, which are representative of this theme, other students at this level also talked about on-going personal development as in the following excerpt:

I see learning as a huge developmental thing that you go through your entire life, whether you are in an institution or not. It is so important to continue to develop and expand your mind. And expanding your mind has so much to do with the details and structure of education, as well as the philosophies behind it. If that makes any sense? And I think that even if you don't have a disability we all have different ways with connecting with that. We have a relationship with education. Everyone has a different value to what their ideals are. Even in definition terms of learning. For me, learning is about being articulate. And it's about intuition, now that someone has educated me with this knowledge and now you use it as a tool in daily life, or your profession, or whatever and you articulate with your new information. It opens the door even more for you and it opens your eyes more and it continues to get bigger and bigger with whatever you read or obtain your knowledge. So that does embody all things. There has to be some memorization because I've thought of some courses where I wasn't able to keep it up there and it makes me sad that I don't remember it. But I also think with learning that should be physical, emotional and verbal. And they should all be connected together. (PM)

The theme of memory vs. understanding was further elaborated to present a complex understanding of the relation between memory and learning. Because some students with LD have problems with memorization, it is important to them to understand the material in order

to memorize it. Being able to recall information is an essential criterion that learning has occurred.

Learning is like clarity, comprehension and knowledge. The act of learning to me is listening, reviewing, reading, doing, actively, there is a whole approach to learning. It's attending, it's being able to pay attention, it's being aware when you are or not learning. As far as I'm concerned, unless you get acknowledged or confirmation that you are doing it, learning is feedback. You need to get that and you need to be able to assess that you learn. For me it's repetition until you get For the main part it is a variety of approaches, so you can comprehend it, then getting it clarified or confirmed that you've actually learned it. It's about getting feedback that you've learned it. To me learning is when you feel comfortable with the information, you can learn it and you can retain it and you can recall it. Learning is that whole process. You can remember it, and you can recall it. But that is based on my perception, that's me because I have a problem with it. Learning is through experience, you have to want to learn as well. Some people are very lucky: they just read something and they retain it. But that's what learning is. (JF)

Conceptions of Learning Disability

Cognitive Complexity

The "Conceptions of Learning Disability" task yielded scores from 4 to 10 for the low-support condition ($M=7.35$, $SD=1.69$), and between 5 and 12 ($M=8.82$, $SD=1.98$) for the high-support condition. Participants consistently increased their scores when probed for explanations. Comparisons of the mean-scores in a related-samples t-test indicated that the difference was statistically significant, $t(16) = 11.79$, $p < 0.01$. Level of cognitive complexity increased with years of formal education, $r = 0.51$, $p < 0.05$ for the low-support condition, and $r=0.55$, $p < 0.05$, for the high-support condition. Correlations with age failed to reach statistical significance. Figures 5 and 6 illustrate these differences and relations. Note that in order to preserve clarity of the presentation, both age and years of education variables are presented as ordinal variables in the figures, regardless of differences in the intervals between participants.

Figure 5. Individual performance on the “Conceptions of Learning Disability” task in the low-support and high-support conditions by age

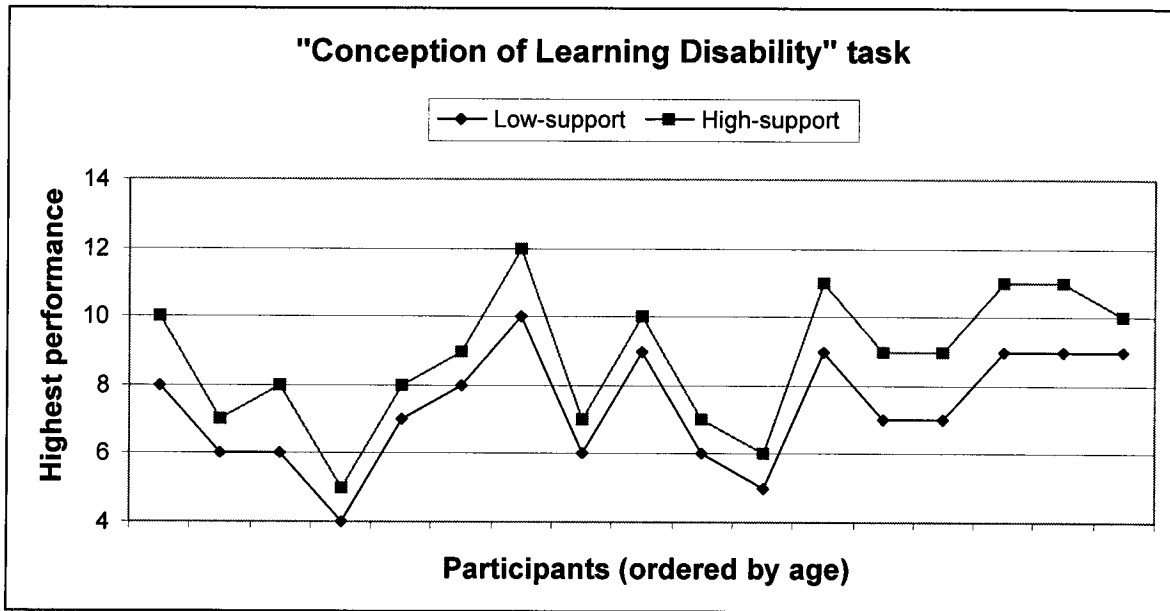
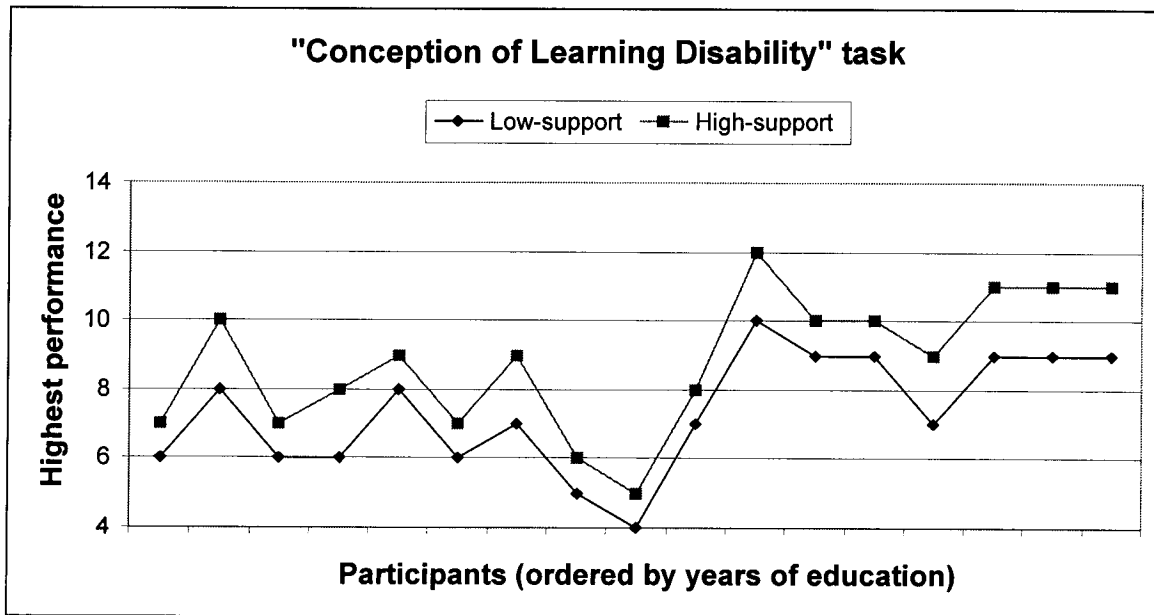


Figure 6. Individual performance on the “Conceptions of Learning Disability” task in the low-support and high-support conditions by years of education



At the *single abstraction level*, students' reasoning, similar to the reasoning about the concept of learning is characterized by simple generalizations from concrete acts and situations. Two of the students who performed at this level on the learning conception task, interestingly, were the same students who performed at the single abstraction level on the LD task as well. Thus, their performance seems consistent across these two tasks. Furthermore, it is noteworthy to point out that although they were asked to reason about LD in general terms, the two students continually thorough the probing, reasoned about their own LD. Although probed or aided, it appeared that especially one of the students understood the questions as asking her to describe her own LD. When asked to provide explanation of her definition of LD, one said "I can't do doable things sometimes that other people can do;" one of the students said "I can't really spell. I feel like I am a little bit stupider than other people. I feel embarrassed. I felt depressed about this. Sometimes I wish they never told me, sometimes I use it as an excuse." In the low support condition, her reasoning could be best described as one demonstrating emergent, not consolidated yet, ability to use abstractions. Through probing, she was able to relate instances of temporary psychological states into an abstraction: "I know I learn differently than other people." Similarly, the other student was able to differentiate between two simple generalizations (such as "being slower" or "being different"), but further elaborations were related to giving concrete examples. The students' responses demonstrated simple unelaborated notions of one's own acts and intentions.

It's difference for everybody else depending on the disability. My friend, I know, for her it's walking and how she writes and she can't draw because her writing is really messy because her leg somehow effects her arm. My sister can't memorize things. For me, I've written something but I don't read it as I've actually written it. I can write a word twice in a row and not notice. Or I'll read a word that's not even there or I'll read another word how I think it says this but it actually says this. (BW)

If I have to see a professor and say I have problems with reading and writing, I really don't know how to describe it. I don't know how to explain it to others; I know what is wrong with me. (SM)

Eight students scored at the *abstract mapping* level of conceptual understanding. The students at this level, compared to the two students at the previous level, were better able to define LD with abstract words. They also referred to their own LD but this reference was made to support their explanation of the abstract notion of LD.

Learning disability is people's day-to-day functions and how they are impaired in some way. There are differences in their day-to-day functions somehow. For me, it's a day-to-day thing, something that you struggle with each and every day in your life. (CB)

Similar to the students' performance on the conception of learning, among all eight students, all substages within this tier were represented. The students were able to form antecedents and consequences—answering the question of why dominated their answers. They were able to employ relations of similarity, opposition and cause and effect. The responses were much more elaborated, often involving the use of more than one abstraction, with more complex relations among concepts.

These capabilities were further demonstrated at the *abstract system* level. Thinking about learning disabilities is generally more complex. Students' understanding of LD almost resembled an implicit theory of LD with different levels of analysis—general as in the need for a definition of disability as a general term to be used for comparison/contrast with other disabilities, and specific—tapping into the heterogeneous nature of LD. This demonstrates students' ability to form complex relations between groups of abstractions. Learning disability is analyzed from an abstract general level to specific individual differences among people with learning disabilities.

Conceptual Content

The high support condition evoked students' thinking not only about learning disability as an abstract concept but also thinking about their own learning disability. All students gave examples for their experiences, making sense of learning disability to support their statements.

