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Developmental stage of performance in reasoning about school bullying

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ABSTRACT

The Student-Bully Problem, an assessment of cognitive developmental stage adapted from Commons et al.'s (2006) Counselor-Patient Problem, was administered to 176 adolescent participants and 77 adult participants at an urban high school, urban middle school, and mid-size college ($N = 253$). This study investigated the following inquiries: At what cognitive developmental stages (as defined by the Model of Hierarchical Complexity) do urban high school and middle school students reason about bullying? How effective is the Student-Bully Problem at measuring cognitive developmental stage? Item and person Rasch scores were used to identify each participant's cognitive developmental stage of performance on the Student-Bully Problem, and to identify the item difficulty of the Student-Bully Problem's items. The Rasch analysis was also used to assess the validity and reliability of the Student-Bully Problem. Participants performed at the preoperational through metasystematic stages on the Student-Bully Problem. The Student-Bully Problem proved to be a useful tool in assessing cognitive developmental stage of performance in reasoning about bullying in school age youth. The Student-Bully Problem was modified with the goal of improving the instrument's effectiveness. Consequently, the Student Bully Problem (2.0) was created and administered to 116 urban high school students. Initial results (see discussion) indicate the modified version could be more effective

KEYWORDS: bullying, cognitive development, high schools, middle schools, peer harassment, stage theory

Over the last two decades, bullying has been a serious problem for public schools across the United States as well as globally (Coloroso, 2003; Felix & McMahon, 2006). Aside from having a significantly negative effect on students' academics, bullying can threaten the safety of school environments, as seen in many tragedies in the United States and around the world (Coloroso, 2003; Graham, 2006). In 1999, two reported victims of bullying killed 12 students, one teacher, and themselves at Columbine High School in Colorado. Statistics have shown a child is bullied every 7 minutes, and 80% of adolescents have reported being bullied. Bullying has been linked to depression, low self-esteem, and homicide. Merrell, Gueldner, Ross, and Isava (2008) found that bullying interventions (traditional bullying prevention programs) have modest positive outcomes, and do not have a significant effect on bullying behaviors in schools.

It is possible that a significant number of students respond to bullying in maladaptive ways, and that they do not respond positively to counseling because counseling interventions are not appropriate for the relevant cognitive developmental stages (or ability levels to reason about bullying) of students (Greene &Ablon, 2006). When discussing the effectiveness of counseling interventions for adolescents and children with anger management issues, Greene and Ablon (2006) stated that a

> *…child's difficulties are not due to a lack of motivation or to adult (counselor, parent, or teacher) ineptitude, but rather to a deficit in cognitive skills, and therefore programs based on rewarding and punishing are unlikely to achieve satisfactory results because incentive based programs do not train lacking cognitive skills, shifting cognitive set. (p. 30)*

Fajemidagba (1986) found that African adolescents might reach the stage of formal operations, but that the age of attainment can differ. The findings among Nigerian adolescents were similar to findings in Western cultures:

> *The implication of developmental stages for learning is that whatever a child is able to learn depends upon the child's level of cognitive functioning, competence to learn and the suitability of the learning or curriculum items. To assist students to move from a lower stage to the next higher stage of cognitive functioning, they must be confronted only with those curriculum*

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> *items which can be understood by them in their present stage and at the same time, the curriculum items must add to and challenge their modes of reasoning. (Fajemidagba, 1986, p. 26)*

A counseling approach where the same type of intervention is used for students of varying stages of cognitive development could result in a large number of cases of ineffective interventions. Rather, counselors should try to fit the intervention to the student's cognitive developmental stage.

In this study, bullying will be defined as physical, verbal, or psychological abuse, which occurs between students in the school setting (Juvonen, Nishina, & Graham, 2006). It is perpetrated by the bully with the deliberate intention of causing harm to the student victim of bullying (Solberg, Olweus, &Endresen, 2007). In order to qualify as bullying, the bully must possess more power than the bullied peer, and the bully must intend to do physical or psychological harm to the harassed peer (Coloroso, 2003, p. 13). The word *bullying*, as used in this paper, will be synonymous with the terms *peer harassment* and *peer victimization*.

Research questions

This study set out to investigate the following inquiries: At what stages of cognitive development (preoperational, primary, concrete, abstract, formal, systematic, or metasystematic) do urban high school and middle school students reason about bullying? How effective is the Student-Bully Problem at measuring cognitive developmental stage in adolescent students?

» REVIEW OF RELATED LITERATURE

Defining bullying

Horne, Stoddard, and Bell (2007) indicate that bullying is a subset of aggression, which is a typical problem found in schools, and acts of aggression might cause either physical or psychological harm. Coloroso (2003) defined bullying as a "conscious, willful, and deliberate hostile activity intended to harm, induce fear through the threat of further aggression, and create terror" (p. 13). Bullying includes an imbalance of power, the intention to harm others, threats of further aggressive acts, and terror. Furthermore, intimidation can be used by the bully to terrorize the student victim of bullying and to help the bully maintain a power imbalance (Coloroso, 2003). Olweus (as cited in Schuster & Maxmilian, 1996) identified bullying behaviors as repeated negative actions by one or more persons that are intentional attempts to hurt or make another person uncomfortable.

Types of bullying

Physical Bullying is the most obvious, observable form of bullying, and might manifest itself in a punch, kick, push, property destruction, throwing of an object, spitting, or in many other ways (Coloroso, 2003). Teasing/psychological bullying is a frequent part of routine social interactions, and could have an adaptive or maladaptive function. Keltner et al. (2001) defined teasing as "an intentional provocation accompanied by playful, off-record markers directed by one person toward another that comments on something of relevance to the target" (p. 229).

Socially excluding students from a peer group or from activities can be another form of bullying (MacDonald & Leary, 2005). Coloroso (2003) defined relational bullying as socially excluding, ignoring, isolating, or shunning others. The spreading of rumors or gossip about someone is categorized as relational bullying (p. 17). In Europe, relational bullying has even been documented in the workplace (Schuster &Maximilians, 1996).

Feinberg and Robey (2008) defined cyberbullying as the sending or posting of negative and cruel text as well as electronic images via the Internet. Whether it happens at school or off-campus, cyberbullying disrupts and affects all aspects of students' lives. Increasingly, students in this age group are setting up online profiles, such as on social networking sites (Enough Is Enough; as cited in Feinberg & Robey, 2008). Cyberbullying is increasingly convenient for students as some cellular phone providers make limitless text messaging and Internet access more affordable. Considering cellular phones are widely used by middle and high school students, it can be expected that cyberbullying will become more prevalent and convenient.

Effects of bullying

Littleton Colorado experienced the most extreme case of peer violence in 1999 when two high school students murdered 13 people at their high school, and then committed suicide. Six years later, in 2005, a high school student from Minnesota murdered five students, a security guard, his grandfather, and later committed suicide. It has been suggested that both of these events have links to bullying (Green, 2007). Garbarino and DeLara (as cited in Honig, 2002) conducted interviews with adolescents and found that bullying, peer harassment, intimidation, teasing, and threats exist in many schools and impede learning while creating an environment of fear. Further, these insidious behaviors at school can encourage students to dropout and increase the rate of deviant behaviors in a school. Garbarino and DeLara indicate that 160,000 students actively avoid their schools, and thousands drop out as a result of an overpowering fear of being bullied.

Bullying can be unpredictable and traumatic for student victims, which could facilitate anxiety and anxiety disorders. Mineka and Zinbarg (2006) note that a perceived lack of control and inability to predict stressful events can cause anxiety. Clearly, student victims of bullying might perceive a lack of control over the bully's actions, and find it difficult to predict when the bully will decide to carry out bullying behaviors. Also, it could be difficult for the student victim of bullying to predict what types of bullying behaviors the bully might carry out at a given time (Mineka & Zinbarg, 2006). "Unpredictability, novelty, low sense of control, and threat to the ego" are causes of stress (Plaford, 2006, p. 75). Both bullied girls and boys have reported being suicidal more than their nonbullied peers (Kerlikowske, 2003).

Farrell et al. (2006) discovered that the quantity of problem situations experienced by students in school has a positive relationship to aggression, delinquency, depression as well as anxiety, and has an inverse relationship to self-worth. Mrug et al. (2008) determined that 78.2% of adolescents in their study reported observing threats or violence in school, and 22.3% reported being a

student victim of threats or violence. Overall, 80% of adolescents reported some degree of exposure to violence in school while 34% reported some exposure in the community, and 13% indicated exposure at home (Mrug et al., 2008).

Cognitive developmental stage and stage theory

"To think, means, above all, to understand; and to understand means to arrive at the transformations, which furnish the reason for the state of things" (Piaget, 1961, p. 275). Theories of cognitive developmental stage and reasoning involve "…an ordered sequence of stages through which individuals progress as their reasoning matures" (Davison et al., 1980, p. 121). With regard to developmental stages of moral reasoning, Snarey, Reimer, and Kohlberg (1985) indicated that stage sequence should be invariant, move upward, progress gradually, be sequential, and not regress more than can be accounted for by expected scoring errors. As an individual progresses through stages, no stage should be skipped.

Hierarchical complexity and task difficulty

"Tasks are defined as sequences of contingencies, each presenting stimuli and requiring behaviors that must occur in some non-arbitrary fashion" (Commons & Miller, 2001, p. 226). Hierarchical complexity is a task property and one type of task difficulty. Generally speaking, hierarchical complexity has been described as the number of concatenation operations within a task. Concatenation is when two or more, lower-order tasks are nested within higher-order tasks. New task required actions are one order higher in complexity than the lower task required actions that they are derived or built from. (Commons & Miller, 2001).

