

Autonomy and Competence as Motivational Factors in Students with Learning Disabilities and Emotional Handicaps

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Over 450 students (136 elementary, 321 junior and senior high school) with primary handicapping codes of learning disability (LD) or emotional handicap (EH) completed several questionnaires. All participants were from self-contained classrooms of a state-operated special education system. Questionnaires assessed students' self-perceptions and perceptions of home and classroom contexts, with all variables theoretically reflecting either the competence or the autonomy aspects of internal motivation or students' personal adjustment. Math and reading standardized achievement test scores were obtained from school records. Using multiple regression analyses, students' achievement and adjustment were predicted from the motivationally relevant self-perception and perception-of-context variables. Interestingly, different patterns of relations emerged for the students with LD and EH.

There is a voluminous literature pertaining to the education of students with learning disabilities (Keogh, 1986) and emotional handicaps (Kauffman, 1986). Including empirical reports as well as theoretical and applied discussions, this work has explored such varied topics as diagnostic categories and procedures (e.g., Bower, 1982), prevalence of the disorders (e.g., Wood & Zabel, 1978), and the utility of medication and other interventions (e.g., Gadow & Swanson, 1986; McConnell, 1987).

Additionally, considerable discussion has focused on the application of general principles of education and learning to these special populations (e.g., Smith, 1986; Torgesen, 1986); however, the work is rather narrow in scope and empirically limited. Discus-

sions and policies pertaining to special education have tended to emphasize the importance of providing a high degree of structure and nurturance for these special needs students, and the empirical literature has emphasized the use of reinforcements as a central feature of programs developed from an operant or neo-operant (i.e., cognitive-behavioral) perspective. In all these practices and prescriptions, the central concept (whether explicit or implicit) is the control of students' behavior through structures created by adults. In fact, a recent study by Grolnick and Ryan (1990) found that teachers reported that they are more controlling with mainstreamed students with LD than with their peers.

The persistent focus on control, structure, and nurturance, however (though

stemming from concern for the special needs of these students), raises the question of whether adults may be failing to provide the right kind of support for the students to initiate and sustain their own behavior and learning. Stated differently, the adults may, in a sense, be "doing for" the students rather than encouraging them to "do for themselves." Correspondingly, it is perhaps revealing that in spite of a great deal of recent research on internal motivation and self-regulation in educational settings (e.g., Ryan, Connell, & Deci, 1985), only a very few studies (e.g., Adelman & Taylor, 1983; Grolnick & Ryan, 1990; Renick & Harter, 1989) have explored these issues with special education students, and there has been very little discussion of concepts such as internal motivation and self-regulation in the special education literature (Deci & Chandler, 1986).

The issues, of course, are complex. For example, psychologists disagree about the importance of the concept of control. Whereas some call for greater control, asserting that all behavior is controlled by reinforcement contingencies (B.F. Skinner, 1953), others call for less control, asserting that it undermines intrinsic motivation and personal initiative (Deci, 1975). Furthermore,

there is disagreement about the extent to which structure and nurturance are or are not controlling and under what circumstances they facilitate versus suppress student initiative (e.g., Connell & Wellborn, 1990).

In the present investigation, we have begun to explore the relation of control, autonomy, and self-regulation to the adjustment and achievement of students, aged 8 to 21, with learning disabilities (LD) and emotional handicaps (EH). In so doing, we have employed a motivational perspective (Deci & Ryan, 1985) that focuses on self-regulation and has frequently been applied to regular education settings (e.g., Deci, Schwartz, Sheinman, & Ryan, 1981; Grolnick & Ryan, 1989; Ryan & Connell, 1989). The question of interest is whether self-perceptions of autonomy and competence and perceptions of support of autonomy and involvement in the social context promote learning and adjustment in special education students as they have been found to do in regular education students (e.g., Grolnick, Ryan, & Deci, 1991; E. Skinner, Wellborn, & Connell, 1990).

Learning Disability

The concept of learning disability (LD) is intended to connote a student of average intelligence who displays inferior achievement because of neurologically based perceptual and information-processing difficulties (Johnson, 1981). Although some of the important recent research on LD has accepted this restrictive definition and explored the neurological basis of LD (e.g., Rourke, 1985), the bulk of the research has employed a less restrictive definition by using as subjects any students who have been labeled LD by their school systems, generally based upon criteria related to discrepancies between actual achievement and the level of achievement that is expected given the students' IQs. The present research with LD students fits into the latter category and explores general motivational processes that could lead to

educational prescriptions for the 2 million American students who have been labeled LD (Biklen & Zollers, 1986) but do not necessarily fit the restrictive definition.

Emotional Handicap

The concept of emotional handicap (EH) encompasses a great variety of mental problems and, in fact, is so broad that no satisfactory definition can be agreed upon by researchers (Hallahan & Kauffman, 1988). Nonetheless, there is a literature that focuses specifically on the special education of students with EH. Even within this more circumscribed arena there is some disagreement about definition, but the most widely accepted definition is the one created by federal regulation, based on work by Bower (1960). It states that an emotional handicap is a condition involving one or more of a set of characteristics (e.g., an inability to build or maintain satisfactory relations with peers or teachers) that adversely affect academic performance. Students with EH fitting this category are quite varied and range from rebellious, acting-out students to withdrawn, suicidal students. As was the case for students with LD, the present project includes students with EH simply on the basis of their having been labeled EH by their school system and placed in a special education program.

Research on Internal Motivation

For the past decade, considerable research has been concerned with students' internal motivation and self-regulation (see Ryan et al., 1985). This work has considered three questions: (1) What are the forms of internal motivation? (2) What contextual factors (or perceived contextual factors) facilitate versus impair internal motivation? and (3) What are the consequences and concomitants of internal motivation? We will briefly review work related to each question, done with regular education students, as that forms the basis for the

present investigation. We will then briefly review studies involving internal motivation variables with special education students.