Table 7. A summary of the themes in students' responses to the "Conception of Learning Disability" task

Complexity Level (Total N)* Main Theme (Total N)**	Theme N***	Single Abstraction (2)	Theme N***	Abstract Mapping (8)	Theme N***	Abstract Systems (7)
Definition (16)	2	Difference in observable behavior	8	Difference in learning, understanding, studying. LD=different learning style	6	Social construction: society's norms of literacy determine who will be LD. Otherwise, it is a different learning style
Label (15)	2	Assigned from outside	8	Reject label "disability" because the term disability evokes visible signs of deficit (e.g., physical)	5	Label necessary as a common frame of reference
Signs (17)	2	Emphasis on external observable acts	8	Emphasis on cognitive processes and mental states, in addition to the behavioral descriptions	7	Elaborated descriptions, relations to areas of strengths within a personality profile
Understanding weaknesses and compensation (15)	2	Poor	8	Assertiveness about the need to accept, understand and try to find ways around the difficulties posed by the presence of learning disability. The notion of compensation and copying is more complex.	5	The personality of someone with LD; need to accept and compensate by relying on one's strengths; elaborated compensatory strategies
Self-identification and acceptance (11)			6	Negative emotions associated with past accounts of stigma. Tendency to avoid being different from others and a wish to be accepted by others, and to hide the presence of learning disability as much as possible.	5	Part of one's life and personality; positive source of motivation to succeed; unique perspective and ability to view the world from multiple perspectives; pride in having LD

*Total N=Total number of students scoring at this level

**Total N=Total number of students per main theme across levels

***Theme N=Total number of students per theme within level

At the *single abstraction* tier, learning disability is not a disability or a deficit-- it is a difference in observable behavior. The word disability is associated with visible signs; it evokes images of “special needs” or children with Down Syndrome. Learning disability is not visible, and therefore is not a disability. Difference is defined by means of giving examples of observable concrete behaviors, which are generalized into “being slower at doing things” or “not doing as well as other people” traits. The emphasis is on the external, on the signs of learning disability, not internal, cognitive differences, and in turn the students can’t explain what exactly it is that makes them different from other students. Learning disability is a label assigned to students from outside, by some external authority, which they are not yet able to interpret critically as a part of their own self-definitions. The fact that they can’t do even simple things such as spelling makes them think that something is wrong with them and/or they are stupider than other people, and makes them feel depressed or embarrassed. Although they do not agree with the label, they believe that the reason for poor performance on certain school tasks resides within them. One can get better by doing things differently, though the notion of compensation is poorly articulated.

The students at this level demonstrate an attempt to integrate their own and others’ intentional states such as feelings, personal judgments, and judgment of others but this integration is still tied closely to examples of concrete behaviors. The ability to reflect on their own ways of learning and to explain them to others is not integrated in an elaborated way. The examples the students use to support their statements suggest an ability to make social comparisons in achievement behavior. An understanding of the role of effort in performance is present without a clear relation of how effort and ability are related.

I don’t have the speed. Something that takes you longer to do than somebody else. Or it could be something you don’t do as well as someone who doesn’t. It’s below average but it’s not because you are not trying. You try but what you’re doing won’t put your score up higher. (BW)

I definitely feel different than other people. I know I learn differently, and sometimes I think I am so stupid, this is the easiest thing in the world, why can’t I learn it, and I just kind of give up on it. I

notice that I give up very fast, because I think what is the point, why would I want to put myself through this? I know what is wrong with me, but I don't know how to explain it to others. (SM)

I don't consider it a disability whatsoever. I know this sounds really bad, but I think of the special needs children. When people tell me I have a disability, I think of a special needs child. The word 'disability' reminds me of Downs Syndrome or something like that. I think I am not one of those people I am different. (SM)

At the *abstract mapping* level, defining learning disability as a difference is again the predominant theme but the explanations reveal richer meaning: learning disability is defined as difference in learning, understanding, studying. Learning disability is a difference which is similar to individual differences or individual learning style. Typical answers include:

To me it means challenge. I interpret that I learn different. I don't learn the same way as everyone else. I have to do it my way to understand information. It should be challenge or learning challenged. (JD)

Everybody is unique in their own way. I always try to think of myself as a part of the larger population, something that is not going to be separate. I just tell people I have a different learning style, or a learning difference. (CB)

Difficulty learning. I don't know. I have trouble doing some things that other people don't. That's just me and who I am. I don't know – a learning disability is just a label that they put on people that are different. So for me it is a learning disability. It is a term that everyone can understand when you say it. The main difference between people who are learning disabled and who are not is that they are slower. I don't think that is a negative thing. I'd say that it takes me a little bit longer to read something than everybody else in my class. (BD)

A few of the respondents analyzed the term learning disability from a perspective that resembles a theoretical approach to the term. "Disability" is indicated as a misnomer because it is most often associated with visible signs of deficit.

It is an incorrect the way I think of it, but I think learning disability means a bit slower. I also think of it as I have to learn differently than everyone else, and also the fact that I need a little bit more help and time for things. I don't think LD is really fair representation because I know people that do have learning disabilities and they can function just fine. They have learned what their disability is and have found ways around it. When you think of disability you almost think of being blind or deaf or something like that. (ND)

A learning disability in my perspective is something that is a disadvantage to you that most people don't have as they're learning. I still would define it as a disability only to the effect that if you were to compare it with a physical disability, it's something that seriously ails a person. For my disability, it seriously ails me; it sets me back from the rest of my classmates, peers. If someone is physically disabled it sets them apart from their peers as well. (LB)

The descriptions of the observable signs of learning disability include reflection on cognitive processes and mental states, in addition to the behavioral descriptions present at the

previous level. Overall, respondents at this level manifest better and more detailed understanding of what is "wrong" and where the difficulties lie. A new component at this tier is the assertiveness about the need to accept, understand and try to find ways around the difficulties posed by the presence of learning disability. The notion of compensation and copying is more complex.

It is not something you need to fix about me. That is just me. There are ways I can work at to make myself read faster. There are things I can do myself. There's ways that I can come around it. I can listen to talking books to help myself so I go at the same speed as everyone else. That's not fixing it that is supporting. You can work at it and you can minimize it. Mine is a lot different than it was. I've gotten a lot better. I don't know. I found ways to adapt. If I can't spell something I will look around the room for the word. I've found ways to adapt. It is things that I learned myself and ways to overcome it. I feel that I have become smarter, but it isn't something you can fix. It's not like someone went in to my brain and changed things. I worked hard. The whole year I wasn't at school I read everyday. I wrote in journals so I would keep my writing skills up. (BD)

There are people who have the same characteristics as me, but they are just slackers. But there are people who have the same characteristics as me, and are identified, but they don't know. The reasons for it-I think it is hereditary, and maybe it partially has to do with the way you are brought up, if your parents are accepting of a disability, then I think if they are accepting of a disability, you will be a little more accepting of the disability you have. It is a part of who I am. I've never known another way. I've never been able to read clearly, it's always been the same way. I think of myself, for the most part, if no one had ever labelled me or identified me, I would have did something myself, for not being able to comprehend words and stuff like that. (LB)

Learning disability is understanding your strengths and weaknesses, and being able to utilize your strengths and weaknesses. That's a part of my life a lot, I have to sort of step back and figure things out. How big of a part of me is it - I analyze it everyday because something always comes across, like my spelling, my memory, to just sit on chew on something. But you have to work around your weaknesses and have the time needed to do it. You are stuck with yourself at the end of the day. You have to figure out what you have to do. You come to accept your limitations and be able to work through it or work around it or work with it. (CB)

At this level, the experience of the disability is associated with negative emotions. Reference to these states is mostly associated with accounts from the past when encountering the stigma and stereotyping of learning disability. The students recall that these encounters resulted in an overall tendency to avoid being different from others and a wish to be accepted by others, and to hide the presence of learning disability as much as possible.

The label is positive to the effect that we get a lot of help at school, and it opens a lot of options for you. But, for me at least, there is a stigma attached to it. I don't like the stigma that is attached to it because people see you as different. (LB)

I do not tell my classmates about my LD, because all of a sudden special needs, kind of thing. Not to stereotype anybody in any way. But for example if a person walks up to another person who is in a

wheelchair, their approach is totally different. It is sort of like that. It would almost make me worried, because I could just imagine that separation, being separate from the others. For example, when going to Learning Assistance in high school, that already separates you from everybody else and categorizes or stigmatizes you. (CB)

In the past, a lot of times I thought, “What is wrong with me?” If I didn’t have a learning disability my schooling would have been a lot different. I would feel like I could have achieved a lot more. I am a little ashamed of it. For example, if I am writing in class, and it’s something I have to hand in right away so I don’t have the time to put it through the computer, I am almost embarrassed to leave that paper so anyone else can see it. You know I am afraid that they are going to look at it and laugh. So I always make sure my paper is turned down when I hand it in. I just don’t think they are educated in disabilities. I also think that it is my self consciousness being insecure: I am being unsure of myself. (JD)

Several respondents demonstrated a compartmentalized view of learning disability.

The learning disability does not affect one’s social functioning. It is confined to functioning in the academic domain.

I am a pretty normal person. It is only really learning for me. In other areas of my life it is fine. Nobody really knows I have a learning disability until they get me to write something, but even then people think I am just a bad speller. But there is so much more than that. (ND)

I think being disabled, in my kind of way, doesn’t affect friend making or gaining peers until that person gets to know you a little bit better and then they realize you may have a disability. I am pretty sure for me that if someone knows they are generally accepting. (LB)

An emerging theme is thinking of learning disability as a social construction. Some answers show awareness that learning disability is a problem relative only to social standards of academic performance such as reading and writing.

When I’ve read the psychologist’s report, a few times, it gets me very depressed, because you can relate to it and what not. I’m in that lower average range in certain areas, where the standards are-- reading and writing. But in my view that is not disability, I just think I function a little differently. (CB)

Some themes from the previous tier (theoretical perspective, social construction) are further developed at the level of *abstract systems*. The definition of learning disability is approached in a logical way, by referring to the general term and outlining the specific differences that distinguish learning disability from other disabilities. In this regard, the label “learning disability”, although not considered precise, is accepted as necessary to ensure common understanding and approach to the problem.

Depiction of learning disability as a social construction is clearly expressed.

Respondents indicate that society's norms of literacy determine who will be viewed as learning disabled. Otherwise, the term denotes nothing more than a different learning style, or way of learning.

At the turn of the 19th and 20th century, when psychology and science, when biological sciences came about, and that you can now identify someone as a schizophrenic, you can identify someone as such and such, this person has this disease, it grows throughout the years. Learning disability itself is just a general title to encompass so many different things. So that someone can actually say, "Learning Disability". Instead of me going, "I am spatial", I can say, "I have a learning disability". If somebody said, "oh, spatial", what are you talking about? Learning disability is the medical term which was derived from so many great thinkers in the past to be able to allow for people to understand it. (MAT)

To me it just means that my brain just works in a different way. It learns in an absolutely different way than someone else. I don't think that anybody learns exactly the same way. There is not a single person. Even normal people, they are not even the same. Learning disability just means that you don't really conform to what the status quo is. I just think that my brain doesn't absorb things as the status quo has been set up. Had the status quo been set up in my favor then maybe the kids who were considered normal would be learning disabled. The way that the population looks upon it, I think it is the negative connotations that come with the word 'disability'. Immediately you think, disability, people aren't going to think something small. They think the big, worst thing ever. (CHW)

The ability to make social comparisons extends beyond comparisons to others and includes comparisons between students with learning disabilities. Despite differences in expression, the manifestations of LD are very often described in general terms, followed by details on different profiles for people with LD.