Rasch analysis

The Rasch model is "…a well-established psychometric model that is particularly well-suited for examining patterns of performance in developmental data" (Dawson-Tunik et al., 2005, p. 164). When an individual develops a new concept, cognitively, hierarchical integration is involved, which is when a new concept is built (at a new level) through the coordination of conceptual elements from the previous level (Dawson-Tunik et al., 2005). A new concept is more hierarchically complex than an older concept because the newer concept integrates "…earlier knowledge into a new form of knowledge" (p. 165). Considering stages are successive hierarchical integrations, developmental stage sequence must progress without the omission of stages. The Rasch model examines "hierarchies of person and item performance, displaying both person proficiency and item difficulty estimates along a single interval scale (logit scale) under a probabilistic function" (Dawson-Tunik et al., 2005, p. 172). Rasch analysis can be used to analyze a unidimensional attribute, such as a specified type of human development, and it transforms ordinal data into interval data by calculating the natural logarithms of raw data (Bond & Fox, 2001).

The model of hierarchical complexity (MHC)

The MHC defines cognitive developmental stage as the performance required to accomplish a task of a specific order of hierarchical complexity as defined by the MHC (Commons et al., 1998). Using Rasch (1980) analysis, Commons, Goodheart, and Dawson (1995) found that hierarchical complexity of a given task (that is completed) predicts stage of a performance, the correlation being $r = .92$ (Commons et al., 2005).

The MHC defines 15 orders of hierarchical complexity (OHC) and the cognitive developmental stages that correspond to the OHC. Stages in the MHC (and their corresponding numbers of hierarchical complexity) are: calculatory stage (0), sensory and motor stage (1), circular sensory and motor stage (2), sensory-motor stage (3), nominal stage (4), sentential stage (5), preoperational stage (6), primary stage (7), concrete stage (8), abstract stage (9), formal operational stage (10), systematic stage (11), metasystematic stage (12), paradigmatic stage (13), and the (14) crossparadigmatic stage (Commons et al., 2005).

» METHODOLOGY

Participants

There were 176 adolescent and 77 adult volunteers in the Northeastern United States who participated in the author's dissertation research study in 2011. More specifically, adolescents from an urban school district, teachers from the same urban school district, and college professors and college students from the Northeastern United States participated in this research study. A convenience sample of adolescents enrolled in mainstream English classes was taken, and included: 6th- through 12th-grade students. However, 7th-grade students were omitted because they were not available at the time of the study. Mainstream English classes include students in college preparatory and higher level English classes. More precisely, students in each grade were enrolled in the following levels of English: college preparatory, honors, pre-advanced placement, and advanced placement. There were 86 female student participants, and 90 male student participants. Student participants had 19 countries of origin, and nine states of origin within the United States. Approximately 34% of student participants indicated English as their second language.

The student body at the urban school district is made up of: 4.4% African American students, 8.4% Asian students, 33.5% Hispanic or Latino students, 2.7% multiracial students, 0.7% Native American students, 0.1% Native Hawaiian or Pacific Islander students, and slightly under 50% White students. There are 51.3 % male students and 48.7% female students.

Adolescents were also selected from a junior high school in the same urban district, which contains 429 students, mostly ranging from 12 to 14 years of age. The student body consists of: 59.4% White students, 32.2% Hispanic or Latino students, 3.5% African American or Black students, 2.3% Asian students, 1.9% multiracial students, and 0.7% Native American students. Approximately 58% of students are classified as low-income students.

Instruments

Paying attention to the axioms and premises of the MHC, an instrument containing scored or staged vignettes was carefully adapted from the Counselor-Patient Problem (Commons, 2006) to assess cognitive developmental stage of performance in reasoning about bullying. First, the domain, general task, and purpose of the task were defined. Next, two groups of vignettes, and three sets of seven vignettes per group were created. Seven vignettes that

represented the seven cognitive developmental stages that were assessed in this research study were present in each set of vignettes, meaning each vignette was created to represent a single cognitive developmental stage and its corresponding order of hierarchical complexity (OHC) as defined by the MHC (Commons et al., 2005).

The adapted instrument, which includes different versions, was titled the Student-Bully Problem (SBP). Two groups (Assigned Seat & Pushing) of vignettes, with three sets of seven vignettes per group, were adapted for the purposes of this dissertation research study. The first adapted group of vignettes consisted of three slightly different sets of seven vignettes regarding an instance of covert or psychological bullying. Specifically, the bully takes another student's assigned seat. Students portrayed in each set of vignettes in this group are intended to demonstrate reasoning about bullying at varying orders of hierarchical complexity before reacting to the bullying. The second adapted group of vignettes also consists of three slightly different sets of seven vignettes involving an instance of bullying, but in this second group, the bullying is overt physical bullying. The bully pushes a student for no reason, and students described in the vignettes are intended to demonstrate reasoning about the bullying at varying orders of hierarchical complexity before reacting to the bullying.

When adapting the vignettes, many steps from Commons et al.'s (2005) Hierarchical Complexity Scoring System were followed. Domain is defined as performance in reasoning about school bullying. The general task is to read vignettes regarding student reasoning about school bullying (representing various cognitive developmental stages/OHC) and rate how well or poorly the student portrayed in each vignette reasons (on a Likert scale of 1–6). Purpose of the task is to identify the cognitive developmental stages that participants, in general, operate at when performing a reasoning task about school bullying (as defined by the MHC).

Each of the three sets of vignettes within a single group (Assigned Seat Group or Pushing Group) of the SBP varied slightly from the other sets within the group. Each vignette in a set represented a different level of hierarchical complexity and its corresponding cognitive developmental stage. Thus, each set contained vignettes representing seven orders of hierarchical complexity and their corresponding stages of cognitive development. The stages of cognitive development represented in the SBP differed slightly from the Counsleor-Patient Problem. More specifically, the preoperational stage was added to the SBP. This change was made because the Counselor-Patient Problem was used with adults while the SBP was mostly used with adolescents. The preoperational, primary, concrete, abstract, formal, systematic, and metasystematic stages defined by the Model of Hierarchical Complexity (Commons et al., 1998; Commons et al., 2006) were included in the SBP.

Like the Counselor-Patient Problem vignettes (Commons et al., 2006), the vignettes adapted for the SBP contain similar word counts (within five words), simple language, and brief sentences. Last names with the same letter count identify students in the vignettes, and the sex of the student is not revealed. Each vignette within a set has a similar lead in portion or beginning and a similar outcome or ending. The middle portion of the vignettes is varied to represent different orders of hierarchical complexity in reasoning about bullying and their corresponding cognitive developmental stages.

Structure of vignettes at each stage for the student-bully problem. When reading the description of how vignettes were structured at each particular stage (below), it is important to note the following: "*c*" represents a concrete instance or event, actor, place; "*v*" represents a variable; and "*R*" represents a relationship (or coordination).

Preoperational stage: order 6. At the preoperational order, minimal or no thought process precedes behavior. Simple, impulsive reactions follow social conflict. There is no capability for true counting (true counting is the ability to accurately attach number words to sets of randomly ordered objects). However, sets of ordered objects can be counted.

Primary stage: order 7. It is reality based, and a single perspective might be presented at one time. True counting, simple deduction, and simple one operation arithmetic and logic can be conducted.

Concrete stage: order 8. One may specify and talk about concrete instances, events, places, and actors (c_1, c_2, … these symbols represent specific events, places, or actors).

Abstract stage: order 9. Actual variables may be used at the abstract order. This means that words representing variations, such as "most," or other words representing something that varies can be used. Stereotypes and generalizations may be used. For example, a general group of people, like "teachers," might be referred to at this stage, as opposed to a reference to a specific person such as "my math teacher" (v_1, v_2, v_3…).

Formal stage: order 10. At the formal order, one relationship is operative ($v_n R_{n+1}$), and "If-then" logic may be used. Single variables outside of the relationship may be present.

Systematic stage: order 11. The systematic order consists of two or more relationships between variables, which form a system ($v_1 R_1 v_2$, $v_3 R_2 v_4$). Single variables may be present outside of these relationships between variables ($v_1 R_1 v_2$, $v_3 R_2 v_4$, v_5, v_6…).

Metasystematic stage: order 12. The metasystematic order consists of a relationship between two distinct systems, which are composed of relationships between variables. Single variables may be present outside of these relationships $\{(v_1 R_1 v_2)\ R_3\ (v_3 R_2 v_4), v_5, v_6\ldots\}$.

Commons et al. (2005) indicated that after vignettes are adapted or written according to the specifications set forth in the Hierarchical Complexity Scoring System, they should be piloted by having 30–50 participants rate the reasoning portrayed in each vignette on a rating scale of 1–6. Then, the data should be analyzed in a Rasch analysis to ensure that each vignette empirically represents

the intended order of hierarchical complexity. Overall, if the vignettes are ordered correctly, the Rasch analysis should show that the vignette with the highest order of hierarchical complexity (corresponding with the metasystematic stage in this case) is the most difficult for participants to order or to identify as the best reasoning. Conversely, most participants should order the vignette with the lowest order of hierarchical complexity (corresponding with the preoperational stage in this case) as the worst form of reasoning (Commons et al., unpublished).

Three versions of the Assigned Seat and Push groups of vignettes were created because errors or confounding variables in some of the vignettes (e.g., errors in writing or choice of vocabulary) could make it extremely difficult to identify problems with flawed vignettes. Creating several adapted versions of the instrument allows the researcher to "throw out" vignettes that are not representing their intended orders of hierarchical complexity after being piloted, modified, and piloted again. When the piloted items' (vignettes') orders of hierarchical complexity were regressed against the item difficulty (Rasch measures), sets of vignettes strongly supported the intended orders of hierarchical complexity (showing $r > .75$).

Procedure

Design. This research study is quantitative and descriptive in nature, and was designed to describe at what cognitive developmental stages urban middle school and high school students reason about bullying in school age youth. Two versions of the SBP instrument (Student-Bully Problem A, 1–1, 2–1 & Student-Bully Problem B, 1–2, 2–2) were administered to 6th through 12th-grade students (with the exception of 7th-grade students) in "mainstream" English classes. Additionally, junior high school teachers, high school teachers, college professors, and college students (from a midsize college in the Northeast) were administered the SBP. As suggested by Commons (personal communication, April 11, 2008), a relatively equal number of two slightly different versions of the SBP were distributed to participants in each administration group.