Being internally motivated refers to displaying behaviors for which the source of initiation and regulation is inside the person. In other words, the person is said to be internally motivated when his or her behavior does not require an immediate, external demand, control, or reward contingency. Recent work on this topic has identified different types of internal motivation that are experienced as more versus less self-determined. Chandler and Connell (1987), for example, distinguished between intrinsic motivation (motivation for which the gratification is the spontaneous joy or interest derived from the activity itself) and internalized motivation (motivation that was originally external but has been taken in by the person). Deci and Ryan (1985) pointed out further that these internalized motivational regulators can be either introjected or identified. A regulatory process is referred to as *introjected* if a behavior is displayed because the child thinks he or she *should* do it or that adults would approve. With this type of internal motivation, it is as if the child were being regulated by the introjected structure rather than regulating himself or herself in a volitional, unpressured way. Alternatively, an internal regulatory process is referred to as *identified* if the child has accepted it as his or her own—that is, if the child has identified with the value that underlies the activity and thus does it quite willingly. With identified regulation, the child is said to be more autonomous or self-determined than with introjected regulation. Ryan and Connell (1989) developed a scale that assesses each of these internal regulatory styles in the academic domain: intrinsic, identified, and introjected, as well as external regulation, when the reason for action is an immediate prod or pressure. Their scale, which was used in the present research, also yields a Relative Autonomy Index (RAI) reflecting the extent

to which a child is self-determined with respect to his or her schoolwork.

Numerous studies concerned with internal motivation in regular education settings have indicated that children tend to be more self-regulating and autonomous when they (a) believe they are competent to attain significant outcomes at school—in other words, believe they understand what behaviors lead to success and feel competent to execute those behaviors (e.g., Connell, 1985; Harter, 1982; E. Skinner et al., 1990)—and (b) feel a sense of personal autonomy and do not feel pressured or controlled by significant adults (Grolnick et al., 1991).

Research on social contexts (e.g., Deci, Nezlek, & Sheinman, 1981; Grolnick & Ryan, 1989; Koestner, Ryan, Bernieri, & Holt, 1984) has shown that children's internal motivation and autonomous self-regulation will be facilitated in classrooms and homes that provide a combination of (a) personal involvement by significant adults and (b) support of autonomy (i.e., encouragement for the child to choose and initiate, and acknowledgment of his or her perspective). Finally, several studies have shown that when contexts promote autonomy and competence (through support of autonomy and involvement), children evidence enhanced conceptual understanding (Grolnick & Ryan, 1987), greater creativity (Amabile, 1983), higher self-esteem (Deci, Nezlek, & Sheinman, 1981), and lower anxiety (Ryan & Connell, 1989).

Studies on the internal motivation and self-regulation of students with LD or EH are, as mentioned, relatively few. The ones that have been done have concentrated primarily on comparing children with handicaps to non-handicapped children in terms of their self-perceptions and others' perceptions of them. For example, Renick and Harter (1989) reported that students with LD in a resource room gradually, over the years from third to eighth grade, came to see themselves as less academically competent than their nonlabeled peers; however, when the

students based their self-evaluations on their fellow resource room students, their perceived competence remained constant over that same period.

Grolnick and Ryan (1990) did between-group comparisons of mainstreamed students labeled LD with three nonlabeled groups: matched IQ, randomly selected, and matched low achievers. These researchers reported that students with LD rated themselves as less academically competent than did the matched-IQ and randomly selected students, but they did not differ from the nonlabeled low achievers in self-perceptions of academic competence. Furthermore, the students with LD did not differ from any of the other three groups on their ratings of general self-worth. However, when teachers rated the students in these four groups on a variety of motivation-related variables, the students with LD were consistently judged to be different from the other three groups. The teachers rated them as less competent, less motivated, lower in self-esteem, and as having more learning problems than any of the other three groups. From these and other such studies, it seems that the question of whether students with handicaps have more negative self-perceptions than do other students depends on whom the labeled students use as comparison others and whom the researchers use as the control group when they make cross-group comparisons. On the other hand, it appears that teachers see students labeled as LD as functioning less well in general than all other non-labeled students, even low achieving and low IQ students.

The present study extends the previous work on the internal motivation and self-perceptions of students with handicaps by using variables related to internal motivation to predict the school achievement and adjustment of students with LD or EH. Thus, rather than comparing special education students to regular education students, we will explore the intercorrelations of the motivationally relevant variables

and test the utility of these motivational variables for predicting the effective functioning of students with handicaps in self-contained classrooms.

Our general hypothesis is that students who have been labeled as having either learning disabilities or emotional handicaps and placed in special education classrooms will evidence greater achievement and adjustment when they (a) report that they understand how to attain desired school outcomes and feel competent to do so, (b) report more autonomous reasons for doing their schoolwork and accept responsibility for their own failures (rather than projecting the causes outward), (c) perceive that their teachers and parents are involved with and interested in them and their schoolwork, and (d) perceive that their teachers and parents support their autonomy.

Method

Subjects

Subjects for this study were 457 students, aged 8 to 21, who attended self-contained special education classes administered by the New York State Board of Cooperative Educational Services (BOCES). Of these students, 321 were in junior or senior high school (with multiple teachers) and 136 were in elementary school. All students had a primary handicapping code of either learning disability (LD) or emotional handicap (EH). The breakdown of sample sizes for each code at each educational level appears in Table 1. Elementary school students in each primary-handicapping-code group ranged from 8 to 14 years of age (\bar{X} = 11.4 for each), and junior-senior high school students in each group ranged from 12 to 21 years (\bar{X} = 16.7 for LD and 16.8 for EH).

