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Proportional, Combinatorial, and Correlational Reasoning

A Manual Including Measurement Procedures and Descriptive Analyses

Study „Individual Development and Social Structure"
Data Handbooks Part 4

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0. Introduction

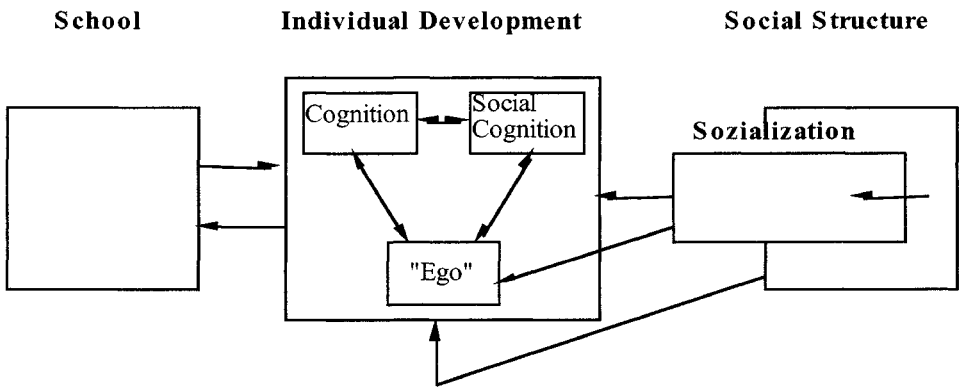
0.1. Background of the study

The data of this handbook are part of the longitudinal study "Child Development and Social Structure" (IDSS), that was taken up in 1976 (Edelstein, Keller & Schröder, 1990).

The aim of the study was to analyze the developmental trajectories of Icelandic children in cognition (Schröder 1989, 1992) and social cognition (Keller & Edelstein, 1991; Keller & Edelstein, 1993) and to investigate personality dimensions and ego resources (Hofmann, 1991; Schellhas, 1993) against the background of socio-structural constraints in a society undergoing an accelerated modernization process (Björnsson & Edelstein, 1977).

Figure A specifies the hypothetical relationships between the psychological and the sociological dimensions.

Figure A Hypothetical model of developmental relationships



0.2. Design of the 'IDSS'- Study

The first Wave of data collection happened in 1976/77 in Reykjavik. The children attended the first grade of primary school and were between 7 and 8 years old. The following measurement occasions including the Reykjavik sample happened at the ages of 8, 9, 12, 15, 17, 19 and 22.

A further sample from three rural communities was measured two years after the investigation of the urban sample (Tab. A) successively.

Table A: Measurement occasions of the IDSS-Study

	Urban Sample	Rural sample	Age	Grade
Wave 1	1976/77	1978	7	1
Wave 2	1977/78		8	2
Wave 3	1978/79	1980	9	3
Wave 4	1981/82	1983	12	6
Wave 5	1984/85	1986	15	9
Wave 6	1986/87		17	
Wave 7	1988/89		19	
Wave 8	1991/92	1991/92	20 (rur) 22 (urb)	

0.3. Sampling Design

The population, from which the Reykjavik sample (N=121) was selected, had been stratified according to three analytically relevant dimensions:

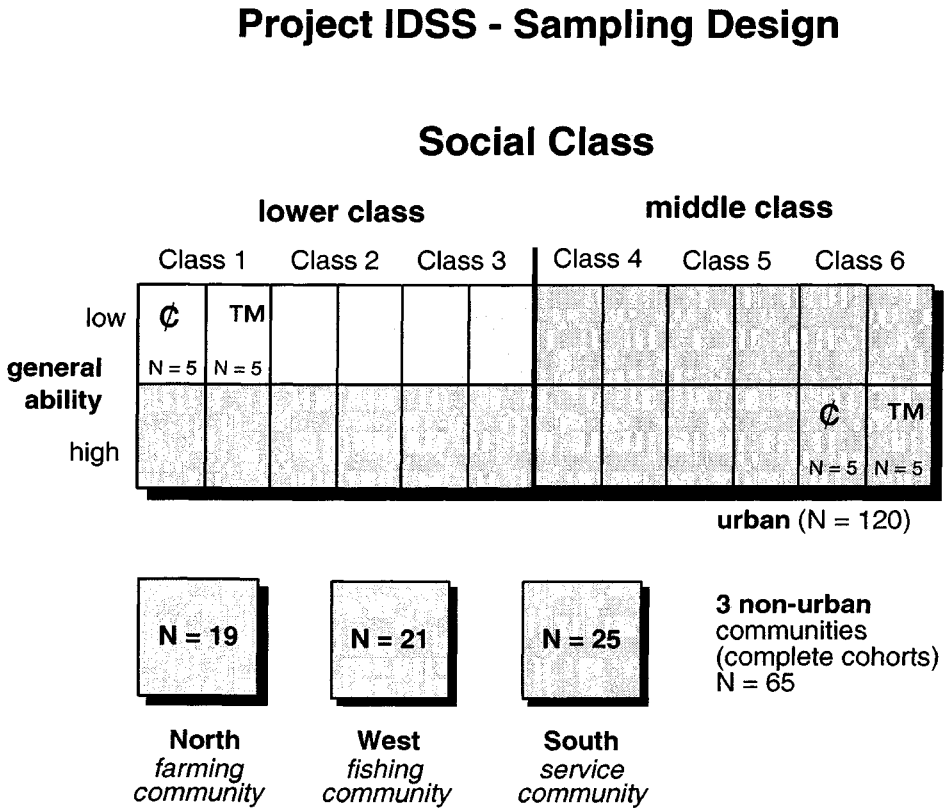
1) according to the children's sex;