Parental consent and child/adolescent assent were attained, and the SBP instrument was administered to student participants. These participants were assigned one of the two versions of the instrument. The high school students who assented to participate in the study were assigned sequential subject identification numbers. The even assigned identification numbers were given the Student-Bully Problem (A, 1–1, 2–1) Survey, and the odd numbers were given the Student-Bully Problem (B, 1–2, 2–2) Survey. The survey was administered before classroom instruction began, and it took high school participants between 20 and 45 minutes to complete. The same process was repeated with middle school students.

At the start of the survey administration for middle and high school students, participants were given a paper copy of the SBP. Then, they were asked to complete a demographics page, and to stop upon completion of the demographics page. Once this was completed, they were asked to read the instructions and vignettes in the SBP Survey, and to answer all questions. Following completion, students handed in the SBP to the principal investigator who was present during the entire administration.

An informational e-mail about the study was sent to middle school and high school teachers along with a Survey Monkey link to the Student-Bully Problem Survey and the participation letter. The e-mail addresses of the teaching staff were acquired from the school district's administration, and the e-mail addresses were numbered. Those with odd subject numbers were sent a participation letter and a link to the Student-Bully Problem (A., 1–1, 2–1), which allowed them to anonymously submit answers via Survey Monkey. The same process was followed for teachers with even subject numbers, but they were given a link to Student-Bully Problem (B, 1–2, 2–2).

An informational e-mail about the study was sent to college professors and college students in a midsize college in the Northeast. The e-mail addresses of professors and students were acquired from the college administration. Each e-mail address on the list was assigned a number (consecutively). The e-mail contained a Survey Monkey link to the Student-Bully Problem Survey, including the participation letter. The e-mail addresses that were assigned an odd number were sent a link to the Student-Bully Problem (A, 1–1, 2–1), and the e-mail addresses that were assigned even numbers were sent the link to Student-Bully Problem (B, 1–2, 2–2). Answers were submitted anonymously via Survey Monkey. Adult participants took the survey at their convenience.

Rasch analysis

Participants' ratings of vignettes were coded in order to correctly associate each rating with the appropriate vignette, and set of vignettes (Assigned Seat or Push) from which the particular vignette belonged. Once all data were coded and organized in a matrix, a Rasch analysis (Bond & Fox, 2001; Linacre, 2009) was conducted. Rasch analysis obtains objective, fundamental, linear measures that are "… qualified by standard errors and quality-control fit statistics from stochastic observations of ordered category responses" (Commons et al., unpublished, p. 19). Logistic regression is used to minimize errors in item as well as person scores. Rasch analysis puts raw person and item scores on equal interval linear scales. Item scores are representative of item difficulty, and person scores are representative of a person's performance when dealing with an item of a particular difficulty (Commons et al., unpublished):

> *The linear measures created under the Rasch Model are item-free (item-distribution-free) and person-free (person-distribution-free). This means that the measures are statistically equivalent for the items regardless of which persons (from the same population) are analyzed, and for the people regardless of which items (from the same set) are analyzed. Analysis of the data at the response-level indicates to what extent these ideals are realized within any particular data set. The higher a person's performance score is relative to the difficulty of an item, the higher the probability of a correct response on that item by the participant. When a person's location on the latent trait is equal to the difficulty of the item, by definition, there is a 0.5 probability of a correct response. (p. 20)*

Table 1. Data matrix of participant ratings

Participants	Participant ratings						
Subject	**Preoperational**	**Primary**	**Concrete**	**Abstract**	**Formal**	**Systematic**	**Metasystematic**
S1a	3	2	5	4	3	3	3
S2a	1	2	3	6	4	6	6
S3a	1	2	4	6	4	4	5

Note. The subject ratings or numbers in Table 1 (under stage names) are from a 1–6 rating scale used by participants when rating vignettes. "1" represents worst reasons and "6" represents the best reasons. Ideally, low stage vignettes (like preoperational) would have lower ratings while high stage vignettes (like metasystematic) would have higher ratings.

Stage scores

After the person and item Rasch scores were derived from the Rasch analysis, item and person stage scores (as defined by the Model of Hierarchical Complexity) were calculated. This was done because "…the mean and standard deviation of a Rasch item score or a Rasch person score are not fixed in the same way the order of hierarchical complexity and stage are fixed" (Commons et al., unpublished, p. 21). Rasch scale parameters were transformed in order to ensure "their scale conformed" to the scale that stage is measured on when defined by the MHC. More specifically, the MHC measures stage on a scale from 0 through 14 where each number represents a distinct, hard stage.

The intended hierarchical complexity of each vignette was put in a regression analysis with the item Rasch score of each vignette. If the intended order of hierarchical complexity was correct, then the item Rasch score should be in agreement with the vignette's intended order of hierarchical complexity. For example, the item Rasch score representing the most difficult item should highly correlate with the highest ordered or staged vignettes (12th order of hierarchical complexity/metasystematic stage in this research study), and conversely, the lowest item Rasch score should highly correlate with the lowest ordered or staged vignette (6th order of hierarchical complexity/preoperational stage in this research study). The extent to which the item Rasch scores were in agreement with the vignettes' intended orders of hierarchical complexity defined validity and reliability of the SBP's items. It was expected that the adapted instrument in this study would prove highly valid and reliable since the Counselor-Patient Problem instrument (Commons et. al, 2006), which it was adapted from, proved highly valid and reliable. Since Rasch analysis measures person performance as well as item difficulty (Bond & Fox, 2001), the analysis also revealed how participants performed on the task of rating how well or poorly students portrayed in the vignettes reasoned about bullying.

The researcher used an assessment based on the Model of Hierarchical Complexity stage theory because it is quantitative in nature and could be adapted to the relevant area of study: bullying. Therefore, the instrument did not determine cognitive developmental stage based on physics tasks or other arbitrary tasks. This instrument was limited to assess how students performed on a reasoning task about bullying. Knowing how students reason in other contexts, such as physics or in more general contexts, might be helpful to counselors addressing bullying issues, but it should be more helpful to know at what cognitive developmental stages students, in general, reason about bullying.

» RESULTS

Coding the data

The collected data were coded, so responses to SBP (a) could be distinguished from responses from SBP (b). Additionally, data were coded, so data from Assigned Seat vignettes could be distinguished from data from Push vignettes. A data matrix was created to organize all participant ratings with their corresponding vignettes and their intended OHC (see Table 1).

The column headings above participant ratings in Table 1 represent the intended stage/order of hierarchical complexity (OHC) of Assigned Seat items. In order to differentiate Push items from Assigned Seat items, ratings for Push items were listed below the following headings: Preoperational 2, Primary 2, Concrete 2, Abstract 2, Formal 2, Systematic 2, and Metasystematic 2 (2 indicating Push items). This specific organization of the data prepared it to become input for a Rasch analysis with Winsteps Software.

Rasch analysis with student data

Data from this research study were analyzed in several different ways (student data only, student and adult data together, and adult data only). Student data was analyzed separately from adult data in order to identify how the Student-Bully Problem performed when solely administered to students; consequently, Rasch analysis of student data is reported here. All of the student data (6th through 12th grade) from the Assigned Seat vignettes were analyzed in one Rasch analysis, and all of the student data from the Push vignettes were analyzed in a second Rasch analysis. Following the Rasch analysis, output tables were created with Winsteps software to illustrate item difficulty and person performance. The rank measure tables for the Assigned Seat and Push data were produced to illustrate item difficulty on the Rasch scale. The person measure tables were produced to show person performance on the Rasch scale. Item and person Rasch scores were used to calculate person and item stage (as defined by the MHC), which is described later in the results section.

Reliability of the Rasch analysis

Rasch analysis is useful because it calculates person performance as well as item difficulty on a single continuum. Person performance measures are more reliable when it is highly probable that persons with higher Rasch measures are actually higher performers than those with lower Rasch measures. Item difficulty measures are more reliable when it is highly probable that items with higher Rasch measures are actually more difficult than those with the lower Rasch measures. In order to achieve high item reliability, you

Table 2. Item stage scores

	Preop.	Prim.	Conc.	Abs.	Formal	Syst.	Metasyst.
Intended order of HC	6	7	8	9	10	11	12
Assigned seat stage of item score	5.66	9.25	8.08	9.4	9.8	11.82	11.89
Push stage of item score	6.34	4.75	7.92	8.64	10.17	10.12	12.11

need a test with a large item difficulty range and/or a large sample of persons (Linacre, 2010). Rasch analysis output showed that data collected from Assigned Seat vignettes had a person reliability of 0.48, and an item reliability of 0.98. The person reliability of the data gathered from the Push vignettes was 0.71, and the item reliability was 0.96. Linacre (2010) indicated that approximately 0.70 and higher is adequate for person reliability. Different circumstances, such as a small number of items or a limited participant sample might decrease person reliability. Person reliability seemed relatively low for the Assigned Seat vignettes, but adequate for the Push vignettes. Lower person reliability could be caused by the small number of items in the SBP or by the limited participant population, which was from two schools in a single school district; adding items to the SBP might increase person reliability. The item reliability was quite high, which indicated that the item Rasch score (taken from the rank measure table in Winsteps) accurately reflected the difficulty of an item. However, some of the items were out-of-order, which was demonstrated when the item difficulty (item Rasch score) of some items (vignettes) was higher or lower than expected considering the intended OHC of those items. This likely indicated the intended OHC of some of the items was not adequately achieved. Item Rasch scores are discussed further in the person stage section of the results.

Stepwise regression

Rasch item scores were regressed against the items' intended OHC. One regression was conducted for the Assigned Seat vignettes and another was conducted for the Push vignettes. OHC was set as the independent variable, and Rasch item score was set as the dependent variable in the linear regression, which was conducted with SPSS software. With the Assigned Seat vignettes, OHC was shown to be a significant predictor of Rasch item score or item difficulty. More specifically, the results of the linear regression showed the following: $r = .877$, $r^2 = .77$, $p < .05$. With respect to the Push vignettes, it was also shown that OHC was a significant predictor of Rasch item scores, as the linear regression results showed: $r = .872$, $r^2 = .712$, $p < .05$.

After running the regression analyses, scatter plots with best-fit lines were generated. The scatter plot for Assigned Seat vignettes shows that the abstract (OHC 9) and primary (OHC 7) vignettes are substantially more difficult (or complex) than intended. Similarly, the scatter plot for the Push vignettes shows the abstract vignette is significantly more difficult (or complex) than intended.