Subjects in the study had been sent to the BOCES programs from several different suburban and rural districts in the greater Rochester, New York, area, though none came from the city school district. The students were predominantly Caucasian and tended to

TABLE 1
Descriptive Statistics by Handicapping Code and Educational Level

	LD	EH	Total
Elementary (n)	73	63	136
Males (n)	50	52	102
Females (n)	23	11	34
IQ (\bar{X})	88.2 (14.5)	98.5 (14.9)	93.0
Age (\bar{X})	11.4 (1.3)	11.4 (1.3)	11.4
Junior-Senior High School (n)	179	142	321
Males (n)	120	114	234
Females (n)	59	28	87
IQ (\bar{X})	83.6 (11.5)	92.9 (13.0)	87.7
Age (\bar{X})	16.7 (2.3)	16.8 (2.1)	16.7

Note. Standard deviations are given in parentheses LD = learning disabilities; EH = emotional handicaps.

be middle to lower middle class. There is no indication that differences in racial or SES factors existed among the four groups. The coding and placement of the students into the BOCES program was done by a multidisciplinary team in the home district that is referred to as the Committee on Special Education and consists of at least a physician, a psychologist, a parent, a special education teacher, and an educational administrator.

The process of placement typically begins with a teacher's observation that the student is not learning or that he or she is either aggressive or withdrawn. Occasionally, however, the process is initiated by a parent's concern about the student. In either case, the situation is then discussed by school personnel, and if they consider it appropriate they inform the parents that they would like to refer the child to the Committee on Special Education. At that time, intellectual and psychological testing is done by the school psychologist, and the relevant school personnel meet with the parents to discuss options before presenting the case to the committee. The committee then reviews all relevant information and does the coding and placement based on the rule of placing the student in the

least restrictive setting within which the committee believes he or she will be able to function well. The LD code is generally given on the basis of a discrepancy between ability and achievement that does not appear to be emotionally caused, and the EH code is generally given on the basis of the student's being unable to develop social relationships and on having test results that indicate special psychological needs. These criteria, however, are impossible to define precisely, for they are subjective and vary among the school districts.

The BOCES system provided information on the students' Full Scale IQ scores, using the Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974). The averages were as follows: LD elementary, 88.2 (range 58 to 142); EH elementary, 98.8 (range 69 to 136); LD high school, 83.2 (range 55 to 121); and EH high school, 92.8 (range 59 to 127).

Overview of Procedure

Students in this study completed all or parts of six scales that have been developed by various researchers for use with school-age subjects. The scales were simplified somewhat so that the

young children with IQs on the low side of normal could complete them, and those modifications will be detailed with the scale descriptions. Four of the scales pertain to the children's self-perceptions and one each pertains to their perceptions of their parents (homes) and teachers (classrooms). In addition, the reading and the math achievement scores from the Stanford Achievement Test (Gardner, Rudman, Karlsen, & Merwin, 1982) were made available from school records. The data were used to form correlation matrices and to regress achievement and adjustment onto self-perceptions and perceptions of contexts.

Questionnaires

Administration Procedures. Prior to administration of the questionnaires, a letter was sent to each parent by a BOCES administrator explaining and endorsing the project. Parents were encouraged to phone the administrator with questions or concerns and were told that participation was optional. Students were also told that they were free not to participate, yet virtually all students did proceed. All questionnaires were group-administered in the classroom by at least two trained examiners, one who read each question aloud and one or more others who were available to help as needed. All participating students were cooperative and were able to complete all items on the questionnaires, although a few of the youngest ones required some individual help. Teachers were not present during most of the administrations, though with the lower functioning elementary students the teacher or aide sometimes stayed for the first few minutes to be sure things got started smoothly. For most classrooms, the set of questionnaires was divided into two administrations so the students would not become overly tired; in the lower functioning elementary classrooms, there were three administrations. In all cases, the administrations to a particular classroom were done within a 10-day period, often on

consecutive days. Classroom groups to which the questionnaires were administered ranged from 8 to 16.

Academic Self-Regulation Questionnaire. This 16-item adaptation of a scale developed by Ryan and Connell (1989) assesses students' style of self-regulation in the academic domain. Each item presents a reason why a student might perform a given activity, such as trying to do well in school, doing classwork, or answering questions in class. Below each reason is a 4-point Likert-type scale on which the student indicates how often he or she exhibits the behavior for that reason (*always, most of the time, sometimes, never*).

The original scale also has questions concerning reasons for doing homework, but those items were omitted because most BOCES students (especially elementary) do not do homework. Further, the original scale is formulated in terms of how true (from *not at all true* to *very true*) each statement is (e.g., "I do my classwork because the teacher will be angry at me if I don't"). The format was changed to the "how often" format, as described above, to make the items easier to understand for the lower functioning students.

Four subscales are included in this self-regulation scale, ranging from less to more autonomous. They are External Regulation (activities engaged in to avoid external consequences or to obey rules), Introjected Regulation (activities done to avoid guilt or anxiety or because the child thinks adults would approve), Identified Regulation (behavior done to achieve a self-valued goal), and Intrinsic Motivation (behavior done for inherent enjoyment). Alpha coefficients for the four subscales, reported by Ryan and Connell (1989), ranged from .66 to .82, indicating adequate reliability. Subscales can be combined, through a weighting procedure, based on a simplex-like model of the scale structure, to form a summary score called the Relative Autonomy Index (RAI). In this study, the RAI was used as one of two indicators of perceived autonomy, because higher scores

connote engaging in schoolwork for one's own reasons without needing controlling inducements.

Ryan and Connell (1989) presented extensive evidence for the construct validity of the Academic Self-Regulation Questionnaire from four diverse school samples. In those and other studies, the RAI has been shown to correlate positively with scales of intrinsic versus extrinsic motivation (Harter, 1981), perceived competence (Harter, 1982), and perceptions of the classroom on the origin versus pawn dimension (deCharms, 1976), and to correlate negatively with perceived control by powerful others and unknown sources (Connell, 1985). Thus, there is evidence that the scale adequately assesses perceived autonomy in school, and it has been used in several other published studies (e.g., Connell & Ilardi, 1987; Grolnick & Ryan, 1987, 1989).

Academic Coping Inventory. The Academic Coping Inventory was designed by Tero and Connell (1984) to index how students respond to failures and other problems in schools. The scale has 20 items that describe four types of responses, though we employed a 10-item version of the scale because only two of the subscales were relevant to our project. The scale presents students with statements, all of which begin with "When I do a bad job on my schoolwork" and end with a type of behavior that fits one of the subscales. In our adaptation, children respond by circling one of four responses (ranging from *always* to *never*). These are the same four responses that were used in our adaptation of the Academic Self-Regulation Questionnaire, although the original of both scales used responses that reflect degree of truth.