Most of the time people with learning disabilities would be definitely shy, and not in, socially withdrawn. Also at other times they would be acting out because lots of times people with learning disabilities don't know how to communicate. The way they act out is the only way they know, that's hitting, punching, or being withdrawn and not talking to anybody else. ... If they lack something in one area they probably excel in another. Learning disabled people aren't kind of even. If you look at learning disabled people we are like this – we are really bad at something and outstanding at others. We have to compensate. (CW)

I think that learning disability is like a finger print – none of them are the same. I don't think that everyone suffers the same way. I think someone may suffer from the same thing but not the same severity. And someone can be learning disabled and have completely the opposite symptoms than someone else. Some people can be learning disabled but can't talk but they can write. I don't think you can stick two kids together and say this learning disability and this is exactly the same, because they are not. But I believe that there are sections that are similar, comprehension, spelling, mathematics, speech, confidence, and social learning. It kind of grows together like that. Similar things will grow together. I have a problem with spelling, reading comprehension and math, but that doesn't really affect my social part of my life. If I had a hard time speaking and had a hard time hearing, I might have social problems because I wouldn't be able to talk or hear people. (CW)

Compared to respondents at the other levels of complexity, respondents at the abstract system tier demonstrate very clear understanding of their strengths and weaknesses, as well as ability to monitor their own cognitive functioning. Related to this, respondents provide elaborated descriptions of compensatory strategies and their application.

Students with learning disabilities have to know themselves. Some do not understand any sense of time management. They think they are like everyone else. When everyone goes did you read the chapter last night, I say, "Last night? That normally will take me three days." They think, 'Oh it will take them one night, so it'll take me one night.' Then they don't get it done. They cram, they get frustrated, they have to learn time management skills. I have an essay due in two weeks, I should start it now. This time management is I'm writing an essay, it's 500 words, it's going to take me approximately this long, with proofreading and re-writing again and organizing my ideas. It's not one step, some people can sit on the computer for three hours and type it out, proof read it, print it out and it's done. Not the learning disabled, we have to think about our ideas, organize them, flip flop them, we have to make our opening, then do grammar and spell check which is just tedious for us. Then we have to print it out, get someone else to read it, go over your corrections, then get someone else to read it just to make sure you're overlapping. It's not an easy process. And the same with reading. Students should know that if you're learning disabled don't try to do a job and five courses. It's impossible. Suicide is five courses. I could take five courses right now and work one job just because my program is a little bit different. It's a lot of stuff I have experience with. One more thing to understand is that there is a point in your life where you are not really focused on learning new skills anymore. When I hit college, I knew this is what I can do and this is what I can't do. There's no more, I'm not going to really expand on those skills anymore because now I am in a different focus in my life; I'm going towards my career. So basically, when you first come to college, you have to kind of get rid of – and not worry about – the stuff you are not good at. I don't focus on learning how to spell words. I don't sit there and write out words. I come to school and I can't comprehend. I am not going to sit there and try to comprehend. I am going to adapt and get a reader. I don't know how to spell. I'm not going to sit there and try to learn how to spell; I am going to adapt and learn how to use a computer. Throw the stuff out that you don't think you need and compensate for it. Really, really focus on the things that you are good at. Learn how to tweak it and how to use it in every situation. Get better at that than trying to focus on learning the other things. (CW)

More importantly, this deeper knowledge of one's disability is framed by a prevailing positive outlook on LD. Negative experiences are recognized, but overall, the learning disability is viewed as central to who one is and is viewed as an "asset," strength and a source of "pride." Some of the respondents commented that being able to see things differently allows them to have a richer perspective and become a better person.

I still deal with it [learning disability], and I will deal with it for the rest of my life, and there is no way around it, so I had to learn young, that I had to accept it, and that's what's going to happen. Some people choose to wear it on the inside, but you're always going to have to not be afraid of it. Some people wear it on the inside but don't want people to see, so it will stop them. I do that myself sometimes too. For example, if I am talking on MSN, where you write, I don't talk or say certain things to people about certain things I feel about because I don't know how to spell it. That's one

thing that kind of blocks it; which is not that big of a deal, it's MSN, it's my friends or whatever. I know, for a fact, that one of my friends has a speech impediment and the reason why he is on his third year of not going to school is because he does not want to make the appointment with the counselor. He is afraid they are going to make fun of him on the phone because he has a stutter. So that kind of thing you have to learn to accept because it is going to be with you for the rest of your life. It is going to get better but it's going to be there all the time. Acceptance is really, really, important" (CW)

I feel incredibly proud about being dyslexic. The reason is that it creates an anomaly and you are an enigma. It affects every part of me, seeps into all aspects of who I am. You are a different type of person than anyone else on the planet. You don't have the same socialization that high school kids go through. You can't be dyslexic and be a mean person. It is really difficult. Even when you are frustrated and really mad. From my experience, a lot of people who are dyslexic were humiliated a lot as kids, and they were really teased. They understand that to a different level, so they are really good with people. They don't want to do that to any one else. I find too with dyslexia that a lot of people are artistic. It's also because you look at things from a different view because you are a processor. You look at things from all aspects and all perspectives. When you look at things from more than one – you are multi-faceted. When you look at things at that level you are open minded. I think the #1 message to communicate to others is that this is not curable. This is not like if you're lazy and if you really tried hard you could get it done. No. It is not fixable. There are ways to connect. I am a more productive person but that's because I have learned huge tricks and connections. It's important to really find your niche. Everyone has a learning niche. That's why I've been committed as an advocate. Because of my experience, my great family support, and such great training, I have been committed to advocacy, especially for other adults with learning disabilities. (PM)

Complexity Across Tasks

In order to explore complexity levels across tasks, participants were sorted according to their performance on the three tasks simultaneously. Two groups were formed, based on participants' mean performance for the three tasks. To review, levels assigned 4, 5 and 6 correspond to the single-abstraction stage, 7, 8 and 9 – to the abstract mapping stage, and 10, 11 and 12 – to the abstract systems stage. The cut-off dividing the two groups was between levels 9 and 10. Table 5 lists individual scores of the sorted sample as well as means and standard deviations for the sub-groups and the entire group.

Participants scored consistently across tasks: correlations among measures were all significant at $p < 0.01$, and ranged from .75 to .86. Scores on the "understanding others" task were significantly higher than scores on the "conceptions of LD" and "conceptions of learning" tasks, $t = 5.28$, $p < 0.01$, and $t = 5.80$, $p < 0.01$, respectively, but performance on the latter two tasks did not differ significantly. This pattern was preserved when tasks were compared for the two sub-groups.

The differences between the average complexity levels of the two groups on the three tasks were expected (after all, grouping was based on the performance on these tasks). The age difference between the two sub-groups is consistent with Fischer's theoretical model and predictions for the age (~25) at which reasoning at the abstract-systems level is expected to appear. Inspection of the individual values of the age-variable, however, indicates that there were three cases that did not conform to the expectations.

Table 8: Individual and group statistics: Age, years of education and complexity levels on the three tasks

	Gender	Age	Years of education	Understanding others	Conceptions of LD	Conceptions of Learning	Average level across tasks
Single abstraction and abstract mapping levels							
	F	19	13	8	5	6	6.33
	F	23	13	8	6	6	6.67
	F	23	12	9	7	7	7.67
	M	27	12	9	9	7	8.33
	F	19	12	9	8	8	8.33
	F	20	13	9	8	8	8.33
	F	21	12	9	9	9	9.00
	M	18	12	10	7	8	8.33
	F	22	12	10	7	9	8.67
Mean		21	13	9.00	7.33	7.56	
SD		2.61	0.29	0.71	1.32	1.13	
Abstract systems level							
	M	26	14	11	9	9	9.67
	M	18	12	11	10	9	10.00
	F	47	14	11	10	11	10.67
	F	29	14	11	11	11	11.00
	F	21	13	12	12	8	10.67
	F	22	13	12	10	11	11.00
	F	25	15	12	11	11	11.33
	M	34	15	12	11	11	11.33
Mean		28	14	11.50	10.50	10.13	
SD		8.98	1.02	0.53	0.93	1.25	
Entire group							
Mean		24	13	10.18	8.82	8.76	
SD		7.03	0.96	1.42	1.98	1.75	

CHAPTER 5

Discussion

Summary of Purpose and Research Approach

The idea for this study started from a social reality, which seemed to contain a paradox: more and more high school students and individuals with learning disabilities have entered postsecondary education, an area which is generally a learning enterprise. That is, they choose to seek actualization, career, or vocation in a domain where they are, by definition, likely to experience difficulties. Regardless of nuances in definitions and social ramifications of the label “learning disability” or definition of “learning,” the fact remains that these are individuals who have had repeated struggles learning.

Quite logically, in order to understand these choices, comes the question of how individuals with learning disabilities who are already attending postsecondary institutions think about learning and learning disability. Since learning happens in a social context, and manifestations of learning disability are evident as a result of social comparisons, then maybe there is something about these students’ social cognition that makes them define the situation positively and ignore the risks of failure. Thus, this study focused on college students with learning disabilities’ conceptions of learning, learning disabilities and understanding others in the learning context.

Conceptualizations can be characterized according to their form and their content. One of the important characteristics of the form of thought is quantitative: the number of elements (e.g., abstractions) that can be coordinated simultaneously in the reasoning process. The more elements, the more complex the thought process can be. Neo-Piagetian research (e.g., Case, 1992, Fischer, 1980) has demonstrated that this quantitative dimension acts as a functional constraint (e.g., working memory capacity) on the form of thought in that it sets the upper level of reasoning complexity of which one is capable. Content, on the other hand,

characterizes the semantics of thought: the meaning assigned to concepts and the relations among them. The research approach to these characteristics is quite different. While complexity yields to quantitative characterization and is generally studied from a quantitative perspective, the area of content and meaning is usually approached from a qualitative perspective. The approach adopted in this study is what Fischer and colleagues call *problem-focused methodological pluralism* (Dawson, Fischer, & Stein, 2006), combining methods from qualitative and quantitative research, depending on the goals of the study.

Instead of privileging qualitative or quantitative methods a priori, researchers fit the questions they pose to the most appropriate methods for addressing them -- sometimes qualitative, sometimes quantitative, often a combination of qualitative and quantitative, to produce usable knowledge. (p.230)

As discussed in the previous chapters, this approach is reminiscent of the methods both Piaget (Inhelder & Piaget, 1958) and Vygotsky (1983) used to advance knowledge about cognitive development. By using Case's (1992) and Fischer's (1980) theoretical frameworks, contextually specific descriptions of reasoning at different developmental levels in a range of domains (e.g., learning, learning disability) that can be reasonably compared with one another were explored. The strong measure used in the study, coupled with qualitative analysis, out-performs a purely qualitative approach (or a purely quantitative one) to examining developmental questions.

Thus, two sets of research questions guided this research. The first set of questions aimed at describing the level of cognitive complexity displayed by students with LD in their conceptualizations of learning, learning disability, and understanding others in the learning context. The second set of questions sought to delineate qualitatively different conceptions of learning, learning disability, and others.

Summary of Findings

Cognitive Complexity

Complexity displayed by students in their thinking of learning, learning disability and others was predominantly at the abstract mapping and abstract systems tiers, as defined by Fischer, Hand and Russell (1984). The average levels for the different tasks, 10 (SD=1.42) for understanding others, 9 (SD=1.18) for conceptions of learning disability, and 9 (SD=1.75) for conceptions of learning, fall within the highest levels of the abstract mapping tier and “push” towards the abstract systems tier. The abstract systems level is the dominant one for the college population both according to theory and as found in empirical studies with Fischer’s model (e.g., Dawson-Tunik, 2004).

Compared to the understanding others task, the conceptions of learning and conceptions of LD tasks were characterized by lower performance levels. Because all tasks were scored using the same scoring metric, these differences are most probably due to the different format and character of the tasks. The understanding others task required students to reason about behaviors and personal qualities, based on a meaningful story. They had the opportunity to get involved and practice with an example of higher level of reasoning. Further, this task tapped into a domain of experience close to students’ day-to-day lives: social relations, school environment, and experience seeking disability supports. The other two tasks, by contrast, required definitions and reasoning about abstract concepts, which, even with support, are more difficult to do without consistent exposure to questions and probes about abstract concepts. Usually, day-to-day experience and environments do not require abstract thinking. In order for spurts or actual development to occur, active engagement in the process of skill construction is necessary (Kitchener et al., 1993). Kitchener et al.’s research showed that as new capacities developed in early adulthood, there was some recursion to lower levels of performance on novel tasks. They claim that people

need to build and rebuild skills over time, especially when they are confronted with new content and new tasks.