Item stage scores

Item stage scores were calculated from the item Rasch scores by using the item stage formula defined by the MHC (Commons et al., unpublished). In the item stage formula shown below, Stage Mean_1 is the mean of item Rasch scores representing items at the single OHC being scored for item stage, and Stage Mean_2 is the mean of item Rasch scores representing items at the single OHC immediately higher than the item being scored. For example, if the preoperational item is being scored, then the mean of preoperational items' Rasch scores is Stage Mean_1, and the mean of the primary items' Rasch scores is Stage Mean_2. In this case, there were only two items to average at each order of hierarchical complexity (Assigned Seat & Push). For example, there was an item Rasch score for the preoperational Assigned Seat item, and a Rasch item score for the preoperational Push item. Item Rasch Score is the item Rasch score of the specific item for which Stage of Item is being calculated. "Item HC" refers to the intended order of hierarchical complexity of the relevant item. Item stage scores are compared to the intended OHC and their corresponding stages of cognitive development in Table 2. The stage of an item is calculated with the following formula (Commons et al., unpublished):

$$\text{Stage of Item} = \frac{\text{Item Rasch Score} - \text{Stage Mean}_1}{\text{Stage Mean}_2 - \text{Stage Mean}_1} + \text{Item HC}$$

Person stage scores

Each participant's stage, as defined by the MHC (Commons et al., 1998) was calculated with the following formula (Commons et al., unpublished):

$$\text{Stage of Person} = \frac{\text{Person Rasch Score} - \text{Stage Mean}_1}{\text{Stage Mean}_2 - \text{Stage Mean}_1} + \text{Item HC}$$

Person stage was calculated once with Rasch analysis output from the Assigned Seat data, and a second time with Rasch analysis output from Push data. Thus, person stage calculation did not actually require the calculation of a mean because there was only one item Rasch score at a single OHC for Assigned Seat vignettes, and there was only one item Rasch score at a single OHC for Push vignettes. Consequently, in this study, Stage Mean_1 equals Stage_1 (or item Rasch score 1), and Stage Mean_2 equals Stage_2 (or item Rasch score 2).

Ideally, the item Rasch score for each item/vignette would represent the intended OHC of that item/vignette and create linearity of stages. When this ideal is achieved, the Rasch analysis of data should produce decreasing item Rasch scores that are ordered from the lowest intended OHC to the highest intended OHC – without the mixing of orders. It is important to remember that the item at the lowest OHC should have the highest Rasch score, as the highest Rasch score indicates the least item difficulty. This linearity, or ideal of item Rasch scores representing items' intended OHC, is necessary to calculate person stage scores. If there is mixing of stages/OHC, some items must be collapsed into multistage items to establish the linearity needed to calculate person stage. If stage mixing demonstrates most items'

Table 3. Assigned seat vignettes with collapsed multistage items

Assigned seat item Rasch score	OHC	Stage name
1.02	6	Preoperational
0.08	7-8	Primary-concrete
-0.07	9-10	Abstract-formal
-0.46	11	Systematic
-0.6	12	Metasystematic

intended OHC was not achieved, then it would be impossible to create linearity by collapsing some items into one or more multistage items. In this research study, there was some mixing of item OHC. However, item Rasch scores represented the items' intended OHC to a degree allowing for collapsing of out-of-order items into multistage items, which created the linearity of orders necessary to calculate person stage scores.

Person stage scores for student assigned seat data

Rasch scores indicated that some of the items were out of order, which broke up the intended linearity of staged items. However, creating a few multi-stage items restored linearity, which is necessary when calculating person stage scores. The primary and concrete items had to be collapsed into a multistage item (Primary-Concrete), and the abstract and formal items had to be collapsed into a multistage item (Abstract-Formal). Transforming two items into a multistage item restored the ideal linearity with intended item orders of hierarchical complexity, but it made it impossible to assess primary, concrete, abstract, and formal items individually as intended. Consequently, results and calculations regarding these stages were less specific than desired, but still useful. A collapsed multistage category was created by averaging the participants' raw ratings that corresponded with the staged/ordered items being collapsed into one multistage category. Participants rated items with a 1–6 rating scale, so some of the ratings had to be rounded up or down, as the rating representing the multistage category had to be 1, 2, 3, 4, 5, or 6 and could not be any other number. In order to create a multistage category for the concrete and abstract stage items with a participant's data, the concrete and abstract ratings were averaged. For example, the ratings 5 (for the concrete item) and 4 (for the abstract item) were averaged to 4.5, and then the average was rounded to 5 (representing the "concrete-abstract" multistage). Abstract and formal items were also collapsed into a multistage item in the example below. The item headings of the multistage categories indicate the rating under the heading represents two different stages and not just a single stage item (see Table 3).

Table 4. Push vignettes with multistage categories

Push item Rasch scores (with multistage categories)	Push OHC	Stage name
0.69	6	Preoperational
0.28	7	Primary
0.16	8	Concrete
-0.52	9-10	Abstract-formal
-0.60	11-12	Systematic-metasystematic

Table 5. Reliability with multistage categories (for student data)

Reliability of assigned seat and push data with collapsed multistage categories	Person reliability	Item reliability
Assigned seat	.39	.99
Push	.59	.98

After the out-of-order items were collapsed into multi-stage categories, another Rasch analysis was conducted, and its output displayed the linearity necessary to calculate person stage (see Table 3).Using the person stage formula listed earlier in this section, person stage was calculated for each participant whom at least received a person Rasch score equal to the lowest order item (Pre-operational: OHC 6). Some participants' scores were less than the lowest order item and had to be eliminated (Richards, personal correspondence). It was possible to calculate person stage for 168 participants, and eight participants were excluded, as their person Rasch scores did not fit the model (falling below the preoperational item Rasch score). It was found that 21 participants performed at the preoperational stage, 88 participants (in total) performed at the primary and concrete stages, 28 (in total) performed at the abstract and formal stages, 20 performed at the systematic stage, and 11 performed at the metasystematic stage.

Person stage scores and student push data

Next, person stage was calculated from the Push vignette data. Transforming these items into multistage items restored the ideal linearity, but it made it impossible to assess abstract, formal, systematic, and metasystematic items individually, as intended. Therefore, results and calculations regarding these stages were less specific than desired, but still useful. A collapsed multistage category was created by averaging the raw ratings of participants for the items being collapsed into one multistage category, as with the out-of-order Assigned Seat items. After the stages were collapsed into multistage categories, another Rasch analysis was conducted, and its output displayed the linearity necessary to calculate person stage (see Table 4).

The number of participants for whom person stage could be calculated varied slightly from the Assigned Seat data, as some different participants had a person Rasch score below the preoperational item Rasch score. Person stage could not be calculated for 14 participants, which left a total of 159 participants whose person stage could be calculated. Four participants were at the preoperational stage, 13 were at the primary stage, 25 were at the concrete stage, 49 participants (in total) were at the abstract and formal stages, and 68 (in total) were scored at the systematic and metasystematic stages.

Stepwise regression with collapsed multistage categories

After the mixed or out-of-order stages were given linearity via the collapsing of multiple stages, which were out-of-order, it was possible to view how the data should look, ideally, when vignettes represent the correct orders of hierarchical complexity (Appendix C). When the Assigned Seat vignettes with multistage categories were regressed against item Rasch scores, the results

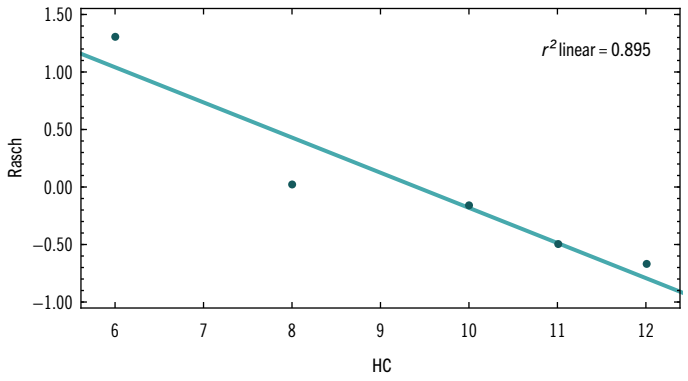

Figure 1. Assigned seat linear regression scatter plot with multistage categories

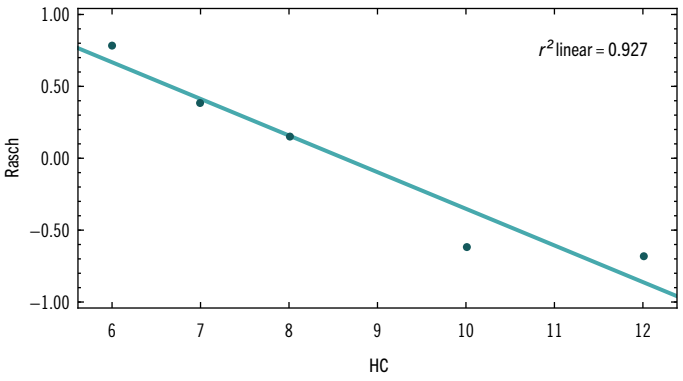

Figure 2. Push linear regression scatter plot with multistage categories

showed: $r = .946$, $r^2 = .895$, $p < .05$ (see Figure 1). The Push intended orders of hierarchical complexity (including multistage categories) were regressed against item Rasch scores and results showed: $r = .963$, $r^2 = .927$, $p < .05$ (see Figure 2). Table 5 illustrates the person and item reliability of Assigned Seat and Push data with collapsed multistage categories.

Similar to with the Assigned Seat data, when person stage scores were calculated from the Push data, single stage and multistage person stage scores were grouped in a linear fashion without much mixing.