Five of the items on this questionnaire relate to projecting blame for one's school problems onto someone else (e.g., the teacher), rather than accepting responsibility for one's own accomplishments, or lack thereof. This subscale, therefore, indexes lack of au-

tonomous self-regulation. When a student is high on projecting responsibility for his or her behavior onto others, the student is not being autonomous. Thus, we use the reverse of the projection scale as the second measure of autonomy (along with the Relative Autonomy Index). The alpha for this subscale, reported by Tero and Connell (1984), was .65.

The other five items we used from this coping questionnaire relate to anxiety amplification in response to problems. This involves blaming oneself, viewing oneself as inadequate, and focusing on one's failure and expected future failures. This, we reasoned, is an indicator of very low self-esteem and poor adjustment. Thus, we used the reverse of this scale as one indicator of classroom adjustment. Alpha for this subscale was .75 (Tero & Connell, 1984).

The Academic Coping Inventory has been used in several studies, and its various subscales correlate in predicted ways with a wide range of motivationally relevant constructs (Tero & Connell, 1984).

The Multidimensional Measure of Children's Perceptions of Control (MMCP). As mentioned earlier, perceiving oneself as competent to attain school outcomes requires (a) understanding which behaviors lead to success and (b) feeling competent to execute those behaviors. The MMCP, developed by Connell (1985), assesses the first of these, namely, the degree to which children understand what controls their successes and failures. The original measure includes four domains, though we used only the cognitive and general domains (omitting the social and physical domains, which are less relevant to this study). Thus, we used eight items, all of which come from the subscale referred to as Unknown Control, which assesses the degree to which the students do not know what controls significant outcomes in school. The reverse of this scale was used as one of the two indicators of perceiving oneself as

being competent to attain desired outcomes.

A sample item from the Unknown Control subscale is, "When I get my schoolwork right, I don't understand why." The students respond to such items with the same four Likert-type options described in the two previous questionnaires (ranging from *always* to *never*), though the original scale (like the others) assesses the degree to which respondents believe each statement is true. This measure has been widely used in research, and the unknown subscale has been shown to relate negatively to motivation and performance in school (Skinner et al., 1990). Its alpha coefficient was reported as .67 (Connell, 1985).

Perceived Competence Scale. The Perceived Competence Scale (Harter, 1982) is a 28-item questionnaire assessing students' feelings of competence in three domains—cognitive, social, and physical—and also assessing children's general feelings of self-worth or self-esteem. The questionnaire format describes two types of children for each item. A child decides which type he or she is more like, and then decides whether that description is sort of true or very true for him or her. The result is a 4-point Likert-type scale. For the current research, we simplified the format somewhat: For each item, we described four types of children corresponding to the four points on the Harter scale. We did this by using phrases like "very" and "sort of" with the descriptions in the original scale. For example, one of the two options for one of the cognitive subscale items reads, "Some kids feel like they are just as smart as other kids their age." A student can respond by endorsing that this is *very true* or *sort of true*. We adapted this to the following two descriptions: "Some kids always feel like they are as smart as other kids their age" and "Some kids sometimes feel like they are just as smart as other kids their age." By doing this, we had four descriptions per item, and a student would then decide which of the four descriptions was most like him or her.

Pilot testing indicated that our lower functioning students found this format much easier.

As mentioned, the Harter measure has three domain-specific subscales. Of these, we used only the Cognitive subscale ($\alpha = .76$, as reported by Harter). Because being competent to attain outcomes involves both understanding how to achieve outcomes and feeling competent enough to do the instrumental actions, we used cognitive perceived competence (from the Harter measure) plus the reverse of the Unknown Control subscale from the MMCP to measure students' perceptions that they were competent to control significant school outcomes. This strategy of assessment is consistent with the theoretical ideas of several investigators (e.g., Bandura, 1977; Skinner, 1990; Weisz, 1983).

The General Self-Worth subscale from the Harter (1982) measure indexes students' self-esteem ($\alpha = .73$), which is commonly used as an indicator of personal adjustment. Thus, we used this subscale along with the reverse of the anxiety-amplification scale to form a composite indicator of students' adjustment in school. Both the Cognitive Perceived Competence and General Self-Worth subscales of the Harter measure are widely used and have very good validity.

The Classroom Context. Students completed a questionnaire developed by deCharms (1976) in which they reported their perceptions of their classrooms and teachers, organized in terms of the general concept of the classroom as being origin-promoting versus pawn-promoting. In the former, teachers are experienced as being accepting and responsive to the students and as providing opportunities for the students to take initiative and be more autonomous. In the pawn-promoting classroom, on the other hand, teachers are seen as controlling and directing of students' behavior. The measure includes 24 items that relate to support of autonomy and 4 that assess teacher warmth, which we interpreted as reflecting teacher involvement. Stu-

dents rate the classroom/teacher on these items, which are presented in a Likert-type format and are phrased in terms of teachers' behavior and/or things that happen in the classroom.

In the original scale, respondents circle the choices *always*, *often*, *sometimes*, and *never*, though we changed *often* to *most of the time*, thus making the four responses the same as in three of the other scales described earlier. No other changes were made to the measure. Elementary students have one primary teacher and classroom, so they responded accordingly. The junior-senior high school students responded as if they were giving their general sense of all the classes they were in. This measure, which was used in a large longitudinal study by deCharms (1976) and in numerous other studies (e.g., Deci, Nezlek, & Sheinman, 1981; Ryan & Grolnick, 1986), has been shown to be valid.