2) according to the social status of the parents as an indicator for developmentally advantageous resources or for possible impediments of the socialization conditions and the life worlds of children and

3) according to the general ability level at the onset of schooling (Figure B).

An additional sample (N = 65) includes the entire birth cohorts of three rural communities in Iceland, assumed to represent different contexts of socialization, modernization and three typical lifeworlds within the Icelandic culture: (1) a rural stray settlement, (2) a farming and service village and (3) a fishing village. This second sample should make it possible to investigate individual development against the background of different ecologies.

Figure B: **Sampling Design of the longitudinal study**



The sampling design of the longitudinal study was introduced with the aim of maximizing interindividual variance. Individual differences refer to the general ability level at school onset, to the children's sex, to the socio-economical status of the parents and to the ecologies of the lifeworlds.

The three dimensions according to which the urban sample had been stratified were treated as factors within a quasi-experimental design. Though the general ability level constituted a systematic stratifying dimension in the urban sample only, it could be derived retrodictively for the rural children also. As the rural samples formed entire birth cohorts, the socio-economical status of parents is not equally distributed.

General ability level

During the first two weeks after school entrance, teachers in all first grades of the city of Reykjavik were asked to nominate three children in the upper third and three children in the lower third of the general ability distribution in their particular classes. In the absence of information about the school entrants, the teachers grounded their assessments on the cognitive, verbal and social competencies of the children, as an informal inquiry showed. The assignment to the cells 'high' or 'low ability' happened by chance until every cell included five children at least.

The teachers' judgment can be considered as a global rating of the probands' general ability level at the onset of the longitudinal study, that was cross-validated with the cognitive and socio-cognitive data of Wave 1. The predictive power of the teacher rating proved considerable. The regression on a summary measure of cognitive competence about six month later produced a correlation coefficient of $r = .74$.

The 'general ability level' was introduced to contrast differential impacts of this variable on the individual trajectories of the children and - supposing a decelerated developmental speed within the 'lower ability' sample - to focus developmental processes with a finer grade.

Social class

To determine the social class of the parents, the status measures of Björnsson and Edelstein (1977, S. 29ff.) were used. Six classes were distinguished, whose relative proportions of the Icelandic population are shown in brackets:

1) Unskilled workers (26,1%);
2) Skilled workers and craftsmen (31,3%);
3) unskilled and skilled clerical workers and civil servants (10,0%);
4) technical or teaching professions, lower managerial (14,8%);
5) employers, businessmen or higher managerial professions (9,9%);
6) academic professions including secondary teachers, artists and leading occupations in the political or administrative system (7,8%).

Drop out rate: Despite the wide time range of the study (8 years from the first to the fifth wave) the drop out rate is pretty small; it amounts to 10 % for the urban and less than 5 % for the rural sample.

0.4. Material and Instruments

In order to measure the development of formal operations, four 'classical' concepts - multiple compensation (conservation of volume, e.g. Inhelder & Piaget, 1958), syllogistic reasoning, the pendulum (Inhelder & Piaget, 1958) and isolation of variables (Kuhn & Brannock, 1977) - were investigated at the ages of nine, twelve and fifteen years. At the age of seventeen, the urban sample was reassessed with the task battery used two years before.
Furthermore, three additional formal operational tasks - correlation, combination and proportion- were administered at Wave 5 and Wave 6 (urban sample only).
Within the framework of this measurement design, the development of formal operational reasoning can be reconstructed across a time span of six years for the rural and across eight years for the urban sample.

In the following, only the task material, investigation procedure and descriptive statistics for the measurement of the combination, the correlation and the proportion are documented, information concerning the assessment of the four 'classical' concepts is given in an additional volume of the Data Handbook.

In Table B the instruments mentioned in the former section are ordered according to measurement occasions.

The selection of the tasks to be repeatedly measured happened according to developmental age. For several instruments contextual variations (variations in presentation, in content, in application contexts or in the procedure) were introduced. Tasks were coded dichotomously or structurally.