Nevertheless, the high-support condition elicited higher levels of reasoning. This finding is consistent with other studies using the distinction between functional and optimal performance level (e.g., Karcher & Fischer, 2004). In addition, there were high correlations among tasks, indicating that students who scored higher on one task also scored higher on the other tasks, and those who scored lower, scored lower across all tasks. The consistency of these relations and findings adds credibility to the capacity of the approach to elicit finer distinctions in measuring complexity.

According to Neo-Piagetian theory, changes in complexity are related to increase in capacity to process information (increase in working memory capacity) and depend on experience with the conceptualized domain. For the sample in this study, complexity displayed in all three tasks correlated with experience, as indexed by the years-of-education variable. Only the conceptions of learning task correlated with age. This pattern of associations underscores the importance of experience for developmental changes in cognition after adolescence. The findings support the notion that higher forms of reasoning require formal learning due to their decontextualized and abstract nature (Case, 1992). The learning environment in postsecondary education values ambiguity, conflicting truths, and abstract thinking. What the findings seem to suggest is that this kind of climate transcends learning within the classroom to influence students' habits of mind. The longer students are in postsecondary education, the more likely are they to think abstractly about a number of conceptual domains. Dawson-Tunik (2004), for example, found that thinking at the abstract principle level occurred after 25-26 years of age but only when the students were enrolled in doctoral studies.

The role of experience and/or age did not seem to account for the performances of several students in the study. One of the students was younger and with 12 years of education, and still the student performed at a higher than expected level of conceptual understanding (given his age and years of education). A closer examination of the student's profile revealed that this student presents superior vocabulary abilities. Some authors qualify these abilities as "encapsulated" (Porath, 2001) abilities that are developmentally advanced. In this case, therefore, performance may be better explained from a theoretical perspective, which views the mind as modular in nature and not subject to the general maturational constraints.

One student, who performed consistently at the single abstraction level (a level which according to the theory is predominant in late adolescence), is 23 years of age with 13 years of education. The student repeatedly enrolled in classes only to get really frustrated with the inability to manage the course work, resulting in repeated withdrawals. Although the total years of education amounted to 13, these were not years of consecutive education. This is an important factor to consider. As the theory suggests, abstract abilities need to be developed in supported environments with the active engagement on the part of the learner. Further, although the student had been in college for a while, the bulk of courses the student took were upgrading literacy courses, which were conducted within the context of students' everyday experiences. Similarly, another student, although older (27 years of age), also did not perform at the expected level of conceptual understanding. He also undertook upgrading course work. These findings seem to confirm Case's point that abstract thinking develops within the context of formalized, decontextualized learning. Two other students who are 21 and 22 years of age with 13 years of education performed at levels higher than predicted by the theory. Both students presented average vocabulary abilities. They were similar in the support they received from their families in understanding and accepting their LDs. The

students were identified as LD in early childhood and grew up in highly supportive family environments where they were taught what an LD meant. These were the students who accepted LD as a part of who they are, as a source of developing their own identity. These findings suggest that when analyzing conceptual understanding, a multitude of factors and individual experiences should be taken into account. In addition to claiming that performance varies as a function of contextual support, skill theory also acknowledges that skill development varies as a function of context, experience, and culture. There are multiple means to develop skills and the routes to skill development may follow many interconnected strands (Fischer, & Bidell, 1998).

Conceptual Content

Overall, across tasks, the students displayed the abilities of constructivist narrators, interpreting and constructing meaning from social experience (e.g., Bruner, 1990). In each of the tasks, throughout the interviews, the students' interpretations consistently focused on understanding and making sense of their own and others' actions, intentions, feelings and traits. This supports the assumption that thinking about the concepts of learning and learning disability elicits socially "charged" cognition, concerned with psychological events, human experiences related to internal life and social relations. The predominant content across tasks was interpretive, contained in students' abilities to take a meta-position on their experiences (McKeough & Genereux, 2003).

Understanding others in the learning context. Overall, "Understanding Others" was the easiest task to reason about because of its closeness to students' experiences. It is important to note that the understanding of LD seems to connect within the context of understanding others.

The prevalent theme was the issue of self-identification. As a group, the students connected self-identification to the "LD" theme of not being different from others. They

emphasized the apprehension with which students with LD consider self-identification.

According to the students, self-identification seems to be determined by age, experience, and a clear definition of one's educational goals. Based on well-defined educational goals comes the realization that seeking and receiving services become critical factors in one's success in school. Related to this theme is the theme that once there is a clear educational plan, learning becomes a process of personal growth and enrichment. Students at the higher level of complexity emphasized how they love to learn, to absorb new ideas, to become a "worldly individual" (CHW).

Another consistent theme across the whole group was the theme of proving one's abilities and achievement. Five of the students were honor-roll students in high school, and they wanted to do well in college too. In a way, proving oneself by achieving as high as or even better than one's peers, is the students' way to counter negative LD stereotypes. Related to this desire, students with LD identified the benefits of the LD experience. This experience equipped them with approaches to learning which their peers did not need to learn. This experience also made them more responsible for their own learning.

Conceptions of learning. The central themes in conceptions of learning, which emerged from the data, are remarkably similar to the themes found in research on general college students' conceptions of learning. To summarize, according to this research (Marton & Booth, 1997), there are six qualitatively different ways that students are believed to conceptualize the idea of learning (starting at the lowest level): (1) quantitatively increasing one's knowledge, (2) memorizing and reproducing, (3) applying, (4) understanding, (5) seeing something in a different way, and (6) changing as a person.

The central themes in students with LD's thinking were "learning as assimilation of new knowledge," "learning as understanding and application of knowledge" and "learning as on-going personal development, a growing not only intellectually but also morally." The

important difference between this study and research on learning conceptions is that these themes are associated with different levels of complexity, which suggests that there is a developmental progression in students' thinking about learning. This is consistent with developmental research on college students' epistemological thinking.

In addition, students' interpretations of learning cover multiple dimensions (goals, approaches, results), which seem to be present simultaneously in students' awareness. There is also variation on the theme of memory vs. understanding. Some of the students, in order to feel that they have learned, have to be able to recall information, ideas, and knowledge. These students value understanding and practice. They emphasized the fact that practicing and active engagement keeps what they know alive, which according to them, is a necessity being students with LD. In the learning-conception research, memorizing is perceived as a lower level conception in the hierarchy of conceptions. It is associated with rote learning, which is linked to lack of understanding and results in a surface approach to learning. In contrast to the learning conception research, memorization for some of the students with LD is a vehicle to preserve deep understanding. Overall, students' understanding about learning transitioned from learning as an external, given task to learning as an internal, personal, and developmental process.

Conception of learning disability. Similar transition and relation with complexity was found in the analyses of students' conceptions of learning disability. At the lower level of complexity, the students reasoned about the concept of learning disability as an external label given to them, or imposed constraint that they have to deal with. Students at the higher levels of conceptual understanding redefined for themselves the definition of LD. For these students, LD is central to how they define themselves as individuals and learners.

The overarching theme for conceptions of learning disability is "learning disability as difference." Practically all students felt uncomfortable with the "disability" part of the term

and insisted that there is simply a difference in the way they learn. The meaning of “difference,” however, varied with the level of complexity.

Conceptions of the “difference” at the lower complexity level were characterized by describing the difficulties in the process of learning, and the negative emotional experiences associated with overcoming the difficulties. A couple of the students described the internal confusion they have been dealing with when trying to make sense of themselves. They perceived themselves as “normal” persons, which conflicted with the negative aspects associated with not being able to do certain learning tasks and the internalized negative stereotypes associated with the LD label. This confusion seems associated with lower levels of cognitive complexity.

With increase in complexity of reasoning, explanations appear as to the source of these difficulties, which are related to a more elaborated concept of LD and attempts at making sense of one’s own self mental states, emotions and abilities, and at making sense of self as learner as compared to others. In these explanations, however, the view of learning disability is still of something external, out of control; for example, imposed social norms as the reason for having difficulties, or the need for persistence in overcoming these difficulties. The students continued to perceive the label “LD” as a socially imposed term that they resisted applying to themselves. What became clear from the data was that the students have internalized, although not accepted, the negative stereotypes and the medical language of deficit prevalent in the current models of service delivery. With further increase in complexity, students re-framed LD in what can be described as acceptance of LD in one’s definition of self. For some of the students the LD becomes a source of self-identity. While learning disability is still defined as a difference, the meaning of the “difference” is one of a special ability, an asset, rather than an impediment.

Similar to the conception of learning, a driving force behind the development of qualitatively different capacities in reasoning about the concept of learning disability is experience (as indicated by the association with years of education) but not age. One possible explanation is that thinking about learning disabilities comes into play primarily in the educational context. As evident in most of the interviews, a number of participants got to know themselves better, and to transform the negative LD stereotypes only after years of experience in college.

Credibility of the Findings

Strong support for validity and trustworthiness of the study's findings comes from a qualitative study done by Pliner (1999), who examined how entering and exiting college students with LD understand and make meaning of themselves as learning disabled. Pliner's study sample is similar to the present study's sample in terms of age, gender, and ethnicity. Although the focus of Pliner's study was to identify the processes involved in LD identity development, most of the themes identified in the present study were found in Pliner's study as well. These are: "proving one's self," "acceptance of LD," "fear of being judged," "apprehension to disclose," and "others' lack of understanding of LD." The most convincing finding is that Pliner, without using a developmental framework, identified two groups of students: students who provided simple descriptions and understanding of LD, and students who had a complex understanding of LD. Remarkably, some of the content in the excerpts in her study are almost identical to the interview transcripts in this study. All in all, the experiences of the students in the present study do NOT seem to be completely idiosyncratic. Their experiences of being college students with LD are possible experiences of other postsecondary students with LD.

Limitations

Sample: Demographics

Access to participants is always a challenge in research. The developmental models that framed the study suggest that there is a developmental progression in adults' conceptual understanding, which unfolds in a sequence of steps or developmental substages. These substages are associated with age. Ideally, in order to capture this sequence, an attempt needs to be made to include an equal number of individuals, representing an equal number of males and females at different ages encompassing the age range of research interest (cf. Fischer & Bidell, 1998). This condition posed a difficulty to the study's recruitment and selection processes, because of the virtual absence of data on the incidence of learning disabilities associated with age and gender within the postsecondary LD student population.

Comprehensive statistics on learning disabled students enrolled in postsecondary institutions in BC were difficult to obtain, because BC postsecondary institutions do not implement a systematic way of gathering information on these students' demographics. Major colleges were approached in hopes of recruiting enough students to form an age sequence or different age groups. This proved to be a challenge, because although the invitation to participate in the study targeted the whole adult age range, the students who volunteered to participate were mainly in their early to late twenties. In spite of extending the recruitment process from 6 months to over a year, the resulting sample was imbalanced with respect to age and gender. On the other hand, participants were quite similar in terms of years of education and ethnicity.