The Home Context. In addition to the classroom context, we hypothesized that the students' home context would affect their motivation, achievement, and adjustment in school. To assess this, we adapted a measure of children's perceptions of their mothers and fathers, developed by Grolnick et al. (1991). All items relate to the support of autonomy (versus control) and involvement (versus noninvolvement) of the parents with the children and their schoolwork. The item format of the original scale was similar to that used by Harter in her Perceived Competence Scale, for which the respondent is first asked to decide which of two types of parent his or her parent is more like, and then to decide whether this is only sort of true or is really true of the parent. The result is a 4-point Likert-type scale, with high scores indicating high parental support of autonomy or high involvement. Because items are worded in both directions, some were reversed in scoring. As with the Harter scale, this measure was modified by describing four types of parents and asking the students to tell which of these was most like their own.

In the elementary sample, we used 11 items (6 support of autonomy, $\alpha = .67$; and 5 involvement, $\alpha = .66$, as reported by Grolnick et al., 1991), all worded in terms of mothers. We did this because it was not practical to assess the two dimensions for each parent and because research has shown that the maternal items are more strongly related to the school motivation and behavior of elementary students (Grolnick et al., 1991). Thus, it seemed clear that for elementary students, mothers are more salient in creating the home context. For the junior-senior high school sample, we used the same 11 items but substituted the word "parents" for "mother." We did this because junior-senior high school students' developmental issues are different from those of the younger students and either parent could be the more salient in creating the home context for the student. The students were told to respond in terms of whichever parent (or both) occurred to them for that item.

The Constructs Reviewed. In this research we assessed students' self-perceptions of autonomy and of competence, and also their perceptions of the support of autonomy and involvement of their parents and teachers. There were two indicators of perceived autonomy—the Relative Autonomy Index and the reverse of projecting blame for failure (Tero & Connell, 1984). There were also two indicators of perceived competence to attain outcomes—the reverse of the Unknown Control subscale and the perceived academic competence scale. For the classroom context, there was a measure of perceived autonomy support and of perceived involvement (i.e., perceived teacher warmth), both taken from deCharms (1976); and for the home context, there was a measure of perceived support of autonomy and perceived involvement (Grolnick et al., 1991).

As dependent variables, we assessed adjustment in school, using general self-worth (Harter, 1982) and the reverse of anxiety amplification (Tero

& Connell, 1984), and we obtained reading and math achievement scores on the Stanford Achievement Test from school records.

Results

All of the analyses in this project were done separately for the four different groups: elementary LD, elementary EH, junior-senior high school LD, and junior-senior high school EH. We did not have a priori hypotheses about differences among these groups, but it seemed prudent to analyze the data in this way as long as we had the opportunity to do so.

Gender

As noted in the method section (see also Table 1) there were far fewer females than males in the special education population we sampled. To see whether there were differences between males and females on the variables of concern, we performed one-way ANOVAs for all 10 self-perception and perception-of-context variables within each of the four samples. No gender difference was found in either elementary sample. In the junior-senior high school samples, 4 out of 20 comparisons yielded significant differences. Because there were so few differences and because the female samples were very small, all further analyses combined males and females within the four samples.

Correlations: Self Variables

Tables 2 and 3 show the correlation matrices among the students' self-perception variables, as well as their Full Scale IQ and age, within each of the four groups. One can see from these tables that there are numerous significant correlations among the six motivationally relevant self-perception variables in all samples, providing construct validity for the revised self-perception measures and suggesting that meaningful patterns of relations exist among

these variables within the samples of special education students.

There were more significant correlations in each junior-senior high school sample than in each elementary sample. Although there are several possible reasons for this, the different sample sizes are likely to account for most of the difference. Within each handicapping code, the junior-senior high school sample is twice as large as the elementary sample, so correlation coefficients of lower values are significant in the former.

As can be seen in Tables 2 and 3, IQ correlated with some self-perception variables in each of the samples (11 of the possible 24 correlations were significant), but IQ did not correlate with any one of the self-perception variables in all four of the samples, and the magnitude of the correlations tended to be on the low end of the range of significant correlations in the matrices. Thus, it seems reasonable to conclude that although IQ has some relation to the motivationally relevant variables in this study, it does not provide a systematic explanation of the relations that exist among the motivationally relevant variables. The tables also indicate that age was even less strongly and less systematically related to the motivation variables.

Returning now to the correlations among the self-report variables, one can see from Tables 2 and 3 that in the junior-senior high school samples, the correlation matrices in the two special-population samples are quite similar, whereas in the elementary samples there appear to be interesting differences between the pattern of relations within the two special populations. Specifically, the competence-in-attaining-outcome variables (unknown control, reversed, and perceived competence) appear to be central for the children with LD, whereas the autonomy variables (RAI and projection, reversed) appear to be central for the children with EH. One can see this particularly clearly by inspecting the correlations between those four variables and the two adjustment variables (general self-worth and anxiety am-

TABLE 2
Correlation Matrices for Special Education Elementary Students' Self-Perception Variables, Full Scale IQ, and Age^a

	RAI	Pro	UC	PAC	GS-W	AA	IQ
With Learning Disabilities (<i>n</i> = 71)							
Autonomy Index (RAI)							
Projection (Pro)							
Unknown Control (UC)		.38**					
Perceived Academic Competence (PAC)		-.31**	-.31**				
General Self-Worth (GS-W)		-.25*		.56**			
Anxiety Amplification (AA)		.45**	.35**	-.45**	-.37**		
Full Scale IQ		-.28*	-.38**			-.32**	
Age	.37**	.35**			.32**	-.28**	
With Emotional Handicaps (<i>n</i> = 62)							
Autonomy Index (RAI)							
Projection (Pro)							
Unknown Control (UC)		.32**					
Perceived Academic Competence (PAC)							
General Self-Worth (GS-W)	.36**	-.42**		.55**			
Anxiety Amplification (AA)	-.32**	.35**			-.47**		
Full Scale IQ		-.26*				-.29*	
Age							

^aIncludes only coefficients with *p* values less than .05.

p* < .05. *p* < .01.