Table B: Overview of measurement occasions for correlation, combination and proportion

	Urban sample		Rural sample	
Formal operational concepts	15 years	17 years	15 years	17 years
Correlation	x	x	x	-
Combination	x	x	x	-
Proportion	x	x	x	-

0.5. Aim of the Data Handbook

The data handbook describes the cognitive concepts and the instruments included in the longitudinal study and documents the measurement procedure and the method applied as well as the results of some basic statistical analyzes.
The data handbook is intended to provide a quick and systematic overview in the domain of formal operations for all people interested in the IDSS-project. Furthermore, it should give orientation for the planning of investigations and make possible the descriptive comparison of different studies focussing Piagetian concepts.

0.6. Contents of the Data Handbook

This is the third and last of the handbooks covering formal thought. It includes three concepts: combinations, proportions and correlations.
Every chapter starts with an introductive exposition of the particular concept, subsequently the instruments, materials and the scoring rules utilized in the study are documented and an exemplary description of the testing procedure and the instructions is given .
Information concerning the electronic storage of the data is confined to a listing of the English variable names and their labels.
Results are documented separately for each measurement point, only simple descriptive statistics (cell frequencies) are reported.

1. Combinations

1.1. Introduction

In the original version of the combination task (Inhelder & Piaget, 1958), it is examined if the subject is able to form a system of combinations needed to encompass the range of possible causal hypotheses that can account for a given phenomenon. The question that underlies this task is concerned with the structural and genetic identity of the systems that organize combinatorial and propositional operations.

The subject is presented with four similar flasks that are filled with colorless, odorless liquids (1,2,3 and 4) and a bottle containing the indicator solution (g). By a mixture of 1,3 and g, a yellow coloration is obtained, whereas 2 is neutral, i.e. it leaves both chemical composition and outward appearance of g unchanged. The yellow coloring of the indicator solution is demonstrated to the subject but without her knowing which of the four liquids are involved in the process.

The task of the subject is to reproduce the coloring by using the four liquids 1-4 and the indicator solution g. The complete solution consists of the finding that 1 and 3 together with g produce the yellow coloring, that 2 has no effect and 4 removes the coloration.

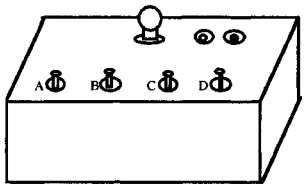
Inhelder and Piaget identify five substages in the solution of this task: At stage I, which corresponds to the preoperational level, the answers of the subjects lack any reference to causal hypothesis or proof. The subjects randomly associate two elements at a time and provide phenomenalistic explanations. At substage II A, the subjects are limited to establish simple one-by-one correspondences between the indicator solution g and the four liquids, i.e. they do not try to test combinations that include more than two elements. Thus, the colouring of the liquid is ascribed to single elements, not to a possible combination of them. Two-by-two or three-by-three combinations emerge at substage II B, where the subjects start in the same way as on substage II A, by forming one-to-one correspondences, but turn spontaneously to higher-order combinations when realizing that the solution cannot be found by multiplying two elements only. But the establishing of these higher order correspondences proceeds without any reference to a system of combinations, enabling the subject to test every possible combination systematically.

The level of formal operations is characterized by the application of a systematic method in the solution of the task, i.e. the subject aims at testing the set of possible combinations of the elements exhaustively and systematically. Two substages are identified: At stage III A the subject adopts the combinatorial method, i.e. she tries every combination one after the other in a systematical way. Thus, the subject does not content oneself when a positive instance occurs but goes on until all possibilities are tested. The application of this procedure leads the subject to a reconceptualization of 'cause': She no longer holds that the effect is attributable

to a single element only, but locates the cause in a certain combination of the elements. Substage III B differs from III A only in the speed and the certainty with which the subject makes use of this combinatorial system.

In order to reduce the expense in material and time of the original experimental arrangement, Sills and Herron (1976) proposed an electronic analog to the chemical bodies task. It consisted of a small plain box with a series of four push buttons and an indicator light bulb which were intended to replace the four flasks and the indicator solution of the Piagetian experiment. Instead of mixing the correct subset of liquids, the subject has to determine that buttons 1 and 3 must be pushed simultaneously to make the bulb burn. In analogy to the original presentation, button 2 had no effect on the bulb and button 4 extinguished the light when pushed. Sills and Herron conducted a comparative study between electronic and chemical presentation and related the results to an independent Piagetian measure and several outcome variables. The correlation pattern obtained suggests that the electronic analogue may serve as a substitute of the original chemical bodies task although the results were flawed by the small sample size and the experimental design.

1.2. Description of the measures: equipment and material



To measure 'combinatorial reasoning', a box is administered, on which a row with four switches (A, B, C and D), a light bulb and two buttons were fixed. There are two states for each of the four switches: 'UP' and 'DOWN'. To make the bulb burn, switch B and switch D have to be turned 'UP' and switch 'C' has to be turned down. The position of A has no effect on the bulb - A is the neutral switch. Thus, there are two possibilities to make the bulb burn:

(1) B, D: 'UP' and A, C: 'DOWN' or (2) A, B, D: 'UP' and C: 'DOWN'.

By means of the black button on the box, it can be checked whether the apparatus is in order and the red button indicates if the respective combination makes the bulb burn.