Student Rasch variable maps for assigned seat

After a Rasch analysis for student participants was conducted for Assigned Seat and Push vignette data (with multistage categories), and person stage scores were calculated, two variable maps were produced (with Winsteps) in order to illustrate where person stage scores were placed on the Rasch scale in comparison to items. The first variable map showed where students' person stage scores calculated from Assigned Seat data fell on the Rasch scale in comparison to the items (see Figure 1 in Appendix C). This variable map made it clear that after out-of-order items were combined into multi-stage categories (primary-concrete; abstract-formal), person stage scores were distributed without much mixing of stages/orders of hierarchical complexity. Preoperational person stage scores were grouped together near the end of the Rasch scale indicating lowest item difficulty, and they were followed by the primary-concrete multistage person stage scores. Next, the Abstract-formal multistage person stage scores were grouped together. Then, the systematic person stage scores were grouped together, and finally, the metasystematic person stage scores were grouped at the end of the Rasch scale representing highest item difficulty. There was slight mixing of person stage scores, as one Primary-Concrete person stage score fell before the preoperational person stage scores, and two systematic person stage scores fell after the metasystematic person stage scores. Single stage and multistage items were ordered in a linear fashion from least to most item difficulty (preoperational through metasystematic) as expected given the item orders of hierarchical complexity.

Student Rasch variable map for push

Similar to with the Assigned Seat data, when person stage scores were calculated from the Push data, single stage and multistage person stage scores were grouped in a linear fashion - without much mixing. Preoperational person stage scores were grouped at the end of the Rasch scale representing low item difficulty, and the highest person stage scores were grouped at the end of the Rasch scale representing high item difficulty in a linear fashion (see Figure 2 in Appendix C). With the Push data, the highest person stage score was a person multistage score (systematic-metasystematic).

» DISCUSSION

Student-bully problem effectiveness

The Student-Bully Problem (SBP) Assigned Seat items proved to be effective in assessing at what cognitive developmental stages adolescents performed at on a reasoning task about bullying. Person stage scores were distributed in a logical manner considering the age of the participants (Commons et al., 1998). The majority of participants were scored at stages between primary and formal, and a minority of participants was scored at the highest and lowest stages. Further, person stage scores seemed to be logically distributed in a linear fashion along the Rasch scale variable map (Appendix C). However, the Assigned Seat items could have been more effective. Considering this was the first study using the Student-Bully Problem, it was expected that the items would not be as effective and refined as possible since they were not used and analyzed in prior studies. The item Rasch scores clearly showed that the primary and abstract ordered Assigned Seat items did not represent their intended orders of hierarchical complexity in this study. Even with these two out-of-order items, order of hierarchical complexity (OHC) was a significant predictor of item Rasch score ($r = .877$, $r^2 = .77$, $p < .05$).

Rasch analysis output showed that data collected from Assigned Seat items had a person reliability of 0.48, and an item reliability of 0.98. The relatively low person reliability could, in part, be attributed to the small number of Assigned Seat items (7 in total), but person reliability might have improved if the primary and abstract items better represented their intended orders of hierarchical complexity. Revisions that could improve

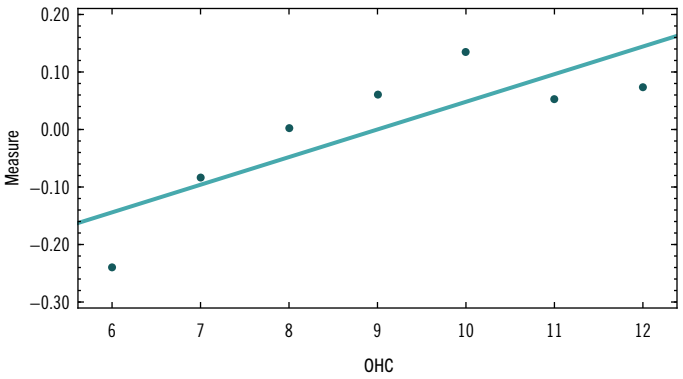

Figure 3. SBP 2.0 (a) & SBP 2.0 (b) Pushing the bully $r = 0.83$

Note. In Figure 3. "Measure" is "item Rasch score," and "OHC" is "order of hierarchical complexity." In this figure, a lower measure/item Rasch score corresponds to lower item difficulty and lower OHC. The preoperational stage has an OHC of 6, primary stage has an OHC of 7, concrete stage has an OHC of 8, abstract stage has an OHC of 9, formal stage has an OHC of 10, systematic stage has an OHC of 11, and metasystematic stage has an OHC of 12.

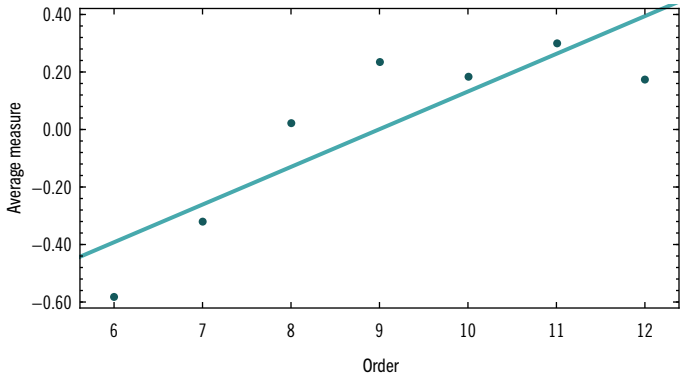

Figure 4. SBP 2.0 (a) & SBP 2.0 (b) Assigned seat $r = 0.86$

Note. In Figure 4 "Measure" is "item Raschscore," and "Order" is "order of hierarchical complexity." In this figure, a lower measure/item Rasch score corresponds to lower item difficulty and lower OHC.The preoperational stage has an OHC of 6, primary stage has an OHC of 7, concrete stage has an OHC of 8, abstract stage has an OHC of 9, formal stage has an OHC of 10, systematic stage has an OHC of 11, and metasystematic stage has an OHC of 12.

the Assigned Seat items are discussed later. Rasch output showed that item reliability was very high, meaning the estimated item difficulty of each item (ordered for hierarchical complexity) was highly accurate.

The Student-Bully Problem's Push items consisted of some items that performed well, but overall, the push items did not seem to assess participants as well as the Assigned Seat items. This was evidenced in the Rasch variable map for Push items (see Figure 2 in Appendix C), which displayed most participants at the highest stages. Given that an adolescent population was assessed, this result was not expected and could not be explained. Most participants should have been somewhere between the concrete and formal stages while either a minority of participants or no participants at all would have been expected to be scored at the lowest and highest stages. The person reliability of the data gathered from the Push vignettes was 0.71, and the item reliability was 0.96. Since Linacre (2010) indicates that approximately 0.70 and higher is adequate for person reliability, this seems like a good indication, but the issue here was that some Push items were out-of-order, and the higher stage items, in particular, seemed to be at a lower OHC than intended. The out-of-order items detracted from the good person reliability indicated by the Rasch output, as person reliability was partly based on person performance on items that did not represent their intended orders of hierarchical complexity. Order of hierarchical complexity was a good predictor of item Rasch score with Push items ($r = .872$, $r^2 = .712$, $p < .05$), but when considering that the systematic and metasystematic item represented lower OHC than intended, this significant relationship was not as meaningful as it seemed. However, it does indicate that if Push items are revised in a manner allowing them to better represent their intended OHC, then OHC should be a highly significant predictor of item Rasch score. The abstract item seemed to be the farthest from its intended OHC; it showed a much higher item Rasch score than expected, which was almost the same as the metasystematic stage item. There will be further discussion about specific Push items later in this section.

Student-bully problem 2.0 (SBP 2.0)

Based on analysis of the researcher's dissertation data described earlier, the Student-Bully Problem (SBP) was modified (SBP 2.0), and a research study was conducted in the spring of 2012 to assess the newly revised instrument. Since the Student-Bully Problem originally only had one item corresponding with each staged / ordered vignette, reliability could have been unnecessarily compromised. Consequently, the revised SBP (SBP 2.0) has five questions corresponding with each staged/ordered vignette. Vignettes were rewritten (see Appendix D) to correct some problems identified with the dissertation research, and also to make the vignettes more "user-friendly" to the reader. Since questions were added for each vignette, question content changed. The new questions corresponding to each vignette are:

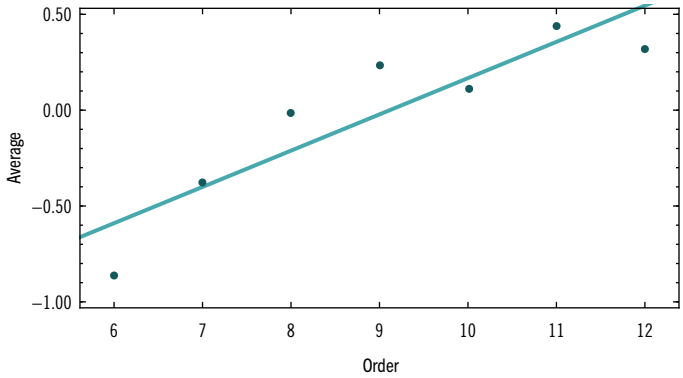

Figure 5. SBP 2.0 (b) Assigned seat $r = 0.90$

Note. In Figure 5 "Measure" is "item Raschscore," and "Order" is "order of hierarchical complexity." In this figure, a lower measure/item Rasch score corresponds to lower item difficulty and lower OHC.The preoperational stage has an OHC of 6, primary stage has an OHC of 7, concrete stage has an OHC of 8, abstract stage has an OHC of 9, formal stage has an OHC of 10, systematic stage has an OHC of 11, and metasystematic stage has an OHC of 12.

- How smart is (insert name) for saying this and acting this way?
- How much do you trust (insert name) to help you with a bully?
- How much do you look up to (insert name) for saying this and acting this way?
- How much trouble will (insert name) get in for saying this and acting this way?
- How much will the other student hate (insert name) for saying this and acting this way?

The SBP 2.0 vignettes are included in the appendix (Appendix D), and can be compared to the original SBP (Appendix A, Appendix B).The SBP 2.0 was administered to 116 urban high school participants from grades 9–12 (in the Northeastern United States) in the spring of 2012. A convenience sample was used and student participants were all in "mainstream" English classes. The demographics were similar to those reported for the dissertation research study. The SBP 2.0 was administered online (in classrooms) via Survey Monkey.