TABLE 3
Correlation Matrices for Junior–Senior High School Special Education Students' Self-Perception Variables, Full Scale IQ, and Age^a

	RAI	Pro	UC	PAC	GS-W	AA	IQ
With Learning Disabilities (<i>n</i> = 161)							
Autonomy Index (RAI)							
Projection (Pro)	-.31**						
Unknown Control (UC)	-.21**	.41**					
Perceived Academic Competence (PAC)	.18*	-.24**	-.18*				
General Self-Worth (GS-W)		-.26**		.41**			
Anxiety Amplification (AA)	-.21**	.28**	.56**		-.21**		
Full Scale IQ			-.18*			-.20**	
Age			-.20**			-.18*	
With Emotional Handicaps (<i>n</i> = 119)							
Autonomy Index (RAI)							
Projection (Pro)	-.28**						
Unknown Control (UC)	-.27**	.40**					
Perceived Academic Competence (PAC)	.22**	-.34**	-.25**				
General Self-Worth (GS-W)		-.30**	-.21*	.34**			
Anxiety Amplification (AA)	-.32**	.35**	.41**				
Full Scale IQ	.18*	-.18*	-.24**	.26**			
Age	.19*						-.38**

^aIncludes only coefficients with *p* values < .05.

p* < .05. *p* < .01.

plification, reversed). One finds that within the LD sample, three of the four correlations between the competence variables and the adjustment variables are significant, whereas only one of the four between autonomy and adjustment is significant. However, within the EH sample, only one of the four correlations between the competence and adjustment variables is significant, whereas all four of the correlations between the autonomy and adjustment variables are significant. It appears, therefore, that at the elementary level (ages 8 to 14), competence may be a central psychological dynamic for children with LD, whereas autonomy may be central for children with EH.

Relations of Contexts to Self

Tables 4 and 5 show how the students' perceptions of their home and classroom contexts relate to their motivationally relevant competence and autonomy variables. Recall that for elementary students, questions about the home context were all stated in terms of "mother," whereas for junior and senior high school students they were stated in terms of "par-

ents." In general, a moderate number of significant correlations were found between perceived contexts and self-perceptions, and all were in the expected direction. As with the inter-correlations of self-perceptions, there were more significant correlations in the junior-senior high school samples than in the elementary samples.

For the elementary students classified as LD, no clear pattern emerged, though maternal support of autonomy correlated with three self-perceptions, and maternal involvement and teacher warmth each correlated with one self-perception. For elementary students classified as EH, the pattern was somewhat clearer. All five of the significant correlations were with the two variables indexing support of autonomy in the social context (viz., maternal support of autonomy and an origin-promoting classroom). Again, one sees a strong tie between autonomy-related variables and the adjustment variables for students with EH, lending at least modest additional support to the pattern of differences between the elementary students with LD and EH that seemed to emerge in the correlation matrix of self-perceptions.

It is interesting to note that when both groups of elementary students are considered together, the maternal support-of-autonomy variable was by far the strongest perceived-social-context predictor of self variables. In the junior-senior high school samples, however, the perceived-context variable that most strongly related to student motivation variables was perceived teacher support of autonomy (i.e., the origin-promoting classroom). This, of course, makes good sense, because teenagers are typically more individuated from parents and thus more influenced by other aspects of their social environment than are younger children.

In the junior-senior high school LD sample, the origin-promoting classroom related significantly to four self variables. In addition, parental involvement and teacher warmth were also related to students' motivation—7 out of 12 possible correlations were significant in the predicted directions. In the junior or senior high school EH sample, the pattern was somewhat different, however. Origin-promoting classrooms correlated significantly with three variables and parental sup-

TABLE 4
Correlation Matrices for Elementary Special Education Students Between Perceptions of the Social Context and Self-Perception Variables^a

	Maternal support of autonomy	Maternal involvement	Origin-promoting classroom	Teacher warmth
With Learning Disabilities (<i>n</i> = 71)				
Autonomy Index				
Projection	-.26*			-.35**
Unknown Control				
Perceived Academic Competence	.32*			
General Self-Worth	.24*	-.34*		
Anxiety Amplification				
With Emotional Handicaps (<i>n</i> = 62)				
Autonomy Index				
Projection				
Unknown Control				
Perceived Academic Competence	.33*		.32*	
General Self-Worth	.38**		.31*	
Anxiety Amplification	-.35*			

^aIncludes only coefficients with *p* values < .05.

p* < .05. *p* < .01.

TABLE 5
Correlation Matrices for Junior–Senior High School Special Education Students Between Perceptions of the Social Context and Self-Perception Variables^a

	Parental support of autonomy	Parental involvement	Origin-promoting classroom	Teacher warmth
With Learning Disabilities (<i>n</i> = 158)				
Autonomy Index			.25**	.30**
Projection		-.20**	-.42**	-.39**
Unknown Control				
Perceived Academic Competence		.16*	.28**	.15*
General Self-Worth		.40**	.32**	.36**
Anxiety Amplification				
With Emotional Handicaps (<i>n</i> = 117)				
Autonomy Index	.23*		.20*	
Projection	-.21*		-.43**	-.33**
Unknown Control	-.22**			
Perceived Academic Competence			.29**	
General Self-Worth		.33**		.17**
Anxiety Amplification	-.23**			

^aIncludes only coefficients with *p* values < .05.

p* < .05. *p* < .01.

port of autonomy correlated significantly with four, whereas there was only one significant correlation for parental involvement and only two for teacher warmth. Thus, in these two samples, we see some evidence that support-of-autonomy variables may be relatively more important for EH students, whereas involvement variables may be relatively more important for LD students. This complements various related findings mentioned earlier.

Learning and Adjustment

In this research we explored whether the children's self-perceptions concerning autonomy and competence, as well as their perceptions of the support of autonomy and nurturance of their parents and teachers, would predict their achievement and adjustment. To do this, we used the reading comprehension and math scores from the Stanford Achievement Test as our indices of achievement and formed a composite of general self-worth and the reverse of anxiety amplification to serve as our index of adjustment.