1.3. Investigation procedure and instructions

At the beginning of the investigation, all the switches are turned 'DOWN'.

I: "On this box there are four switches. They are marked by 'A', 'B', 'C' and 'D'. These switches can be in the position 'UP' or in the position 'DOWN' (The I demonstrates the two positions). To make this bulb burn (The I points to the light bulb), we have to use these switches. But you can not anticipate which switches you should use to make the bulb burn. You have to try. There can be several possibilities. To check if a position makes the bulb burn, you have to press this button (The I points to the red button). The black button (The I

points to the black button) just serves to check if the apparatus is in order (The I presses the black button to make the bulb burn). When you have chosen a position of the switches, press the red button to check if this position makes the bulb burn. After every check, you always should return to this standard position ('DOWN'). Then, you start from the beginning, until you have checked all possible combinations. Keep in mind that none of the two positions 'UP' and 'DOWN' means that the light is turned off (as with common light switches - this is not the case here). Your task is to find all possible combinations that can make the bulb burn. Try to check a single combination not more than once. Here you have a piece of paper and a pencil in case you want to make notes. Please, keep in mind to turn every switch 'DOWN' after each trial."

(A) In case the S stops after a lighting of the bulb, the I asks: "Are you sure that you detected every possibility to get light ? Are other possibilities conceivable ?" - "How do you know that ?"

If the S affirms there to be further possibilities, the I says: "Show them to me. Check them!"

I: "Can you tell me the function of each switch separately ? Which switches are necessary to make the light burn ?" - "What about the others?"

In case the S mentions only switch B and D, the I emphasizes: "Are only two switches important ? Or are there any further ?"

(B) If the subject has passed 20 trials without success or has given up without detecting the correct position, the I shows him: B, D : 'UP' and A , C : 'DOWN'. I.: "This is the first possibility". Then he shows A, B, D : 'UP' and C: 'DOWN'. I.: "This is the other possibility".

I: "Can you tell me know the function of each switch? Which switches are necessary to make the light burn ?" - "What about the other switches ?"

In case the S does not try to use the buttons herself, the I asks: 'How do you know this ? How can you prove this ?'

At the end of the investigation, the I asks: 'Does this task remind you of something you learned at school ? In which subject has that been ? Can you remember the subject and the grade ? Did this happen at the school you presently attend or at a different school ?'

1.4. Scoring instructions and coding rules

The following answers were coded:

- documentation of the solution process

  1st trial: switch A 'UP' or 'DOWN'
  1st trial: switch B 'UP' or 'DOWN'
  1st trial: switch C 'UP' or 'DOWN'
  1st trial: switch D 'UP' or 'DOWN'
  2nd trial: switch A 'UP' or 'DOWN'
  2nd trial: switch B 'UP' or 'DOWN'
  2nd trial: switch C 'UP' or 'DOWN'
  2nd trial: switch D 'UP' or 'DOWN'
  etc. until
  26th trial: switch A 'UP' or 'DOWN'
  26th trial: switch B 'UP' or 'DOWN'
  26th trial: switch C 'UP' or 'DOWN'
  26th trial: switch D 'UP' or 'DOWN'

- structure-genetic coding:

Stage I	*Preoperational*
that lacks hypothetical	Random association of two switches and an argumentation reasoning
Stage II	*Concrete Operations*
II A	Logical multiplication of two switches, empirical unsystematic trials (trial & error) the lighting of the bulb is attributed to a single switch only
II B	Incomplete permutations, arbitrary trials to combine three switches, the cause of the light is not attributed to the combination
Stage III	*Formal operations*
III A	Systematical application of combinations, the cause of the light is attributed to the combination - spontanous efforts to look for further combinations
III B	Systematical fast and perfect application of combination, A is identified as neutral variable

Stage II-III was assigned to subjects who could neither be subsumed under stage II nor under stage III unambiguously.

- Did the subject find the solution ? (no / one combination / two contacts)
- Does the subject believe that she has found all possible combinations ?

- Number of trials
- Adequacy of judgment about operative variable (inadequate/ adequate)
- Adequacy of judgment about neutral variable (inadequate/ adequate)
- Recognition of task from school
- school subject
- grade
- same / different school
- impression of subject

1.5. List of variables

1.5.1. Variable List data of the fifteen-year-olds

CBTRA501	Trial No1 - switch A
CBTRA502	Trial No2 - switch A
....	
CBTRA526	Trial No26 - switch A
CBTRB501	Trial No1 - switch B
CBTRB502	Trial No2 - switch B
...	
CBTRB526	Trial No26 - switch
CBTRC501	Trial No1 - switch C
CBTRC502	Trial No2 - switch C
...	
CBTRC526	Trial No26 - switch C
CBTRD501	Trial No1 - switch D
CBTRD502	Trial No2 - switch D
...	
CBTRD526	Trial No26 - switch D
CBNTV5	Adequacy of judgment / Neutral variable
CBOPV5	Adequacy of judgment / Operative variable
CBSOL5	Identification of solution
CBSTC5	Stage score (coder)
CBSTI5	Stage score (interviewer)
CBSTP5	Number of trials
CBREC5	Recognition of school topic
CBSUJ5	School topic
CBSCH5	Same/different school
CBWHN5	Recognition of School grade
CBIMP5	Impression of subject
CBKNW5	Identification of all combinations
CBNR5	Name of school (number)