The results indicate it could be more effective than the original SBP, and provide further support that the SBP vignettes' OHC is a good predictor of item difficulty / Rasch measures. Scatter plots (see Figure 3 and Figure 4) show the intended order of hierarchical complexity of an item in the SBP 2.0 is a good predictor of item Rasch score or item difficulty. SBP 2.0 (a) and SBP 2.0 (b)'s "student pushing" vignettes demonstrated $r = .83$ when items' Rasch scores were regressed against the corresponding items' orders of hierarchical complexity / stage (see Figure 3). When a similar regression analysis was conducted for SBP 2.0 (a) and SBP 2.0 (b) "assigned seat," it was found that $r = .86$ (see Figure 4). The regression analysis carried out for SBP 2.0(b) "assigned seat" showed that $r = .90$ (see Figure 5).

Limitations

Clearly, there were limitations placed on the dissertation research study by the Student-Bully Problem survey that was used to collect data. Specifically, Rasch analysis demonstrated that some of the items did not represent their intended OHC. As a result, some items could not be differentiated from other items and were grouped together as a multistage item. This allowed for the linearity (of OHC) among items that was necessary to calculate person stage scores, but some of the stage scores were necessarily multistage scores, meaning that a person might have been scored Primary-Concrete. Primary-Concrete stage would simply indicate that the person was scored at either the Primary or Concrete stage, but the specific individual stage the person scored at could not be identified. Understanding the range of stages a person might be scored at can be useful, but the hope was that the Student-Bully Problem would identify precisely what individual stage of cognitive development a participant performed at on this task.

The revised version of the SBP, the SBP 2.0, supports the original version (as it is an adaptation of the original version / SBP), but performs better and holds more promise. It will be beneficial to collect and analyze more data with the SBP 2.0 to determine if it is a more effective or useful developmentally based instrument than the original SBP. ■

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» APPENDIX A

Student-bully problem (A, 1–1, 2–1)

The problem: A student leaves class to go to the bathroom. When getting back to class, another student is sitting in the student's seat. The student who went to the bathroom was assigned that seat by the teacher and used the seat all year. The following stories have students who deal with this problem the same way. But, *the reasons they have for how they deal with the problem are different*.

Directions: First, read all seven stories carefully. Then, read each story again and rate how good or bad the students' reasons are for how they deal with the problem. It does not matter if you agree with how the student deals with the problem. *You are only rating how good or bad the students' reasons are for how they deal with the problem.*

Kents is surprised the other student took Kents' seat. The other student ignores Kents. Kents wants the other student to move as soon as possible. Students have their own assigned seats for the whole school year. Kents tries to push the other student out of the seat. Kents failed to move the other student. Kents tells the teacher what happened.

Birch is surprised the other student took Birch's seat. The other student ignores Birch. Birch thinks about pushing the other student out of the seat. Pushing other students breaks school rules. If students break the rules, they will be punished. If Birch pushes the other student out of the seat, Birch will be punished. Birch tells the teacher what happened.

Moore is surprised the other student took Moore's seat. The other student ignores Moore. Moore thinks about pushing the other student out of the seat. Moore's friends had told Moore stories of how they got their seats back by telling the teacher what happened. Moore wants to try that, and hopes it will work. Moore tells the teacher what happened.

Stowe is surprised the other student took Stowe's seat. The other student ignores Stowe. Stowe thinks about pushing the other student out of the seat. Good students do not push other students at school. Only bad students push other students in school. The good students always report problems to an adult working in the school. Stowe tells the teacher what happened.

Riley is surprised the other student took Riley's seat. The other student ignores Riley. Riley screams and yells out loud at the other student to get out of the seat. Riley cannot push the other student out of the seat. Riley wants the seat back right away. The teacher is on the other side of the classroom. Riley tells the teacher what happened.

Green is surprised the other student took Green's seat. The other student ignores Green. Green thinks about pushing the other student. Pushing the other student breaks the school rules. Rules are made so students do not get hurt. Pushing a student could hurt that student and get Green in trouble for breaking the rules. Green tells the teacher what happened.

Smith is surprised the other student took Smith's seat. The other student ignores Smith. Smith considers what the other student would think if Smith stole a seat. If Smith broke the seating rule, Smith thinks it would violate another student's rights and the other student would find it fair if the teacher punished Smith. Smith wants to handle this problem fairly. Smith tells the teacher what happened.

Rate how good or bad the students' *reasons* are for how they deal with the problem by circling a number from 1 to 6. Circling "1" means you think the student had the worst reasons. Circling "6" means you think the student had the best reasons. All of the ratings do not need to be used and the same rating can be used for more than one student.

Kents	Worst reasons	1 2 3 4 5 6	Best reasons
Birch	Worst reasons	1 2 3 4 5 6	Best reasons
Moore	Worst reasons	1 2 3 4 5 6	Best reasons
Stowe	Worst reasons	1 2 3 4 5 6	Best reasons
Riley	Worst reasons	1 2 3 4 5 6	Best reasons
Green	Worst reasons	1 2 3 4 5 6	Best reasons
Smith	Worst reasons	1 2 3 4 5 6	Best reasons

The problem: A student is walking down the hallway to class. A larger student pushes the student in the back. The student falls to the floor and school books fall all over the floor. We do not know why the other student pushed the student to the floor in the first place. The following stories have students who deal with this problem the same way. But, *the reasons they have for how they deal with the problem are different.*

Directions: First, read all seven stories carefully. Then, read each story again and rate how good or bad the students' reasons are for how they deal with the problem. It does not matter if you agree with how the student deals with the problem. *You are only rating how good or bad the students' reasons are for how they deal with the problem.*

Price is surprised the other student pushed Price to the floor. The other student ignores Price. Teachers tell students it is wrong to push other students during school. Price wants to get the other student back for this. Price is angry and wants to push or kick the other student really hard. Price pushes the other student really hard.

Corey is surprised the other student pushed Corey to the floor. The other student ignores Corey. Students who break the school's rules are punished. Pushing is breaking the school's rules. Students who push other students to the floor should be punished. The other student should be punished for pushing Corey to the floor. Corey pushes the other student really hard.

Wells is surprised the other student pushed Wells to the floor. The other student ignores Wells. Wells thinks about pushing the other student back. Wells' friends told Wells the stories of how they pushed back when students pushed them for no reason. The friends said pushing back worked for them. Wells wants to try that. Wells pushes the other student really hard.

Bower is surprised the other student pushed Bower to the floor. The other student ignores Bower. Bower knows the other student always bullies students in school. Only bad students like to bully other students. Good students do not bully other students in school. This student is a bully. Bower wants to do something about the bully. Bower pushes the other student really hard.

Speer is surprised the other student pushed Speer to the floor. The other student ignores Speer. Speer screams and yells at the other student, and does not care how much bigger the other student is. Speer is very mad and can't calm down. Speer wants to push or kick the other student right away, really hard. Speer pushes the other student really hard.

Jones is surprised the other student pushed Jones to the floor. The other student ignores Jones. Pushing students is breaking the rules and results in punishment. Teachers give immediate punishment that is effective with students who break the school's rules. There are no teachers around to help, so Jones must punish the student effectively. Jones pushes the other student really hard.

Burns is surprised the other student pushed Burns to the floor. The other student ignores Burns. Burns considers what the other student thinks about being pushed. If Burns broke the no-pushing rule, Burns thinks it would violate another student's rights and the other student would want Burns punished. Burns wants the other student punished fairly, but a teacher isn't around. Burns pushes the other student really hard.

Rate how good or bad the students' *reasons* are for how they deal with the problem by circling a number from 1 to 6. Circling "1" means you think the student had the worst reasons. Circling "6" means you think the student had the best reasons. All of the ratings do not need to be used and the same rating can be used for more than one student.

Price	Worst reasons	1 2 3 4 5 6	Best reasons
Corey	Worst reasons	1 2 3 4 5 6	Best reasons
Wells	Worst reasons	1 2 3 4 5 6	Best reasons
Bower	Worst reasons	1 2 3 4 5 6	Best reasons
Speer	Worst reasons	1 2 3 4 5 6	Best reasons
Jones	Worst reasons	1 2 3 4 5 6	Best reasons
Burns	Worst reasons	1 2 3 4 5 6	Best reasons

Please answer the following questions by circling a number on each rating scale.

How much do you like to watch someone calling a person names or teasing them?

Not at all 1 2 3 4 5 6 Very much

How much do you like to watch someone getting physically pushed around?

Not at all 1 2 3 4 5 6 Very much

How often did you push someone around physically?

Never 1 2 3 4 5 6 Many times

How often did you call people names trying to upset them or trying to get people to laugh?

Never 1 2 3 4 5 6 Many times

How often have you been upset because someone pushed, kicked, or hit you for no reason?

Never 1 2 3 4 5 6 Many times

How often have you pushed, kicked, or hit someone first?

Never 1 2 3 4 5 6 Many times

How much were you or are you bullied in school (circle one)?

1) Never
2) 1 day
3) 1–4 weeks
4) 2–12 months
5) 1–2 years
6) 2 years or more

How bad is bullying?

Not bad at all 1 2 3 4 5 6 Totally bad

» APPENDIX B

Student-bully problem (B, 1–2, 2–2)

The problem: A student leaves class to go to the bathroom. When getting back to class, another student is sitting in the student's seat. The student who went to the bathroom was assigned that seat by the teacher and used the seat all year. The following stories have students who deal with this problem the same way. But, *the reasons they have for how they deal with the problem are different.*

Directions: First, read all seven stories carefully. Then, read each story again and rate how good or bad the students' reasons are for how they deal with the problem. It does not matter if you agree with how the student deals with the problem. *You are only rating how good or bad the students' reasons are for how they deal with the problem.*

Mason does not know why the other student took Mason's seat. The other student will not move. Mason wants to get the seat back. Teachers tell students to stay in the seats they were assigned for class. Mason thinks about yelling at the other student, but doesn't yell. Mason doesn't think the other student will listen. Mason tells the teacher what happened.

Lloyd does not know why the other student took Lloyd's seat. The other student will not move. The teacher gives students their own seats. Students who break the rules get punished in school. Students who steal other students' seats break the school rules. If Lloyd pushes the other student roughly, Lloyd will be punished. Lloyd tells the teacher what happened.