For each of the four samples, we performed six simultaneous multiple regressions to predict the two achieve-

ment indices and the adjustment composite, first from the students' self-perceptions of variables pertaining to autonomy and competence, and then from their perceptions of the support of autonomy and involvement of the home and classroom contexts.

First, consider achievement: In all the achievement analyses, the sample sizes are smaller than the full sample because standardized achievement test scores were not available for all of the students. Tables 6 and 7 summarize the results of the simultaneous multiple regression analyses for the two achievement indices. In these analyses, the four self-perception variables (two related to autonomy and two related to competence) were used in one analysis for each sample and then the perceptions of context variables (support of autonomy and involvement at home and origin promotion and warmth in the classroom) were used in a second analysis. One can see from the tables that these motivationally relevant variables were somewhat successful in predicting the students' performance on standardized achievement tests. One or more of the motivational self or context variables predicted each achievement test score in

each group, with the exception of reading comprehension in the elementary EH group and math achievement in the junior–senior high school EH group.

Tables 8 and 9 present the simultaneous multiple regression results that predicted the adjustment composite. In general, and as might be expected, the motivationally relevant student variables predicted a much larger percentage of the variance in the adjustment index than in the achievement indices. Both the students' self-perceptions concerning competence and autonomy and their perceptions of the social contexts' providing support of autonomy and involvement tended to be strongly predictive of adjustment scores across samples.

Differences: Learning Disabilities and Emotional Handicaps

As noted previously, there was some indication that competence-related self and involvement-related context variables tend to be more dynamically central for students with learning disabilities, whereas autonomy-related self and autonomy-support-related context

TABLE 6
 Summary Regressions, Predicting Reading Comprehension and Math Achievement From Self-Perceptions
 and From Perceptions of the Social Context in Elementary Students^a

	ΔR^2	<i>F</i>	<i>df</i>	<i>p</i> <
With Learning Disabilities (<i>n</i> = 54)				
<i>Reading Comprehension</i>				
<i>Self Variables</i>				
Unknown Control	.084	3.19	1,50	.08
<i>Context Variables</i>				
Maternal Support of Autonomy	.155	9.01	1,50	.01
<i>Math Achievement</i>				
<i>Self Variables</i>				
Unknown Control	.150	8.44	1,47	.01
<i>Context Variables</i>				
None				
With Emotional Handicaps (<i>n</i> = 39)				
<i>Reading Comprehension</i>				
<i>Self Variables</i>				
Projection	.119	4.80	1,35	.05
<i>Context Variables</i>				
Maternal Support of Autonomy	.057	2.82	1,36	.10
<i>Math Achievement</i>				
<i>Self Variables</i>				
None				
<i>Context Variables</i>				
None				

^aIncludes only significant and marginally significant predictors.

variables tend to be more dynamically central for students with emotional handicaps. We performed a series of hierarchical multiple regressions to gain clearer evidence concerning this apparent difference.

Within each of the four samples, for each of the three dependent variables (two achievement test scores and the adjustment composite), we performed two pairs of hierarchical regressions—one pair with self variables and one pair with context variables. Specifically, within each sample for each dependent variable, one pair consisted of first regressing the dependent variable onto self variables with the two autonomy variables entered first, and then regressing the dependent variables onto self variables with the two competence variables entered first. By treating the two autonomy variables as a block and the two competence variables as a block, we could determine which block accounted for greater variance in each dependent variable within each sample. The other pair of regressions in-

cluded repeating the procedure for the context variables, treating support of autonomy at home and at school as one block, and involvement at home and warmth of teacher as another block. For each pair of regressions in which at least one of the two equations was significant, we compared the amount of variance accounted for in the first block of each of the two equations.

There were 24 pairs of equations (viz., 4 samples \times 3 dependent variables \times 2 variable types—i.e., self and context); 12 of these pairs were for LD samples and 12 were for EH samples. Of the 12 pairs of equations for the LD samples, 7 had at least one significant equation, and of those, the competence block accounted for more variance in 5 of the cases. In contrast, for the EH samples, 5 of the 12 pairs had at least one significant equation, and in all 5 the autonomy block accounted for greater variance. It thus appears that there is some validity to the differences in dynamic centrality of compe-

tence versus autonomy variables in the two types of students.

Discussion

Substantial attention in the literature on special education has been focused on developing and advocating structures such as behavior modification systems that control students' school behavior and, in turn, attempt to increase their achievement and adjustment within the school context. In contrast, considerable recent work in regular education settings has been concerned with promoting students' internal motivation and self-regulation and has documented some negative effects on psychological and performance variables of controlling structures. Yet, there has been very little research or discussion pertaining to internal motivation and self-regulation (and to the contextual conditions that promote these processes) within special education settings. The present

TABLE 7
Summary for Regressions, Predicting Reading Comprehension and Math Achievement From Self Variables and From Context Variables in Junior–Senior High School Students^a

	ΔR^2	<i>F</i>	<i>df</i>	<i>p</i> <
With Learning Disabilities (<i>n</i> = 120)				
Reading Comprehension				
<i>Self Variables</i>				
Projection	.024	2.89	1,116	.10
<i>Context Variables</i>				
Teacher Warmth	.042	5.02	1,108	.03
Math Achievement				
<i>Self Variables</i>				
None				
<i>Context Variables</i>				
Teacher Warmth	.043	4.20	1,91	.05
With Emotional Handicaps (<i>n</i> = 76)				
Reading Comprehension				
<i>Self Variables</i>				
None				
<i>Context Variables</i>				
None				
Math Achievement				
<i>Self Variables</i>				
None				
<i>Context Variables</i>				
Origin-promoting Classroom	.080	2.89	1,71	.10

^aIncludes only significant and marginally significant predictors.