Derived information:

(1) To identify the pattern for each experiment, new variables had to be created. These variables are labeled CBTR501 (first trial) through CBTR526 (26 th trial). 0 indicates the switch pointing "down", "1" indicates the switch pointing "up". A pattern "M0000" thus indicates that switch "A"=down, switch "B"=down, switch "C"=down and switch "D"=down. Pattern "M0001"indicates that switch "A"=down, switch "B"=down, switch "C"=down and switch "D"=up. Pattern "M5555" indicates that no further trial was carried out.
To identify the patterns of the last, penultimate and prepenultimate trial for each subject the variables L5, VL5 and VVL5 were created. As before, a "0" indicates the switch pointing down, a "1" that the switch points up.

1.6. Assessment of the fifteen year old children

Urban sample

Table 1
Combinatorial reasoning:
Solution probabilities at age 15
Urban sample

Variable		no solution	one combination	both combinations	N
CBSOL5	found solution	1 %	34,7 %	64,4 %	101

Table 2
Combinatorial reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high			
Variable		no solution	one combination	both combinations	N
CBSOL5	found solution	0,0 %	27,1 %	72,9 %	48

Teacher rating		low			
Variable		no solution	one combination	both combinations	N
CBSOL5	found solution	1,9 %	41,5 %	56,6 %	53

Table 3
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		female			
Variable		no solution	one combination	both combinations	N
CBSOL5	found solution	2,1 %	41,7 %	56,3 %	48

Gender		male			
Variable		no solution	one combination	both combinations	N
CBSOL5	found solution	0,0 %	28,3 %	71,7 %	53

Table 4a
Combinatorial reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		**no solution**	**one combination**	**both combinations**	**N**
CBSOL5	found solution	1,9 %	33,3 %	64,8 %	54

SES		high			
Variable		**no solution**	**one combination**	**both combinations**	**N**
CBSOL5	found solution	0.0 %	36,2 %	63,8 %	47

Table 4b
Combinatorial reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	no solution	one combination	both combinations	N
CBSOL5	found solution	low/low	0,0 %	7,1 %	92,9 %	14
CBSOL5	found solution	low/high	0,0 %	41,7 %	58,3 %	24
CBSOL5	found solution	middle/low	6,3 %	43,8 %	50,0 %	16
CBSOL5	found solution	middle/high	0,0 %	38,9 %	61,1 %	18
CBSOL5	found solution	high/low	0,0 %	44,4 %	55,6 %	18
CBSOL5	found solution	high/low	0,0 %	18,2 %	81,8 %	11

Table 5
Combinatorial reasoning:
Solution probabilities at age 15
Urban sample

Variable		2-6	7-12	13-19	20-26	N
CBSTP5	number of trials	0,9 %	19,6 %	54,1 %	25,2 %	107

Table 6
Combinatorial reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		**high**				
Variable		**2-6**	**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	0,0 %	18,9 %	64,1 %	17,1 %	53
Teacher rating		**low**				
Variable		**2-6**	**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	1,9 %	20,5 %	44,6 %	33,0%	54

Table 7
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		**female**				
Variable		**2-6**	**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	0,0 %	26,0 %	52 %	22 %	50
Gender		**male**				
Variable		**2-6**	**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	1,8 %	14,2 %	61,4 %	23,0%	57

Table 8a
Combinatorial reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		**low**				
Variable		**2-6**	**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	1,8 %	19,8 %	48,1 %	30,4 %	56
SES		**high**				
Variable		**2-6**	**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	0,0 %	19,6 %	60,7 % %	19,5 %	51

Table 8b
Combinatorial reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	2-6	7-12	13-19	20-26	N
CBSTP5	number of trials	low/low	0,0 %	7,1 %	35,7%	57 %	14
CBSTP5	number of trials	low/high	0,0 %	16 %	60,0 %	24 %	25
CBSTP5	number of trials	middle/low	5,9 %	35,4 %	41,3 %	17,7 %	17
CBSTP5	number of trials	middle/high	0,0 %	22,2 %	55,6 %	22,2 %	18
CBSTP5	number of trials	high/low	0,0 %	25,0 %	55,0%	20,0 %	20
CBSTP5	number of trials	high/low	0,0 %	7,7 %	77 %	15,6 %	13

Table 9
Combinatorial reasoning:
Solution probabilities at age 15
Urban sample

Variable		I A	I B	II A	II B	II-III	III A	III B	N
CBSTI5	Stage Score	0, 0 %	1,0 %	12,4 %	39,0 %	1,9 %	35,2 %	10,5 %	105