Sample: Operational Definition of Learning Disability

Research with postsecondary students with learning disabilities can be difficult due to the lack of an agreed upon definition of learning disabilities. Although in postsecondary settings across colleges the DSM-IV-TR (APA, 2000) diagnostic criteria are used to

determine eligibility for services, which provides some consistency in the definition of LD, the assessment reports upon which the diagnoses are based can vary greatly in format and content of the assessment data. The focus of the study was not on the veracity of the diagnosis, which thus had very little effect on the results. I opted for an operational definition of LD as a profile of strengths and weaknesses, which would have been more meaningful and useful had I had to do comparisons between different learning profiles. The sample, however, turned out to be very homogeneous. All students presented predominantly reading and writing disabilities. Thus, any conclusions made would be restricted to students who present similar profiles of learning disabilities.

Self-selection

I approached the colleges' Centers for Students with Disabilities to advertise the study. The study targeted students who were registered with the centers. In order to receive services, the students had to self-identify and present documentation. Thus, this may be a select group of students who are highly aware of their needs and experiences, who are motivated to do well, and who have established a support system that may have led to the specific focus of their answers in the interviews.

Directions for Future Research

Developmental Studies

The utility of a life-span perspective is particularly valuable in the area of research with college students with LD, especially in times of transition (from high school to college) when students with LD tackle developmental tasks that are similar to their peers: understanding of learning and knowledge is central to college students' development and functioning in the postsecondary educational enterprise. Research on the transition from high school to college would illuminate not only commonalities in the development of college students with LD with the general college population, but also would help delineate

individual pathways of development. The developmental frameworks used in this study allows for an examination of both order and variability in development. This type of research could provide a frame of reference for program development and service delivery. To this end, larger scale studies balanced in age and gender would be able to strengthen the results from the present exploratory study. The inclusion of a comparison group would make the conclusion about the presence of developmental progression in students with LD's conceptual understanding clearer.

Focus on Self-as-Learner

Another promising venue for research, which can be conceptually bridged with the present study, is a study focusing on an examination of college students with LD's self-as-learner conceptualizations. It is argued that the majority of entering college and university students are still teenagers who, concurrently to adjusting to a learning environment different from that in high school, are occupied with one of the primary tasks of late adolescence--the consolidation of a cohesive self (Harter & Monsour, 1992). This involves the formation of specific judgments of one's ability in particular domains, the development of beliefs regarding the relative value of each domain, and the level of one's performance in domains that one deems important (Harter, 1999). Late adolescents and young adults are often described as trying on various roles and identities until they find one that fits (Harter & Monsour). As students try on the role of college/university student for the first time, they become attuned to revisiting the "old" self as a learner and to developing a new view of self as a learner and student, based on judgments of scholastic competence and the nature of intelligence and ability within a new learning context and across different academic courses.

Implications for Practice

Currently, a call for the design of programs focused on the development of LD self-understanding and self-awareness skills permeates the field of research and practice on

postsecondary students with LD. The need for these programs is based on the assumption that students with LD, entering the realm of postsecondary education, would face more challenges than their non-disabled peers. Although there are inconsistencies with regards to this claim in the literature, the predominant image of a postsecondary student with LD is one of a student who somewhat trails behind the general college student in understanding the demands of postsecondary education. Further, research on adults with LD emphasizes that understanding and accepting one's LD is associated with successful adult functioning, including college completion and that self-awareness serves as a protective factor, in part because it allows the individual to develop proactive compensatory strategies for achieving in school and employment (Adelman & Vogel, 1990; Spekman et al., 1992). Research on college students with LD also emphasizes these findings; hence the need for support in the area of increasing students' self-awareness and self-understanding.

More importantly, however, is the fact that most of the programs seem to focus on a one time course or short-term interventions aimed at teaching students how to understand their diagnoses in psychoeducational reports. In terms of intervention strategies, the programs seem to involve instruction in an understanding of students' profiles as described by psychologists in psychoeducational reports or in a list of strategies which students are supposed to apply across different situations. It is the contention of this study that before such support programs are designed and implemented we need to gain a better understanding of how students with LD make sense of the postsecondary educational enterprise. Self-awareness skills are outcomes (functions) of students' understandings of their main task of learning in college. Thus, programs try to create the consequences instead of consolidating the reasons for these consequences, namely students' conceptual understanding.

The present research inquiry is underpinned by a model of pedagogy that sees students as thinkers (Bruner, 1996; Porath & Lupart, 2002). This model takes students' conceptual understandings of learning, curriculum and the social-cultural context of the educational enterprise as necessary starting points for instruction (Porath & Lupart). Postsecondary institutions and instructors face the challenge of creating educational environments which will foster lifelong learning and independence, and will also prepare students, including those with learning disabilities, to meet the new and ever-varying demands of adult life and work in a "learning society" emphasizing deep understanding and application of knowledge (Keating & Hertzman, 1999, as cited in Porath & Lupart). In a similar vein, it is argued that disability service providers, similar to instructors, but outside of the classroom, face the challenge of creating academic, emotional and social supports and programs which will foster a better understanding of learning as related to oneself as learner with a learning disability and to others in the learning milieu. The study readily suggests an approach at tapping this conceptual understanding. By using methods similar to this study's interview format and support conditions, a program for teaching self-understanding, understanding of one's disability and the college-learning environment can be designed. This way, students can build rather than borrow meaningful understanding of abstract concepts present in their day-to-day lives to develop compensatory strategies leading to success in school and employment.

Both developmental models, which framed the present study, have a lot to offer to service providers and educators working with students with LD. First, the models provide tools for understanding the development of cognitive capacities over time. Second, they provide an explanation of why an individual student's response fluctuates across tasks and contexts. Third, they provide an explanation of why students may experience difficulties in

understanding abstract concepts. This point is important for students with LD who need to build new skills to make connections between their new understanding of the consequences of LD for postsecondary education and their old understanding of their own LD. It is important for postsecondary programs to address both environmental factors, such as social support and accessibility of faculty, and the development of personal skills and traits, such as independence and persistence. To be successful, college students with learning disabilities need to have a sense of themselves as individuals who are able to think and understand “the game of college,” and can make decisions about important matters in their lives.

Conclusion

The study gathered very rich data that provide a deeper understanding of the challenges college students with LD face. Most of the students who were interviewed in this study knew exactly what their strengths and weaknesses were and were able to capitalize on the former or compensate for the latter as situations demanded. Room exists within college for this almost heroic resourcefulness and determination combined with self-understanding. Support service providers should draw on students’ resourcefulness and conceptual understanding. Disability offices should incorporate support groups into the programs offered for students with LD. A support group would allow students like the students in the study to mentor and teach other students with LD who have not yet developed these types of skills of self-understanding and compensation. Further, a tendency exists in practice for programs for students with LD to focus attention and efforts on students themselves. From students’ responses in the present study, it appears that efforts could be focused on others as well. Currently, the primary means to ensure equal access to instruction for college students with learning disabilities has been to provide accommodations. Disability services providers are mediators between student and faculty. The current service system forces students with

disabilities to disclose their disability semester after semester, to specify their disabilities and limitations and request "special" treatment (i.e., reasonable accommodations). Although access to accommodations is guaranteed under the law, it is often an embarrassing, stigmatizing, and unending process as it was revealed in the students' interviews. These same students commented on how poorly faculty understand learning disabilities. The students who reasoned at advanced levels of understanding (i.e., abstract systems) seemed to have formulated solutions to academic accommodations well ahead of their time. Their thinking echoes the current advancements in the delivery of disability services. For example, currently the idea of Universal Design for Instruction is promoted as the most appropriate approach to academic accommodations. It is an approach to teaching that consists of the proactive design and use of inclusive instructional strategies that benefit a broad range of learners including students with disabilities (McGuire, Scott & Shaw, 2006). It provides a framework for college faculty to use when designing or revising instruction to be responsive to diverse student learners and to minimize the need for "special" accommodations and retrofitted changes to the learning environment. Universal Design for Instruction operates on the premise that the planning and delivery of instruction as well as the evaluation of learning can incorporate inclusive attributes that embrace diversity in learners without compromising academic standards (McGuire, Scott & Shaw).

These are all principles that seemed to permeate students' understanding of others, learning and learning disability. The students in the study defined learning disability not as a disability but as a difference in learning and they idealized instructors as the ones who embraced diversity in learning. Most of all, the students wanted to be perceived as learners first and foremost, who valued learning as a personal development, and then as individuals who needed accommodations.

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APPENDIX A
LETTER OF INITIAL CONTACT

Study Title
College Students with Learning Disabilities: Developmental Perspective on Conceptions of Learning, Learning Disability, and Understanding Others as Learners

Principal Investigator: Dr. Marion Porath, Professor, Department of Educational and Counseling Psychology and Special Education, University of British Columbia
Contact Phone Number: (604)-822-6045

Co-Investigator: Daniela Pacheva, Doctoral Graduate Student, Department of Educational and Counseling Psychology and Special Education, University of British Columbia
Contact Phone Number: (604)-228-0236

Dear Coordinator/Disability Advisor/Learning Specialist:

My name is Daniela Pacheva. I am a doctoral student in the Department of Educational and Counseling Psychology and Special Education at the University of British Columbia. I am working under the supervision of Dr. Marion Porath, professor in the same department. This study is being completed as partial fulfillment of the requirements of a Doctor of Philosophy in Special Education. I am writing you to introduce my research study and to ask for your support approaching students with learning disabilities registered with your office.

Purpose of the study:

We are interested in studying how college students with learning disabilities think about the process of learning and their learning experiences and needs, how they define for themselves the learning problems they encounter, and how, in their views, other college students and instructors think and feel about learning.

In this way, this research study gives college students with learning disabilities a voice so they can express their thoughts and feelings about their college learning experience. College years are important years in one's life, and especially for college students with learning disabilities, it is an important life event. Increasingly, disability service providers and college instructors perceive it important to take into account learning disabled students' perspectives in improving disability support services and in creating meaningful learning experiences for students who have exceptional learning needs. By participating in this study the students will be making an important contribution to the field of learning disabilities as well as paving the way for those with learning disabilities who have yet to attend college. This is a unique opportunity for their opinions and experience to be heard.

Who should participate in the study?

The study involves one interview session. If the students agree to participate in the study, I will meet with them privately to conduct the interview. The interview will take approximately 3 hours. There will be breaks as requested by the participants.

We are interested in interviewing students with learning disabilities who:

1. have some experience learning in postsecondary setting. Thus, students who are, at least, in their second study semester.
2. have self-identified as a student with learning disability and submitted documentation of a learning disability recognized by the Ministry of Advanced Education.
3. are 18 years old and older.
4. are either male or female.
5. are with at least average oral skills.

Confidentiality:

If the students agree to participate in the study, their names or any other information that would identify them directly will not be disclosed in any written or verbal communication.

Compensation:

As a token for their support and time spent in the study, the students will receive 2 passes for Famous Players movie theaters. Even if they choose to withdraw at any time during the interview, they will still receive movie passes.

Voluntary Participation:

Participation in the study will be entirely voluntary. If they do choose to take part in the study, they will have the right to withdraw at anytime during the interview. They have the right to refuse to answer any of the questions and/or stop the interview at any time. They can request that portions of the interview not be shared or disseminated. If the students choose not to participate or if they decide to withdraw, their standing at the college and/or their disability support services will **NOT** be affected in any way.

Letter of Initial Contact:

Attached to this letter are copies of letters of students' initial contact. I would like to ask you to post the letters on your website or bulletin board/s. I would also like to ask you to inform students with learning disabilities registered with your centre about the study and the place where they can read its description and find my contact information.

Contact name if you would like to learn more about the study

If you have any questions or desire further information with respect to this study, you can contact me at 604-228-0236.