Dixon does not know why the other student took Dixon's seat. The other student will not move. Dixon wants to get the seat back. A friend told Dixon how the friend dealt with a student who stole a seat. The friend told on the other student to the teacher. Dixon thinks that could work and wants to try it. Dixon tells the teacher what happened.

Mills does not know why the other student took Mills' seat. The other student will not move. Mills knows that good students do not steal other students' seats. Only bad students take another student's seat without permission from the teacher. This other student must be bad. Teachers should know who the bad students are. Mills tells the teacher what happened.

Baker does not know why the other student took Baker's seat. The other student will not move. Baker screams and yells out loud at the other student to get out of the seat. Baker cannot calm down and threatens to hurt the other student. That is where Baker has sat all year. Baker cannot make the other student move. Baker tells the teacher what happened.

Heath does not know why the other student took Heath's seat. The other student will not move. The other student is breaking the seating rule. Students who break rules get punished by teachers. Heath wants to get the seat back without hurting the other student or breaking rules. The teacher is nearby and can help with this. Heath tells the teacher what happened.

Woods does not know why the other student took Woods' seat. The other student will not move. Woods considers what the other student thinks about the seating rule. If Woods broke the seating rule, Woods thinks it would violate another student's rights and the other student would find it fair if Woods was punished. Woods wants to handle this fairly. Woods tells the teacher what happened.

Rate how good or bad the students' *reasons* are for how they deal with the problem by circling a number from 1 to 6. Circling "1" means you think the student had the worst reasons. Circling "6" means you think the student had the best reasons. All of the ratings do not need to be used and the same rating can be used for more than one student.

Mason	Worst reasons	1 2 3 4 5 6	Best reasons
Lloyd	Worst reasons	1 2 3 4 5 6	Best reasons
Dixon	Worst reasons	1 2 3 4 5 6	Best reasons
Mills	Worst reasons	1 2 3 4 5 6	Best reasons
Baker	Worst reasons	1 2 3 4 5 6	Best reasons
Heath	Worst reasons	1 2 3 4 5 6	Best reasons
Woods	Worst reasons	1 2 3 4 5 6	Best reasons

The problem: A student is walking down the hallway to class. A larger student pushes the student in the back. The student falls to the floor and school books fall all over the floor. We do not know why the other student pushed the student to the floor in the first place. The following stories have students who deal with this problem the same way. But, *the reasons they have for how they deal with the problem are different.*

Directions: First, read all seven stories carefully. Then, read each story again and rate how good or bad the students' reasons are for how they deal with the problem. It does not matter if you agree with how the student deals with the problem. **Y***ou are only rating how good or bad the students' reasons are for how they deal with the problem.*

Ellis does not know the other student who pushed Ellis onto the floor. The other student walks down the hall after pushing Ellis. Pushing someone in a school hallway for no reason is breaking the school rules. Ellis wants to hurt the other student by pushing and kicking the other student. Ellis wants to get the other student back. Ellis pushes the other student really hard.

Clark does not know the other student who pushed Clark onto the floor. The other student walks down the hall after pushing Clark. The school rules say students who push others in school should be punished. Clark knows punishment has been given to students for pushing. Clark thinks the other student should be punished for pushing Clark to the floor. Clark pushes the other student really hard.

Evans does not know the other student who pushed Evans onto the floor. The other student walks down the hall after pushing Evans. Evans' parent told Evans to push other students if they push Evans in school for no reason. Evans wants to do what the parent said. Evans hopes that pushing the other student back will work. Evans pushes the other student really hard.

Flynn does not know the other student who pushed Flynn onto the floor. The other student walks down the hall after pushing Flynn. Flynn knows that good students do not push other students for no reason. Good students try not to break rules or cause trouble in school. Bad students cause trouble in school just like this one is. Flynn pushes the other student really hard.

Davis does not know the other student who pushed Davis onto the floor. The other student walks down the hall after pushing Davis. Davis yells at the other student and threatens to get the other student back. Davis is so angry at the other student and is out of control. Davis wants to hurt the other student right away. Davis pushes the other student really hard.

Allen does not know the other student who pushed Allen onto the floor. The other student walks down the hall after pushing Allen. School rules state that students who push someone should be punished. Adults working in the school should do the punishing. No adults were around to help, but the student should still be punished for pushing. Allen pushes the other student really hard.

Brown does not know the other student who pushed Brown onto the floor. The other student walks down the hall after pushing Brown. Brown considers what the other student thinks about being pushed. If Brown broke the no-pushing rule, Brown thinks it would violate another student's rights and the other student would want Brown punished. Brown wants to be fair, but can't find a teacher. Brown pushes the other student really hard.

Rate how good or bad the students' *reasons* are for how they deal with the problem by circling a number from 1 to 6. Circling "1" means you think the student had the worst reasons. Circling "6" means you think the student had the best reasons. All of the ratings do not need to be used and the same rating can be used for more than one student.

Ellis	Worst reasons	1 2 3 4 5 6	Best reasons
Clark	Worst reasons	1 2 3 4 5 6	Best reasons
Evans	Worst reasons	1 2 3 4 5 6	Best reasons
Flynn	Worst reasons	1 2 3 4 5 6	Best reasons
Davis	Worst reasons	1 2 3 4 5 6	Best reasons
Allen	Worst reasons	1 2 3 4 5 6	Best reasons
Brown	Worst reasons	1 2 3 4 5 6	Best reasons

Please answer the following questions by circling a number on each rating scale.

How much do you like to watch someone calling a person names or teasing them?

Not at all 1 2 3 4 5 6 Very much

How much do you like to watch someone getting physically pushed around?

Not at all 1 2 3 4 5 6 Very much

How often did you push someone around physically?

Never 1 2 3 4 5 6 Many times

How often did you call people names trying to upset them or trying to get people to laugh?

Never 1 2 3 4 5 6 Many times

How often have you been upset because someone pushed, kicked, or hit you for no reason?

Never 1 2 3 4 5 6 Many times

How often have you pushed, kicked, or hit someone first?

Never 1 2 3 4 5 6 Many times

How much were you or are you bullied in school (circle one)?

1) Never
2) 1 day
3) 1–4 weeks
4) 2–12 months
5) 1–2 years
6) 2 years or more

How bad is bullying?

Not bad at all 1 2 3 4 5 6 Totally bad

APPENDIX C

Variable map figures

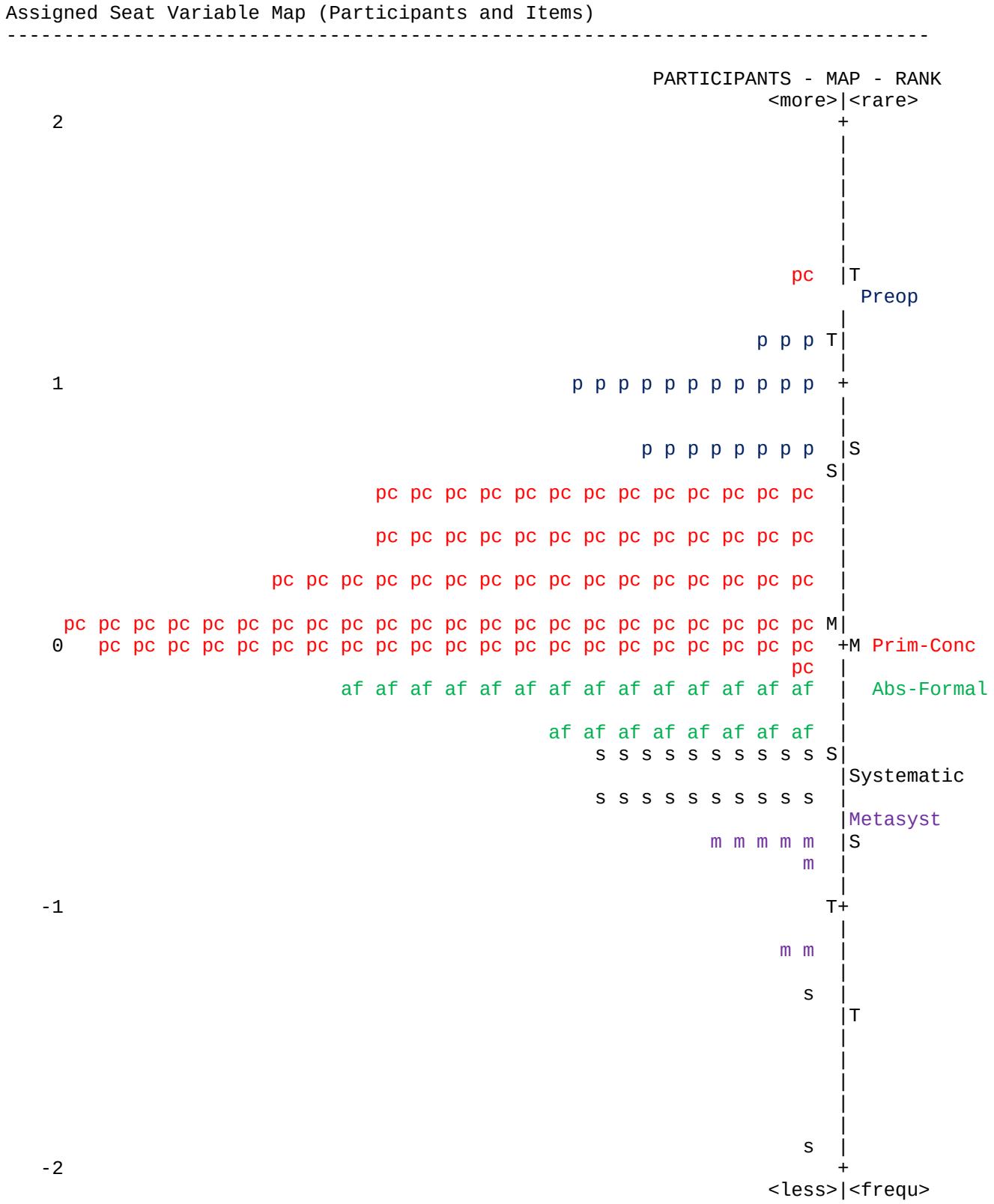

Figure 1. Assigned seat person stage score variable map with multi-stage categories (students)