Table 10
Combinatorial reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating **high**

Variable		I B	II A	II B	II-III	III A	III B	N
CBSTI5	Stage Score	0,0 %	7,5%	26,4%	0,0 %	45,3%	20,8%	53

Teacher rating **low**

Variable		I B	II A	II B	II-III	III A	III B	N
CBSTI5	Stage Score	1,9 %	17,3%	51,9%	3,8%	25,0%	0,0 %	52

Table 11
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender **female**

Variable		I B	II A	II B	II-III	III A	III B	N
CBSTI5	Stage Score	2,0%	16,3%	42,9%	4,1%	28,6%	6,1%	49

Gender **male**

Variable		I B	II A	II B	II-III	III A	III B	N
CBSTI5	Stage Score	0,0 %	8,9 %	35,7%	0,0%	41,1%	14,3%	56

Table 12 a
Combinatorial reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low						
Variable		**I B**	**II A**	**II B**	**II-III**	**III A**	**III B**	**N**
CBSTI5	Stage Score	0,0 %	16,4%	38,2%	3,6 %	32,7%	9,1%	55

SES		high						
Variable		**I B**	**II A**	**II B**	**II-III**	**III A**	**III B**	**N**
CBSTI5	Stage Score	2,0 %	8,0 %	40,0%	0,0 %	38,0%	12,0%	50

Table 12 b
Combinatorial reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	I B	II A	II B	II-III	III A	III B	N
CBSTI5	Stage Score	low/low	0,0 %	14,3%	42,9%	7,1%	35,7%	0,0%	14
CBSTI5	Stage Score	low/high	0,0%	12,0%	40,0%	4,0%	36,0%	8,0%	25
CBSTI5	Stage Score	middle/low	0,0%	25,0%	31,3%	0,0%	25,0%	18,8%	16
CBSTI5	Stage Score	middle/high	0,0%	0,0%	44,4%	0,0%	44,4%	11,1%	18
CBSTI5	Stage Score	high/low	5,3%	21,1%	31,6%	0,0%	36,8%	5,3%	19
CBSTI5	Stage Score	high/low	0,0%	0,0%	46,2%	0,0%	30,8%	23,1%	13

Table 13
Combinatorial reasoning:
Solution probabilities at age 15
Urban sample

Variable		yes	no	N
CBKNW5	all combinations	90,7 %	9,3 %	97

Table 14
Combinatorial reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low		high	
Variable		**yes**	**N**	**yes**	**N**
CBKNW5	all combinations	84,8 %	46	96,1 %	51

Table 15
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male		female	
Variable		yes	N	yes	N
CBKNW5	all combinations	92,3 %	52	88,9 %	45

Table 16 a
Combinatorial reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		high	
Variable		yes	N	yes	N
CBKNW5	all combinations	86,0 %	50	95,7 %	47

Table 16 b
Combinatorial reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	yes	no	N
CBKNW5	all combinations	low/low	76,9 %	23,1 %	13
CBKNW5	all combinations	low/high	91,3 %	8,7 %	23
CBKNW5	all combinations	middle/low	85,7 %	14,3 %	14
CBKNW5	all combinations	middle/high	94,4 %	5,6 %	18
CBKNW5	all combinations	high/low	100,0 %	0,0 %	18
CBKNW5	all combinations	high/low	90,9 %	9,1 %	11

Table 17
Combinatorial reasoning:
Solution probabilities at age 15
Urban sample

Variable		inadequate	adequate	N
CBNTV5	neutral variable	55.6 %	44.4 %	99

Table 18
Combinatorial reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low			high		
Variable		**inadequate**	**adequate**	**N**	**inadequate**	**adequate**	**N**
CBNTV5	neutral variable	75,0 %	25,0 %	48	37,3 %	62,7 %	51

Table 19
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male			female		
Variable		**inadequate**	**adequate**	**N**	**inadequate**	**adequate**	**N**
CBNTV5	neutral variable	53,7 %	46,3 %	54	57,8 %	42,2 %	45

Table 20 a
Combinatorial reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			high		
Variable		**inadequate**	**adequate**	**N**	**inadequate**	**adequate**	**N**
CBNTV5	neutral variable	52,9 %	47,1 %	51	58,3 %	41,7 %	48

Table 20 b
Combinatorial reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

SES

Variable		SES	inadequate	adequate	N
CBNTV5	neutral variable	low/low	50,0 %	50,0 %	12
CBNTV5	neutral variable	low/high	43,5 %	56,5 %	23
CBNTV5	neutral variable	middle/low	68,8 %	31,3 %	16
CBNTV5	neutral variable	middle/high	64,7 %	35,3 %	17
CBNTV5	neutral variable	high/low	61,1 %	38,9 %	18
CBNTV5	neutral variable	high/low	46,2 %	53,8 %	13

Table 21
Combinatorial reasoning:
Solution probabilities at age 15
Urban sample

Variable		inadequate	semiadequate	adequate	N
CBOPV5	operative variable	33,7 %	30,8 %	35,6 %	104