I am available to discuss the study's purpose and procedures with the Dean of Student Services if required before you approach the students.

I would like to thank you in advance for your support.

APPENDIX B

STUDENT LETTER OF INITIAL CONTACT

Study Title

College Students with Learning Disabilities: Developmental Perspective on Conceptions of Learning, Learning Disability, and Understanding Others as Learners

Principal Investigator: Dr. Marion Porath, Professor, Department of Educational and Counseling Psychology and Special Education, University of British Columbia
Contact Phone Number: (604)-822-6045

Co-Investigator: Daniela Pacheva, Doctoral Graduate Student, Department of Educational and Counseling Psychology and Special Education, University of British Columbia
Contact Phone Number: (604)-228-0236

Dear Student:

My name is Daniela Pacheva. I am a doctoral student in the Department of Educational and Counseling Psychology and Special Education at the University of British Columbia. I am working under the supervision of Dr. Marion Porath, professor in the same department. This study is being completed as partial fulfillment of the requirements of a Doctor of Philosophy in Special Education.

Purpose of the study:

We are interested in studying how college students with learning disabilities think about the process of learning and their learning experiences and needs, how they define for themselves the learning problems they encounter, and how, in their views, other college students and instructors think and feel about learning.

In this way, this research study gives college students with learning disabilities a voice so they can express their thoughts and feelings about their college learning experience. College years are important years in one's life, and especially for college students with learning disabilities, it is an important life event. Increasingly, disability service providers and college instructors perceive it important to take into account learning disabled students' perspectives in improving disability support services and in creating meaningful learning experiences for students who have exceptional learning needs. By participating in this study you will be making an important contribution to the field of learning disabilities as well as paving the way for those with learning disabilities who have yet to attend college. This is a unique opportunity for your opinions to be heard and for you to share your thoughts and experience.

What will be involved?

The study involves one interview session. If you agree to participate in the study, Daniela Pacheva will meet with you privately to conduct the interview. The interview will take approximately 3 hours. There will be breaks as requested by the participants.

The following parts are included in the interview:

1. At the beginning of the interview, I will ask you background questions such as age, semester and program of studies, and specific diagnosis of a learning disability.
2. After completing the background information, you will be presented with stories and will be asked to describe the main characters' personality and behavior. After that, I will read 1 scenario describing typical college classroom situations, and will ask you to predict the main characters' behavior, and to describe what the characters are thinking and feeling.
3. After the scenario, I will invite you to discuss your ideas about learning, learning disability and self as a learner. You will be asked to describe, in your own words what you understand, think and feel about these concepts.

Confidentiality:

If you do agree to participate in the study, your name or any other information that would identify you directly will not be disclosed in any written or verbal communication.

Compensation:

As a token for your support and time spent in the study, you will receive 2 passes for Famous Players movie theaters. Even if you choose to withdraw at any time during the interview, you will still receive movie passes.

Voluntary Participation: Your participation in the study will be entirely voluntary. If you do choose to take part in the study, you have the right to withdraw at anytime during the interview. You have the right to refuse to answer any of the questions and/or stop the interview at any time. You can request that portions of the interview not be shared or disseminated. If you choose not to participate or if you decide to withdraw, your standing at the college and/or your disability support services will **NOT** be affected in any way.

Contact name if you would like to learn more about the study

If you have any questions or desire further information with respect to this study, you may contact Daniela Pacheva at 604-228-0236.

Contact name if you would like to participate in the study

If you choose to participate in the study, please contact Daniela Pacheva at (604)-228-0236.

APPENDIX C

BACKGROUND INFORMATION

Instructions:

The information below is being collected in order to explore the influence of different factors on learning disabled college students' functioning in college. You can choose not to provide your name BUT instead to give a pseudonym.

Today's date: Name(optional): Date of birth (MM/DD/YY): College: Campus:	Code ID number (for researcher's use): Pseudonym:
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Please take a moment to answer the questions below. Mark your answers with an "X"

Your gender

- ☐ Male
☐ Female

What background do you consider yourself to be?

(for example, Caucasian, Asian, African etc.)

Education

1) What is your highest level of education BEFORE coming to this college? <input type="checkbox"/> Some high school/last grade completed: <input type="checkbox"/> High school graduate/year: <input type="checkbox"/> Some college/number semesters attended: <input type="checkbox"/> College diploma/specify: <input type="checkbox"/> College certificate/specify: <input type="checkbox"/> Some university/ number semesters attended: <input type="checkbox"/> University graduate/year:	2) What is your area/program of studies?
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APPENDIX C
BACKGROUND INFORMATION

(Cont.)

Education

3) Current year in college? <input type="checkbox"/> First year (second semester) <input type="checkbox"/> Second year <input type="checkbox"/> More than 2 years	
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Learning Disability Designation

4) When you were first identified as a learning disabled student? <input type="checkbox"/> Elementary school <input type="checkbox"/> Middle school <input type="checkbox"/> High School <input type="checkbox"/> College	5) When you were first assessed were you told what your area of learning disability was? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, please indicate which these areas were. (Mark more than one if necessary) <input type="checkbox"/> Reading comprehension and reading speed <input type="checkbox"/> Basic reading and decoding words <input type="checkbox"/> Speech and language skills <input type="checkbox"/> Written composition <input type="checkbox"/> Written expression <input type="checkbox"/> Spelling <input type="checkbox"/> Handwriting <input type="checkbox"/> Math calculation skills <input type="checkbox"/> Math problem solving <input type="checkbox"/> Memory Functions <input type="checkbox"/> Sustained Attention <input type="checkbox"/> Processing speed <input type="checkbox"/> Study skills <input type="checkbox"/> Organizational skills <input type="checkbox"/> Note-taking skills <input type="checkbox"/> Time management <input type="checkbox"/> Test-taking skills <input type="checkbox"/> Behavior/Impulse Control <input type="checkbox"/> Other—please describe
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APPENDIX C

BACKGROUND INFORMATION

(Cont.)

Learning Disability Designation

<p>6) Have you had any subsequent assessments after the first assessment?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>If yes, how many times and when were you assessed?</p>	<p>7) When were you assessed subsequently, were you told what your area of learning disability was?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>If yes, please indicate which this/these area/s was/were?</p> <p>You can use the list above to write down the areas:</p>
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APPENDIX C

BACKGROUND INFORMATION

(Cont.)

Learning Disability Designation

<p>8) What is your current diagnosis of learning disability (for example, reading disability)?</p>	<p>9) What would you describe as areas of learning difficulties at the present time?</p>
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APPENDIX D1
UNDERSTANDING OF OTHERS
Low Support

THE PERSONALITY DIAGNOSIS TASK
BY
ZOPITO A. MARINI
Revised 1990

INSTRUCTIONS

On each of the following pages you will find a story. You must decide what the character in the story would do and why. Note, although some stories might appear similar, each one is different. Please, read each story carefully and answer to the best of your ability. Do not worry about time. If it is easier for you, I can read the stories to you.

Name (or Pseudonym/Code):

Gender:

Date of Birth:

APPENDIX D1

(Cont.)

UNDERSTANDING OF OTHERS

Low Support

Level 1A

One evening as Jane was waiting to buy tickets for the show, another person tried to get ahead of her. Jane told the person that she did not like people getting in the line ahead of her and asked the person to move. The next day, when Jane arrived at school, she went to her history class. There she found that an older student had taken her books and was using them.

What do you think Jane did?

Why?

APPENDIX D1

(Cont.)

UNDERSTANDING OF OTHERS

Low Support

Level 1B

Lisa wanted a new dress for a dance. She heard about a half-price sale at a local store, so she decided to go. At the sale, Lisa found a nice dress and joined the line of people waiting to be served by the cashier. Lisa laid the dress on the counter and while she was counting her money another customer grabbed the dress. As the other person was checking the dress, Lisa left the store. That afternoon when she arrived home, Lisa found that a person had taken her gardening tools and was using them.

What do you think Lisa did?

Why?

APPENDIX D1

(Cont.)

UNDERSTANDING OF OTHERS

Low Support

Level 2A

When Robert was visiting the computer fair, he became very interested in one of the latest models. While waiting to get information on the display model, Robert noticed that several people had been served before him. He told the salesman that he had been waiting for sometime and would like to be served. Later that afternoon, as Robert was entering the school, he saw a student carrying a large cardboard box having problems opening the door. Robert offered his assistance by opening the door so that the student could get in. He then went to his class and found that an older student was sitting in his seat.

What do you think Robert did?

Why?

APPENDIX D1

(Cont.)

UNDERSTANDING OF OTHERS

Low Support

Level 2B

Scott read an advertisement in the paper about a sale on bicycle parts. He needed a new set of tires for his bicycle, so he went into the store to buy them. While he was counting his money to see if he had enough, someone grabbed the last pair of tires that he intended to buy. As the other person went to pay for the tires Scott left the store. On his way to work that afternoon Scott saw a person having problems starting his car. He offered to help and the person accepted. When Scott arrived at work he found that another person had taken some of his tools and was using them.

What do you think Scott did?

Why?

APPENDIX D1

(Cont.)

UNDERSTANDING OF OTHERS

Low Support

Level 3A

Cathy was waiting in line to get her skates sharpened and just as her turn came up they announced that the stop was closing. Cathy told the people at the shop that she had been waiting a long time and she wanted her skates sharpened before they closed the shop. After skating she went over to see her friends. Late in the afternoon she remembered that she had to be home because relatives were coming, so she excused herself and started to leave when her friend asked her for help in finishing an assignment. Cathy helped her friend with her homework and then left for home. On her way she slipped and ruined her favorite pants. When she got off the bus a person approached her asking for directions.

What do you think Cathy did?

Why?

APPENDIX D1

(Cont.)

UNDERSTANDING OF OTHERS

Low Support

Level 3B

Dennis wanted to get information on a new stereo system, so he went to the store to see what he could find. At the store he waited at the counter to be served but the salesman was serving other people, even those who came after him. Dennis left the store without getting his information. On his way to school that afternoon he remembered that he had to bring his project to class, so he went back home to get it. When he arrived at home his brother asked for his help in fixing the car. Dennis helped him fix the car and left for school. Since he was rushing to get to school on time he started to run fast. Just before he got to school he tripped breaking his project that had taken him many hours of work to finish. When he arrived in class he found that a student who did not have enough money to buy biological supplies was using his material without asking for permission.

What do you think Dennis did?

Why?

APPENDIX D2

UNDERSTANDING OF OTHERS

College Scenarios

High Support

“Now you will have the opportunity to apply the things we discussed. I will read you 2 scenarios describing typical college situations, and will ask you questions about the main characters’ behavior, intentions and feelings. Answer to the best of your ability. Please feel free to ask any questions you may have about the scenarios.”

“This is Mary’s (Jack’s) second semester in college. Mary (Jack) finished the first semester poorly, partly because she (he) had a difficult time taking good notes in class. In this semester, one of Mary’s (Jack’s) courses is Biology 100. At the beginning of the semester the biology instructor informed the class that it was his usual policy not to allow students to tape record his lectures. Today’s is Mary’s (Jack’s) most important class for the term. Today the instructor will be reviewing the material, which will be covered on the term’s final exam. Mary (Jack) started preparing herself/himself for the class by taking out of her/his backpack a tape recorder, and placing it on the desk. As she/he was placing the tape recorder on the desk, Mary (Jack) caught the surprised look of one of her/his classmates. Shortly after that, the instructor entered the classroom. Mary (Jack) saw the classmate heading towards the instructor.”

What do you think happened next? Why?