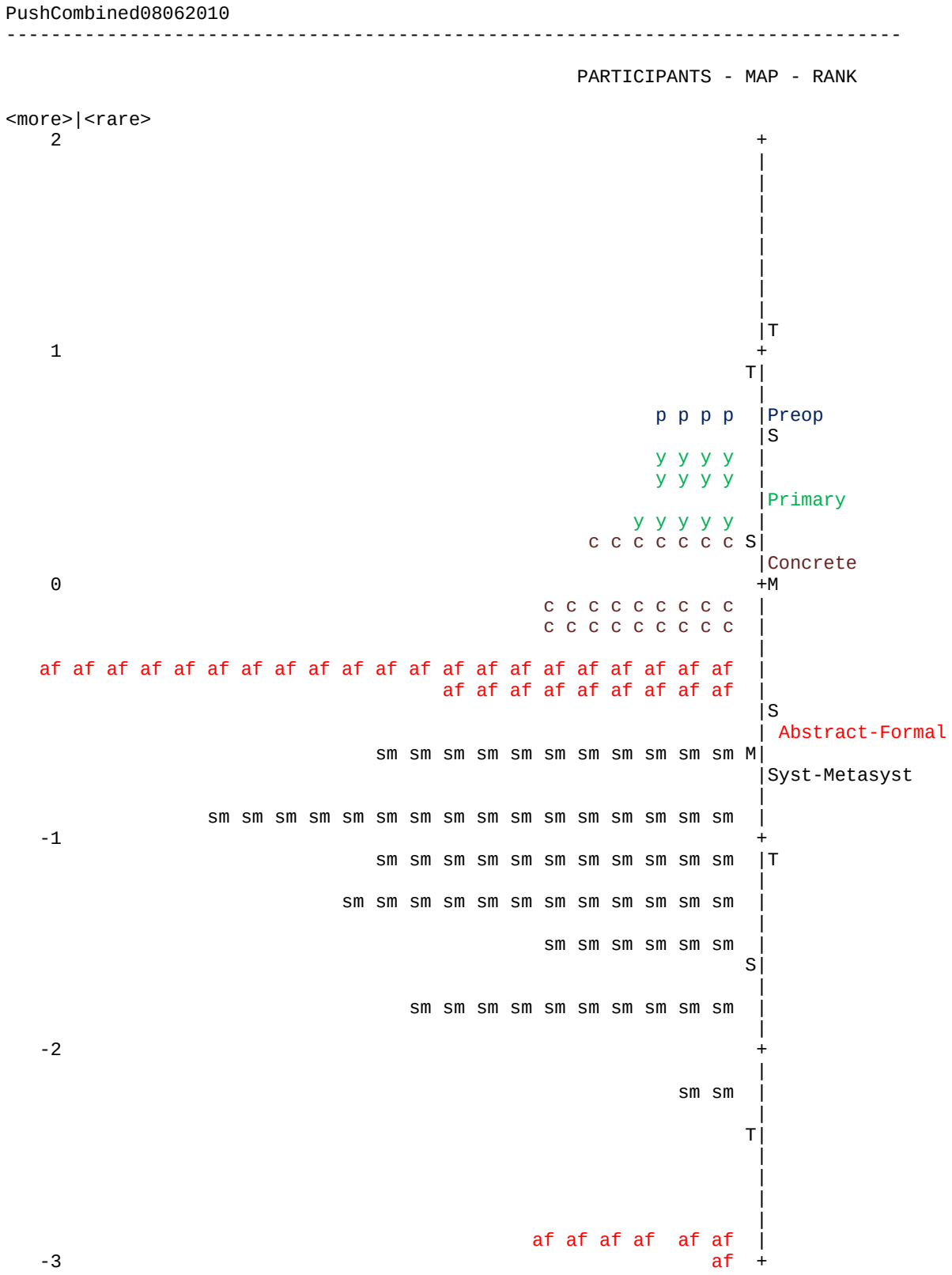

Figure 2. Push person stage score variable map with multi-stage categories (students).

» APPENDIX D

Student-bully problem 2.0 (A) & (B) vignettes

Student-bully problem 2.0 (a) / assigned seat vignettes
03/30/2012 Joaquim

Moore says, "That was my seat in class, and you liked stealing it from me. My friend told me I can get that seat back if I tell the teacher. I will do what my friend said." Moore tells the teacher what happened.

Riley says, "Get out of my seat right now," and screams really loud! "Give me my seat back right away. I am so angry." Riley pushes the other student. The other student does not move. Riley tells the teacher what happened.

Birch says, "Teachers say pushing other students breaks the school's rules. Students who break rules like this may be punished. If some students push other students, then teachers should be the adults to punish them for it." Birch tells the teacher what happened.

Smith says, "What would the other student say and do if I stole a seat? Breaking the seating rule violates another student's rights. The other student would say it was fair if the teacher punished me. I will handle this fairly." Smith tells the teacher what happened.

Green says, "Pushing a student breaks school rules. Rules are made so students do not get hurt at school. Pushing could hurt a student and breaks the rules, so teachers should punish any student who pushes." Green tells the teacher what happened.

Kentssays, "The teacher gave each student one seat for the school year. The teacher told me that is my seat for the school year." Kents pushes the other student, but does not get the other student out of the seat. Kents tells the teacher what happened.

Stowe says, "Sometimes students push other students out of their seats in school. Teachers tell students they should never push or hit other students. Teachers always say that they will help. Students should report problems. Stowe tells the teacher what happened.

Student-bully problem 2.0 (A) / push vignettes

03/30/2012 Joaquim

Bower says, "The other student likes to bully me and students in school. Teachers say students should never be bullying each other in school. Teachers are always telling students to be nice to other students. This student is acting like a bully." Bower pushes the other student really hard.

Jones says, "Pushing students is breaking the rules and results in punishment. Teachers give immediate punishment that is effective with students who break the school rules. There are no teachers around to help with this, so I must punish the student effectively." Jones pushes the other student really hard**.**

Burns says, "I will consider what the other student would do or say after being pushed. If I break the no-pushing rule, it violates the other student's rights, and the other student would punish me. I want the other student punished fairly, but a teacher is not around." Burns pushes the other student really hard.

Speer says, "Get up!" and screams and yells at the other student. "I do not care how much bigger you are than me." Speer is very mad and does not calm down. "I am going to push and kick you really hard right now."Speer pushes the other student really hard.

Corey says, "Sometimes students break the rules in school. Students who break the school rules should be punished. Pushing and hitting is breaking the school rules. If some students act like bullies and push other students, then someone should punish them for it." Corey pushes the other student really hard.

Price says, "The teacher told the class not to push or be rough with each other in school. I am going to get the other student back for doing this. I am angry and will push the other student to the floor." Price pushes the other student really hard**.**

Wells says, "The other student likes pushing me. My friends told me the stories of how they pushed back when students pushed them for no reason. My friends said pushing back worked for them. I am going to do what the friends say will work." Wells pushes the other student really hard.

Student-bully problem 2.0 (B) / assigned Seat

03/30/2012 Joaquim

Dixon says, "The other student liked stealing the seat. A friend told me how the friend dealt with a student who stole a seat. The friend told the teacher what happened. I am going to do what the friend says will work." Dixon tells the teacher what happened.

Baker says, "Get out of my seat!" Baker screams and yells. Baker does not calm down and threatens to hurt the other student. The other student does not move and does not listen to what Baker says. Baker runs to the teacher's desk. Baker tells the teacher what happened.

Lloyd says, "The teacher gave students assigned seats. All students do not follow school rules. The other student broke the seating rule. Pushing the other student breaks school rules too. When students break rules, then teachers should know about it." Lloyd tells the teacher what happened**.**

Woods says, "I will consider what the other student would do or say if I stole a seat. If I break the seating rule, it would violate another student's rights. The other student would find it fair if I was punished. I should handle this fairly." Woods tells the teacher what happened.

Heath says, "The other student is breaking the seating rule. Teachers punish students for rule-breaking. I will get the seat back without hurting the other student or breaking rules. When teachers help with problems, students do not get hurt and rules are not broken." Heath tells the teacher what happened.

Mason says, "I am going to get the seat back. The teacher said to stay in the same seat for the school year. I am going to yell at the other student for this. The other student did not listen last time." Mason tells the teacher what happened.

Mills says, "Teachers have told students not to take other students' seats. Sometimes students do not listen to what teachers say. Teachers ask that students always listen to them. Sometimes, teachers will help out students who lose their seats in school." Mills tells the teacher what happened.

Student-bully problem 2.0 (B) / push

03/30/2012 Joaquim

Flynn says, "Most of the students I see never push other students around. Teachers always tell students not to break the rules or cause trouble in school. Some students will cause trouble in school just like this one." Flynn pushes the other student really hard.

Allen says, "Bullies who push another student should be punished by teachers. When teachers are not around to help, students have to deal with their own problems. When a teacher is not around, a bully still needs punishment." Allen pushes the other student really hard.

Brown says, "I should consider how the other student would react after being pushed. If I push the other student, it violates that student's rights, so the other student would have me punished. I should be fair, but the teacher will not help." Brown pushes the other student really hard.

Davis says, "Get back over here right now! I am going to hurt you!"Davisyells and screams at the other student and is out of control. Davishurtsthe other student right away by pushing and kicking. Davis pushes the other student really hard.

Clark says, "School rules say students cannot push. Different people punish students in school. Sometimes teachers punish students. Teachers do not always see what happens. When teachers do not see what happens, then someone should punish students for pushing." Clark pushes the other student really hard.

Ellis says, "The teacher told us that pushing in the hallway is breaking the school rules. I am going to get the other student back for this. I will hit or push the other student." Ellis walks after the other student. Ellis pushes the other student really hard.

Evans says, "The other student liked pushing me down. The last time a student pushed me in school, my parent said to push the other student back. I want to do what my parent told me to do." Evans pushes the other student really hard.