Table 22
Combinatorial reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high			
Variable		inadequate	semiadequate	adequate	N
CBOPV5	operative variable	20,8 %	22,6 %	56,6 %	53

Teacher rating		low			
Variable		inadequate	semiadequate	adequate	N
CBOPV5	operative variable	47,1 %	39,2 %	13,7 %	51

Table 23
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		female			
Variable		inadequate	semiadequate	adequate	N
CBOPV5	operative variable	25,0 %	47,9 %	27,1 %	48

Gender		male			
Variable		inadequate	semiadequate	adequate	N
CBOPV5	operative variable	41,1 %	16,1 %	42,9 %	56

Table 24 a
Combinatorial reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		inadequate	semiadequate	adequate	N
CBOPV5	operative variable	37,0 %	25,9 %	37,0 %	54

SES		high			
Variable		inadequate	semiadequate	adequate	N
CBOPV5	operative variable	30,0 %	36,0 %	34,0 %	50

Table 24 b
Combinatorial reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	inadequate	semiad.	adequate	N
CBOPV5	operative variable	low/low	33,3 %	33,3 %	33,3 %	12
CBOPV5	operative variable	low/high	24,0 %	36,0 %	40,0 %	25
CBOPV5	operative variable	middle/low	58,8 %	5,9 %	35,3 %	17
CBOPV5	operative variable	middle/high	44,4 %	27,8 %	27,8 %	18
CBOPV5	operative variable	high/low	21,1 %	47,4 %	31,6 %	19
CBOPV5	operative variable	high/low	23,1 %	30,8 %	46,2 %	13

Table 25
Combinatorial reasoning:
Solution probabilities at age 15
Urban sample

Variable		oscillating	reflecting	certain	N
CBIMP5	impression of subject	27,8 %	41,7%	30,6 %	72

Table 26
Combinatorial reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating **high**

Variable		oscillating	reflecting	certain	N
CBIMP5	impression of subject	14,3 %	45,7 %	40,0 %	35

Teacher rating **low**

Variable		oscillating	reflecting	certain	N
CBIMP5	impression of subject	40,5 %	37,8 %	21,6 %	37

Table 27
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender **female**

Variable		oscillating	reflecting	certain	N
CBIMP5	impression of subject	38,7 %	38,7 %	22,6 %	31

Gender **male**

Variable		oscillating	reflecting	certain	N
CBIMP5	impression of subject	19,5 %	43,9 %	36,6 %	41

Table 28 a
Combinatorial reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CBIMP5	impression of subject	31,1 %	42,2 %	26,7 %	45

SES		high			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CBIMP5	impression of subject	22,2 %	40,7 %	37,0 %	27

Table 28 b
Combinatorial reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	oscillating	reflecting	certain	N
CBIMP5	impression of subject	low/low	36,4 %	45,5 %	18,2 %	11
CBIMP5	impression of subject	low/high	38,1 %	33,3 %	28,6 %	21
CBIMP5	impression of subject	middle/low	15,4 %	53,8 %	30,8 %	13
CBIMP5	impression of subject	middle/high	18,2 %	45,5 %	36,4 %	11
CBIMP5	impression of subject	high/low	11,1 %	44,4 %	44,4 %	9
CBIMP5	impression of subject	high/low	42,9 %	28,6 %	28,6 %	7

Table 29
Combinatorial reasoning:
Solution probabilities at age 15
Urban sample

Variable		yes	no	N
CBREC5	recognition school topic	5,9 %	94,1 %	102

Table 30
Combinatorial reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low		high	
Variable		**yes**	**N**	**yes**	**N**
CBREC5	recognition school topic	7%	52	4,0%	50

Table 31
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male		female	
Variable		yes	N	yes	N
CBREC5	recognition school topic	7,3%	55	4,3%	47

Table 32 a
Combinatorial reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		high	
Variable		yes	N	yes	N
CBREC5	recognition school topic	5,5 %	55	6,4 %	47

Table 32 b
Combinatorial reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	yes	N
CBREC5	recognition school topic	low/low	7,1%	14
CBREC5	recognition school topic	low/high	8,3%	24
CBREC5	recognition school topic	middle/low	0,0%	17
CBREC5	recognition school topic	middle/high	0,0%	17
CBREC5	recognition school topic	high/low	11,1%	18
CBREC5	recognition school topic	high/low	8,3%	12

Table 33
Combinatorial reasoning:
Solution probabilities at age 15
Urban sample

Variable		no idea	Physics	Arithmetic	N
CBSUJ5	school topic	94,1 %	2,9 %	2,9 %	102

Table 34
Combinatorial reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		**low**			
Variable		**no idea**	**Physics**	**Arithmetic**	**N**
CBSUJ5	school topic	92,3%	3,8%	3,8%	52
Teacher rating		**high**			
Variable		**no idea**	**Physics**	**Arithmetic**	**N**
CBSUJ5	school topic	96,0%	2,0%	2,0%	50