What do you think Mary’s (Jack’s) classmate did? Why?

What kind of a person is Mary’s (Jack’s) classmate? Why?

What was Mary's (Jack's) classmate thinking? Why?

What was Mary (Jack) thinking? Why?

What was Mary (Jack) feeling? Why?

APPENDIX D2

(Cont.)

UNDERSTANDING OF OTHERS

College Scenarios

High Support

“Wilma (Fred) is in her (his) second semester at one of the city’s community colleges. She/he is enrolled in a psychology 100 class this semester. Last semester, Wilma did very poorly on her exams. She/he had a hard time finishing the exams within the time allotted by the instructors. At the beginning of the first Psychology class, the instructor announced that there would be three exams during the semester, each consisting of multiple choice, essay and short answer questions. The instructor also told the class that the exams would be timed and students were expected to finish them within the allocated time. At the end of the first class, Wilma (Fred) headed for the front of the classroom where there was already a line-up of students waiting to talk to the instructor. As Wilma waited her turn, another student joined a student in the line-up, who was just before Wilma. When Wilma’s turn came, the instructor told her that he was getting late for a meeting and left the classroom.”

What do you think happened next? Why?

What did Wilma (Fred) do? Why?

What was Wilma thinking? Why?

What was Wilma planning to tell the instructor? Why?

How was Wilma feeling? Why?

What do you think the instructor did? Why?

What type of a person is the instructor? Why?

APPENDIX E

CONCEPTIONS OF LEARNING INTERVIEW

Low Support

The interview begins by introducing the participants to the task of thinking about the learning concept:

“I am interested to know how college students understand learning. Let’s pretend that I have heard the word learning for the first time in my life, and I want to know what it means. I am going to ask you questions that will ask you to try to tell me everything you can about learning to help me better understand what learning means.”

What does learning mean to you? How would you, in your own words, define learning?

What is happening when one is learning? How does one know he/she has learned something?

High Support

The interview begins by introducing the participants to the task of providing shorter, specific answers about the learning concept:

“I would like to ask you now more specific questions about learning. When you answer each of the questions, I would like you to summarize or shorten your answers into words or phrases that describe your understanding about learning. For example, instead of giving an answer like “One always know he/she learned something when he/she can remember it later, “ you may want to say, “Learning is remembering.” Try to tell me as many words or phrases (at least four) as you can that describe your thinking about the questions asked. I will write the words you tell me on these sheets of paper, which have different titles written on them (show pages). These titles are key words from the questions I am going to ask you. The interviewer shows the sheets with headings “definition/view of learning,” “approach,” “goals.”

Priming of key elements

What are words or phrases that describe what learning is?

What are words or phrases that describe the goals of learning?

What are words or phrases that describe how one goes about learning?

APPENDIX E

CONCEPTIONS OF LEARNING INTERVIEW

(Cont.)

Probes for assessing levels of cognitive complexity

For each of the probes, the interviewer points to word/s or phrase/s written on the sheets.

Single Abstraction

(1a-definition learning) Here you say that learning is _____.

What does this mean?

(1a-definition goals) Here you say that a goal of learning is _____.

What do you mean by that?

(1b-applies definition goals) What is it like to have a goal like this one? Why do you think this goal is important? Prompt: Give me an example from your college experience describing what is it like to have a goal like this one (the interviewer points to same word and says it out loud).

(1a-definition approach) Here you say that this is _____ (word/phrase) that describes how one goes about achieving learning goals? What does this word mean? Why is this important? (the interviewer points and says out loud a word from the sheet labeled “approach”).

(1b-applies definition approach) What is it like to try to achieve learning in this way? Prompt: Try to think about an example from your experience in college.

Abstract mappings

The interviewer points to two of the words/phrases and then ask the questions:

(2a) Can you see a way in which any of these words/phrases are similar, different, or cause each other?

The interviewer points to/names two other words/phrases and then ask the questions.

(2b) Do you see how any other two of these words are related? How are they related? How is (insert a word) _____ related to _____ (insert a word)?

Prompt: Try to think about a situation, an example from your college learning experience when these two words were somehow related.

APPENDIX E
CONCEPTIONS OF LEARNING INTERVIEW

(Cont.)

Abstract systems

The interviewer selects the pairs of words from 2a and 2b and asks the participant to reason about all 4 words/descriptors:

(3a) Do you see how all of the words in are related to each other?

Prompts: You may want to think about a situation, an example from your learning experience in college where all of these could have been related in some way. Tell me an example that comes to mind of how these all were related.

(3b) Do you see how any of the 4 descriptors are related to each other? In what way?

Tell me, how they are related in this way? Prompt: Tell me an example that comes to mind of how these all are related in this way.

Abstract Principle

(4) If you try to relate all the words, (point to the words discussed in Abstract Systems a) and b) and group them and give them a single description, what would this description be? Is there a common link that connects all of these words in some way?

APPENDIX F

CONCEPTIONS OF LEARNING DISABILITY

Low Support

“So far you’ve told me about your ideas about learning. In this part of the interview, I would like to ask you to think about learning when one has a learning disability. We talked about what learning means; now I would like you to think about what learning disability means and what happens when one has a learning disability.”

How would you, in your own words, define learning disability? What does learning disability mean to you?

What are the signs of learning disability?

What is happening when one has a learning disability?

Where do you think a learning disability comes from?

Can you fix a learning disability? (Additional probes: If yes, how? If no—why not?)

High support

“I would like to ask you now more specific questions about learning disability. When you answer each of the following questions, I would like you to summarize or shorten your answers into words or phrases that describe your understanding about learning disability.

Try to tell me as many words or phrases as you can that describe your thinking about the questions I ask you. I will write the words you tell me on these sheets of paper, (show pages).”

Priming of key elements

What are words or phrases that describe what learning disability means to you?

What are words or phrases that describe the signs of learning disability?

What are words or phrases that describe what is happening when one has a learning disability?

What are words or phrases that describe the causes of learning disability?

APPENDIX F

CONCEPTIONS OF LEARNING DISABILITY

(Cont.)

Answers from the interview to this point will be used to ask participants to reason about the relations among the instances they described across questions. The interviewer places the sheets in front of the participants. The interviewer chooses two words from the answers to each question and asks the questions below.

Probes for assessing levels of cognitive complexity

For each of the probes, the interviewer points to word/s or phrase/s written on the sheets.

Single Abstraction

(1a-definition learning disability) Here you say that learning disability is _____. What do you mean by that?

(1a-defintion of causes) Here you say that the cause for learning disability is _____. What do you mean by that?

(1a-definition of signs) Here you say that one of the signs of learning disability is _____. What does this mean?

(1b-applies definition) Give me an example from your college experience describing what is it like to have a learning disability?

What part of who you are is the LD?

Do you agree with the ways LD is defined by society?

Abstract mapping

The interviewer points to any two of the words/phrases and then ask the questions:

(2a) Do you see how any two of these words/phrases are related? How are they related?

The interviewer points to two other words/phrases and then ask the questions:

(2b) Do you see how any other two of these words are related? How are they related? How is (insert a word)_____related to _____(insert a word)?

Prompt: Try to think about a situation, an example from your college learning experience when these two words were somehow related.

APPENDIX F
CONCEPTIONS OF LEARNING DISABILITY
(Cont.)

Abstract systems

The interviewer selects the pairs of words from 2a and 2b, and asks the participant to reason about all 4 words/descriptors:

(3a) Do you see how all of the words in these two pairs are related to each other?

Prompt: You may want to think about a situation, an example from your learning experience in college where all of these could have been related in some way. Tell me an example that comes to mind of how these all were related.

(3b) Do you see how any of the 4 descriptors are related to each other? In what way? Tell me, how they are related in this way? Prompt: Tell me an example that comes to mind of how these all are related in this way.

Abstract Principle

(4) If you try to relate all the words, (point to the words discussed in 3a and 3b) and group them and give them a single description, what would this description be? Is there a common link that connects all of these words in some way? What do these words tell you about?

APPENDIX G1

GENERAL SCORING METRIC

Level	Score	Skill Structure	Criteria for a Response Pass Cognitive Complexity ¹	Criteria for a Response Pass Social Content ²
Rp3	1	Representational Systems	Able to coordinate and integrate several physical, behavioral or concrete elements into a group.	Able to describe temporary psychological states but they are tied to actions/ concrete social behaviors/concrete social abilities or knowledge/ global likes and dislikes/undifferentiated traits.
	2	Complex Rp3a	Shift of focus between 2 or more Rp3s	Differentiates between several temporary states but cannot relate them.
	3	Complex Rp3b	Compounding 2 or more Rp3s	Relates and integrates <u>2</u> temporary psychological states but the relation is tentative (can't use it consistently)—the understanding is not consolidated yet.
A1	4	Single Abstraction	Able to coordinate and integrate at least <u>two</u> physical, behavioral or concrete characteristics in a single abstract term.	Consolidated from previous substage understanding. Able to describe and integrate at least <u>two</u> <u>temporary</u> psychological states or concrete social actions or concrete social abilities or undifferentiated traits into a <u>single</u> enduring, generalized psychological state or emotion or cognition or general social attitude or general social ability or differentiated or conflicting personality trait.
	5	Complex A1a	Substitution or shift of focus between 2 or adding more Rp but without clear relations among all of them.	Differentiates between <u>2</u> generalized psychological states/ emotions/ social attitude/ general social ability/trait but cannot relate them/can add additional temporary psychological states.

Note: 1—Adapted from Karcher and Fischer (2004); 2—Adapted from McKeough & Genereux, 2003; McKeough, Templeton, & Marini, 1995.

Legend: Rp=Representations; A = abstraction; 1 = single skill (e.g., abstract thought unit); 2 = two skills mapped in relationship to each other; 3 = three or more skills interrelated into one thought unit system; a = transformational step of substituting one skill for another or shifting focus from one skill to another at the same developmental level; b = transformation step of compounding but not yet fully inter-coordinating multiple skills at the same developmental level.

APPENDIX G1

GENERAL SCORING METRIC

(Cont.)

Level	Score	Skill Structure	Criteria for a Response Pass Cognitive Complexity ¹	Criteria for a Response Pass Social Content ²
	6	Complex A1b	Compounding 2 A1s for more A1s but no clear higher order integration/relation.	Relates and integrates <u>2</u> generalized psychological states but the relation is tentative (can't use it consistently); not consolidated yet.
A2	7	Abstract Mappings	Able to relate <u>at least two</u> abstractions to each other. The relation can be either causal (A causes B) or relation of similarity (A and B are alike, because both are instances of _____) or opposition (because A is _____ which is opposite from B which is _____) into a single abstract term.	Consolidated integration between <u>two</u> single enduring, generalized psychological states/emotions/cognitions/social attitudes/social abilities/ or differentiated or conflicting personality traits to each other. Provides explicit explanations—"the why" of behavior.
	8	Complex A2a	Substitution or shift of focus between 2 or more abstractions.	Differentiates between <u>2</u> or <u>more</u> <u>single</u> generalized psychological states/ emotions/ social attitude/ general social ability/trait and able to apply this understanding.
	9	Complex A2a	Compounding –able to relate 3 or more abstractions beyond one mapping.	Relates and integrates <u>3</u> or <u>more</u> generalized psychological states/ emotions/cognitions/social attitudes/social abilities/ or differentiated or conflicting personality traits, but the relation is tentative (can't use it consistently) not consolidated yet.

Note: 1—Adapted from Karcher and Fischer (2004); 2—Adapted from McKeough & Genereux, 2003;

McKeough, Templeton, & Marini, 1995.