TABLE 8
Summary Statistics for Simultaneous Multiple Regressions Predicting the Adjustment Composite From Self Variables and From Context Variables in Elementary Students^a

	ΔR^2	<i>F</i>	<i>df</i>	<i>p</i> <
With Learning Disabilities (<i>n</i> = 69)				
<i>Self Variables</i>				
Perceived Academic Competence	.273	24.21	1,64	.01
Projection	.051	5.86	1,64	.02
<i>Context Variables</i>				
Maternal Support of Autonomy	.054	3.32	1,60	.10
With Emotional Handicaps (<i>n</i> = 62)				
<i>Self Variables</i>				
Perceived Academic Competence	.170	14.02	1,52	.01
Autonomy Index	.155	8.47	1,52	.01
Projection	.136	13.50	1,52	.01
<i>Context Variables</i>				
Maternal Support of Autonomy	.180	7.86	1,48	.01
Origin-promoting Classroom	.059	4.05	1,48	.05

^aIncludes only significant and marginally significant predictors.

TABLE 9
Summary for Regressions Predicting the Adjustment Composite From Self Variables and From Context Variables in Junior–Senior High School Students^a

	ΔR^2	<i>F</i>	<i>df</i>	<i>p</i> <
With Learning Disabilities (<i>n</i> = 179)				
<i>Self Variables</i>				
Unknown Control	.142	16.78	1,169	.01
Perceived Academic Competence	.057	11.10	1,169	.01
Projection	.014	3.14	1,169	.10
<i>Context Variables</i>				
Origin-promoting Classroom	.039	4.09	1,160	.05
Parental Involvement	.043	2.89	1,160	.10
With Emotional Handicaps (<i>n</i> = 142)				
<i>Self Variables</i>				
Unknown Control	.146	14.72	1,126	.01
Projection	.079	14.78	1,126	.01
Autonomy Index	.098	3.14	1,126	.10
<i>Context Variables</i>				
Parental Support of Autonomy	.077	6.09	1,122	.01
Parental Involvement	.047	7.13	1,122	.02

^aIncludes only significant and marginally significant predictors.

research examined (a) whether a network of students' self-perceptions and perceptions of the social context, relevant to competence in attaining desired outcomes and autonomous regulation, would show meaningful patterns of relations within the LD and EH special populations, and (b) whether these motivational variables would predict achievement and adjustment for the students with special needs.

The answers to both questions seem to be yes. On the basis of the data collected with those measures, four summary points can be made, subject to future replications. First, the student self-perceptions do, in general, tend to correlate in ways that would be expected from self-determination theory (Deci & Ryan, 1985). Specifically, the competence variables tend to correlate moderately with the autonomy variables, and both relate to personal adjustment. Second, students' perceptions of their home and classroom contexts related in interesting ways to their motivational self-perceptions. For example, whereas elementary students' perceptions of their *home* context were more strongly related to their motivational self-perceptions, junior or senior

high school students' perceptions of the *classroom* context were more strongly related to their motivational self-perceptions. Third, motivational self-perceptions and perceptions of home and classroom contexts predicted math and reading achievement at both educational levels and in both special populations, and they also predicted students' self-rated adjustment. Fourth, the patterns of intercorrelations and predictions were somewhat different for the two special populations, with competence and involvement variables tending to be more central for the students with LD and autonomy and support-of-autonomy variables more central for the EH students.

The apparent difference between the two special populations is an interesting one, and although we had not anticipated it, it does make sense. Students with LD typically experience a large number of academic failures—they have trouble learning and, thus, trouble feeling competent (Licht, 1983). Given the salience of failures for these students, it is not surprising that their feelings of competence would be central predictors of their adjustment and achievement. On the other hand, students with emotional handicaps are

not as likely to have failures at academic work as they are to have failures of self-regulation. As Ryan and Connell (1989) explained, internalizing regulations of behavior is the basis for autonomous self-regulation, and students with EH are likely to have been less successful in their internalization and subsequent self-regulation. Because students with EH are likely to be frequently reminded of their failures at self-regulation (i.e., at being autonomous), it is quite understandable that autonomy would be a critical issue for them.

Although the present study is but one investigation of students in special education programs, it provides initial evidence that internal motivation variables are important for the achievement and adjustment of these students. Further, there is at least some evidence that support of autonomy in the home and classroom environments (at least as perceived by the students), along with involvement on the part of the significant adults, promotes greater internal motivation, achievement, and adjustment. When this research is considered in conjunction with the literature that has been amassed on the negative effects of external controls on the

internal motivation of regular education students, it raises important questions about the education of special needs students.

As mentioned earlier, the strongest emphasis in discussions of special education has been on the control of behavior through behavior modification programs. It seems to us, based on the research, that although controlling contexts may have some benefits, such as reducing confusion and increasing on-task behavior in the classroom, they could also have some unintended costs, namely, interfering with the students' developing greater self-regulation and leading to poorer achievement and adjustment in the classroom.

It is important, in considering these issues, to make a distinction between structures and controls. *Structures* provide students with information about the relation between behaviors and outcomes and about their performance. *Controls*, on the other hand, pressure students to behave, think, or feel in particular ways. Of course, these pressures can be subtle, as, for example, when offering a token or a gold star for a student's performing in a particular way, but these subtle controls, like more coercive ones, can be detrimental to self-regulation.

For parents and teachers to use structures in a noncontrolling way that will facilitate self-regulation, they need to allow the child as much choice as possible, including the choice of whether to follow the structures or to accept the pre-stated consequences of transgression. Further, it is important for them to provide a clear rationale for the structures to help the child understand and accept them. Finally, by acknowledging the child's perspective and reflecting his or her feelings (for example, that he or she might not want to do the target behavior), adults can increase the likelihood of the child's being willing to accept the structures (Deci, Eghrari, Patrick, & Leone, 1991; Koestner et al., 1984).

These behaviors on the part of the parents or teachers emanate naturally from an attitude that favors and sup-

ports the child's taking initiative, exploring, and experimenting rather than having to behave in particular ways. Such an attitude can have positive effects on the motivation, achievement, and adjustment of special education as well as regular education students. Thus, it seems imperative that considerably more research and discussion be directed toward understanding how to promote autonomy and competence among special population students, rather than falling back on the more traditional—and potentially detrimental—strategy of controlling the students' behavior.

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