Legend: Rp=Representations; A = abstraction; 1 = single skill (e.g., abstract thought unit); 2 = two skills mapped in relationship to each other; 3 = three or more skills interrelated into one thought unit system; a = transformational step of substituting one skill for another or shifting focus from one skill to another at the same developmental level; b = transformation step of compounding but not yet fully inter-coordinating multiple skills at the same developmental level.

APPENDIX G1

GENERAL SCORING METRIC

(Cont.)

Level	Score	Skill Structure	Criteria for a Response Pass Cognitive Complexity ¹	Criteria for a Response Pass Social Content ²
A3	10	Abstract Systems	Able to coordinate <u>groups of abstractions</u> and ingrate them into complex relations with each other.	Consolidated integration of <u>3 or more</u> generalized psychological states/emotions/cognitions/social attitudes/social abilities/ or differentiated or conflicting personality traits.
	11	Complex A3a	Substitution or shift of focus between <u>2 or more A3s</u> .	Differentiates between <u>2 or more groups of 3 or more</u> generalized psychological states/emotions/cognitions/social attitudes/social abilities/ or differentiated or conflicting personality traits.
	12	Complex A3b	Compounding –able to relate <u>3 or more A3s</u> but not integration yet.	Relates and integrates <u>3 or more</u> groups of generalized psychological states/emotions/cognitions/social attitudes/social abilities/ or differentiated or conflicting personality traits but the integration is tentative.
A4	13	Principles (4)	Able to relate <u>two or more abstract systems</u> together to form principles.	Consolidated integration of <u>3 or more groups of</u> generalized psychological states/emotions/cognitions/social attitudes/social abilities/ or differentiated or conflicting personality traits.

Note: 1—Adapted from Karcher and Fischer (2004); 2—Adapted from McKeough & Genereux, 2003; McKeough, Templeton, & Marini, 1995.

Legend: Rp=Representations; A = abstraction; 1 = single skill (e.g., abstract thought unit); 2 = two skills mapped in relationship to each other; 3 = three or more skills interrelated into one thought unit system; a = transformational step of substituting one skill for another or shifting focus from one skill to another at the same developmental level; b = transformation step of compounding but not yet fully inter-coordinating multiple skills at the same developmental level.

APPENDIX G2

ADDITIONAL SCORING GUIDELINES

Skill Structure	Elements
Single Abstraction	<ul style="list-style-type: none"> • Operate on abstract variables such as times, places, acts, actors, states, types. • These variables have a stereotypical quality—words like all, none, some, never, sometimes, always, no one, somebody, everyone • “Some teachers are mean, but mostly they are nice” • Clusters of attributes & traits • “Mean people yell” • Can construct third person; generalizing cause & effect • “You ought to go to school, even though if you do not like it, because everybody wants to get a good job” • Uses group norms, stereotypes • “A good student studies hard, listens to teachers, likes classes” • Formulation of aphorisms “The more you learn, the smarter you will be”
Abstract Mappings	<ul style="list-style-type: none"> • Applies abstract variables connected with if ... then” inferences and causality, similarity, opposition—with single variables on the input side; • “If you talk to your teacher like a person, she will get to know you, and will make her more interested in you. Teachers who are interested in you are more fun to learn from.” • Arguments supported with empirical or logical evidence “getting to know my students helps me figure out what they need to learn next.” • Self-it is composed of clusters of traits or societal roles • “I try to be a good student and ask a lot of questions, but I am shy and little afraid of being embarrassed, and that makes it hard. • Behavior rule-governed because of their proven benefit “ Nine times out of ten, you will fail if you do not study” • Simple rules strung together “If the teacher makes the subject interesting, then you will feel like studying. You learn more.”

Adapted from Dawson-Tunik (2004)

APPENDIX G2

ADDITIONAL SCORING GUIDELINES

(Cont.)

Skill Structure	Elements
Abstract Systems	<ul style="list-style-type: none"> • Words like legal system, society, the educational system etc. start to appear. • Arguments are constructed with systems of relations –relations among relationships among variables. • Constructs multivariate systems coordinating more variables as input “ “Students have different learning styles and interest. One aspect of a good teacher’s role is to learn as much as she can about her students so she can individualize instruction to engage all students” • Events and ideas are situated in larger context “A good education is not just about learning for personal success or for your family it is about each of us contributing to society” • Self is composed of systems of sub-personalities “ in some ways I am a different person as a teacher than I am as a student. As a student I am more in touch with my own ambitions. As a teacher I am more in touch with the kind of world I want to create.” • Behavior—integrated system of tendencies and relationships “Students are not bad or good. Every student has a combination of strengths and weaknesses. We need to bolster their strengths and help them overcome their weaknesses in order to prepare them for life in society.” • Coordinate linear causality in a hierarchy “When I think about good education I ask myself from what point of view—the student, the teacher, the society? I think I really have to look it from the societal perspective because that encompasses the interest of everyone.”
Principles	<ul style="list-style-type: none"> • Multilevel logic, meta-analytic words appear—consistent system incomplete system, incommensurable; comparison of systems and perspectives occurs in systematic way “ A good educational system is based both on the needs of individuals within society and on the needs of the society itself. Our personal interests and shared interests are commensurable—especially if we take a developmental view.” • Reflects on systems; horizontal and vertical causal relations • “The self system and the social system are not closed to one another. They are interdependent. The existence and well being of one is dependent on the existence and well being of the other. When we fully grasp this, then we can go about determining what kind of educational system we want to put into place.” Focus on similarities and differences; causal relations.

Adapted from Dawson-Tunik (2004)

APPENDIX H

INFORMED CONSENT FORM

Study Title:

College Students with Learning Disabilities: Developmental Perspective on Conceptions of Learning, Learning Disability, and Understanding Others in Learning

Principal Investigator: Dr. Marion Porath, Professor, Department of Educational and Counseling Psychology and Special Education, University of British Columbia
Contact Phone Number: (604)-822-6045

Co-Investigator: Daniela Pacheva, Doctoral Graduate Student, Department of Educational and Counseling Psychology and Special Education, University of British Columbia
Contact Phone Number: (604)-228-0236

Dear Student:

My name is Daniela Pacheva. I am a doctoral student in the Department of Educational and Counseling Psychology and Special Education at the University of British Columbia. I am working under the supervision of Dr. Marion Porath, professor in the same department. This study is being completed as partial fulfillment of the requirements of a Doctor of Philosophy in Special Education.

Purpose of the study:

We are interested in studying how college students with learning disabilities think about the process of learning and their learning experiences and needs, how they define for themselves the learning problems they encounter, and how, in their views, other college students and instructors think and feel about learning.

In this way, this research study gives college students with learning disabilities a voice so they can express their thoughts and feelings about their college learning experience. College years are important years in one's life, and especially for college students with learning disabilities, it is an important life event. Increasingly, disability service providers and college instructors perceive it important to take into account college students with learning disabilities' perspectives in improving disability support services and in creating meaningful learning experience for students who have exceptional learning needs.

Procedure:

The study involves one interview session. If you agree to participate in the study, Daniela Pacheva will meet with you privately to conduct the interview. The interview will take approximately 3 hours. There will be breaks as requested by the participants.

The following parts are included in the interview:

1. At the beginning of the interview, I will ask you background questions such as age, semester and program of studies, and specific diagnosis of a learning disability.
2. After that, you will be presented with stories describing different situations in different school settings, and will be asked to describe the main characters' personality and behavior. After that, I will read 2 scenarios describing typical college classroom situations, and will ask you to predict the main characters' behavior, and to describe what the characters are thinking and feeling.
3. After the scenarios, I will invite you to discuss your ideas about learning and learning disability. You will be asked to describe, in your own words, what you understand, think and feel about these concepts.

At any time during the interview, you are welcome to ask for clarification if you do not understand the questions or the tasks.

Risks:

There are no foreseeable risks in taking part in the study. However, if for some reason you feel/felt that the questions make you/made you feel uncomfortable or distressed, you will be able to contact a counselor for personal counseling. Attached to this consent is a list of names of counselors from the college's counseling department.

Confidentiality:

If you choose to participate, your answers will be audio taped. What students say in the interview is important, and I do not want to miss parts of what they say. So I will need to record it. If you choose to participate, what you tell me will be just between you and me. You may ask to stop recording at any point during the interview. On all of the notes from this interview in place of your name a pseudonym will be written. You can give me your own pseudonym. Your name will also be coded with a number. Numbers rather than names will be used in the analyses of the responses. If you do agree to participate in the study, your name or any other information that would identify you directly will not be disclosed in any written or verbal communication. Dr. Porath will have access only to the coded responses.

All recordings will be transcribed verbatim. Each recording will be given a code number. The transcripts will be given a code number and will be entered on a non-networking computer. The access to the files will be protected by a password. All tapes and print materials will be coded and kept in a locked filing cabinet for five years. Only Dr. Porath and I will have access to the cabinet.

Compensation:

As a token for your support and time spent in the study, you will receive 2 passes for Famous Players movie theaters. Even if you choose to withdraw at any time during the interview, you will still receive movie passes.

Voluntary Participation: Your participation in the study is entirely voluntary. If you do choose to take part in the study, you have the right to withdraw at anytime during the interview. You have the right to refuse to answer any of the questions and/or stop the interview at any time. You can request that portions of the interview not be shared or disseminated. If you choose not to participate or if you decide to withdraw, your standing at the college and/or your disability support services will **NOT** be affected in any way.

Dissemination of Study Results

Information from the interview, in addition to the dissertation research, may be disseminated through publications such as journal articles or books, or through conference presentations. As noted, your name or any other information that would identify you directly will not be disclosed in any of these forms of sharing the results from the study. Pseudonyms rather than names will be used.

Contact names if you would like to learn more for about the study:

If you have any questions or desire further information with respect to this study, you may contact Dr. Porath or Daniela Pacheva at 604-228-0236.

Contact if you have concerns about your rights as a research participant:

If you have any concerns about your treatment or rights as a research participant, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598.

Consent:

Your signature below indicates that you have received a copy of this consent form and copies of all attached materials for your own records.

Your signature indicates that you consent to participate in this study.

Participant Signature

Date

Print Name

APPENDIX I

<https://rise.ubc.ca/rise/Doc/071A8G21Q2Q1470EJEJ97D38J61/fromString.html>



The University of British Columbia
Office of Research Services
Behavioural Research Ethics Board
Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3

CERTIFICATE OF APPROVAL- MINIMAL RISK RENEWAL

PRINCIPAL INVESTIGATOR: Marion J. Porath	DEPARTMENT: UBC/Education/Educ Psych/ Spec Educ	UBC BREB NUMBER: H05-81015
INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT: N/A Other locations where the research will be conducted: N/A		
CO-INVESTIGATOR(S): Daniela Pacheva		
SPONSORING AGENCIES: N/A		
PROJECT TITLE: College Students with Learning Disabilities: Developmental Perspective on Conceptions of Learning Disability, Self and Others as Learners		

EXPIRY DATE OF THIS APPROVAL: February 5, 2008

APPROVAL DATE: February 5, 2007

The Annual Renewal for Study have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

*Approval is issued on behalf of the Behavioural Research Ethics Board
and signed electronically by one of the following:*

Dr. Peter Suedfeld, Chair
Dr. Jim Rupert, Associate Chair
Dr. Arminee Kazanjian, Associate Chair
Dr. M. Judith Lynam, Associate Chair

<https://rise.ubc.ca/rise/Doc/071A8G21Q2Q1470EJEJ97D38J61/fromString.html>10/1/2007 11:32:27 PM