Table 35
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		**male**			
Variable		**no idea**	**Physics**	**Arithmetic**	**N**
CBSUJ5	school topic	92,7 %	3,6 %	3,6 %	55
Gender		**female**			
Variable		**no idea**	**Physics**	**Arithmetic**	**N**
CBSUJ5	school topic	95,7%	2,1%	2,1%	47

Table 36 a
Combinatorial reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		**low**			
Variable		**no idea**	**Physics**	**Arithmetic**	**N**
CBSUJ5	school topic	94,5 %	1,8 %	3,6 %	55
SES		**high**			
Variable		**no idea**	**Physics**	**Arithmetic**	**N**
CBSUJ5	school topic	93,6 %	4,3 %	2,1 %	47

Table 36 b
Combinatorial reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	no idea	Physics	Arithm.	N
CBSUJ5	school topic	low/low	92,9 %	0,0 %	7,1 %	14
CBSUJ5	school topic	low/high	91,7 %	4,2 %	4,2 %	24
CBSUJ5	school topic	middle/low	100,0 %	0,0 %	0,0 %	17
CBSUJ5	school topic	middle/high	100,0 %	0,0 %	0,0 %	17
CBSUJ5	school topic	high/low	88,9 %	11,1 %	0,0 %	18
CBSUJ5	school topic	high/low	91,7 %	0,0 %	8,3 %	12

Rural sample

Table 37
Combinatorial reasoning:
Solution probabilities at age 15
Rural sample

Variable		no solution	one combination	both combinations	N
CBSOL5	found solution	1,7 %	33,9 %	64,4 %	59

Table 38
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender female

Variable		no solution	one combination	both combinations	N
CBSOL5	found solution	3,8 %	46,2 %	50,0 %	26

Gender male

Variable		no solution	one combination	both combinations	N
CBSOL5	found solution	0,0 %	24,2%	75,8 %	33

Table 39
Combinatorial reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North			
Variable		**no solution**	**one combination**	**both combinations**	**N**
CBSOL5	found solution	5,3 %	21,1 %	73,7 %	19

Region		West			
Variable		**no solution**	**one combination**	**both combinations**	**N**
CBSOL5	found solution	0,0 %	41,2 %	58,8 %	17

Region		South			
Variable		**no solution**	**one combination**	**both combinations**	**N**
CBSOL5	found solution	0,0 %	39,1 %	60,9 %	23

Table 40
Combinatorial reasoning:
Solution probabilities at age 15
Rural sample

Total Score

Variable		7-12	13-19	20-26	N
CBSTP5	number of trials	18,0 %	52,5 %	29,5%	61

Table 41
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		female			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	21,4 %	43,4 %	24,9%	28

Gender		male			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	15,1 %	51,6 %	33,4 %	33

Table 42
Combinatorial reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		**North**			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	26,4 %	52,7 %	21,2 %	19

Region		**West**			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	5,6 %	55,6 %	39,0 %	18

Region		**South**			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP5	number of trials	21,0%	50,1%	29,1 %	24

Table 43
Combinatorial reasoning:
Solution probabilities at age 15
Rural sample

Variable		**II A**	**II B**	**II-III**	**III A**	**III B**	**N**
CBSTI5	number of trials	16,4 %	54,1 %	0,0 %	16,4 %	13,1 %	61

Table 44
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		**female**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTP5	number of trials	21,4 %	42,9 %	17,9 %	17,9 %	28

Gender		**male**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTP5	number of trials	12,1 %	63,6 %	15,2 %	9,1 %	33

Table 45
Combinatorial reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		**North**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTP5	number of trials	15,8 %	42,1 %	21,1 %	21,1 %	19

Region		**West**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTP5	number of trials	22,2 %	55,6 %	16,7 %	5,6 %	18

Region		**South**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTP5	number of trials	12,5 %	62,5 %	12,5 %	12,5 %	24

Table 46
Combinatorial reasoning:
Solution probabilities at age 15
Rural sample

Variable		**II A**	**II B**	**II-III**	**III A**	**III B**	**N**
CBSTI5	Stage Score	16,4 %	54,1 %	0,0 %	16,4 %	13,1 %	61

Table 47
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		**female**					
Variable		**II A**	**II B**	**II-III**	**III A**	**III B**	**N**
CBSTI5	Stage Score	21,4 %	42,9 %	0,0 %	17,9 %	17,9 %	28

Gender		**male**					
Variable		**II A**	**II B**	**II-III**	**III A**	**III B**	**N**
CBSTI5	Stage Score	12,1 %	63,6 %	0,0 %	15,2 %	9,1 %	33

Table 48
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Region		**North**					
Variable		**II A**	**II B**	**II-III**	**III A**	**III B**	**N**
CBSTI5	Stage Score	15,8 %	42,1 %	0,0 %	21,1 %	21,1 %	19
Region		**West**					
Variable		**II A**	**II B**	**II-III**	**III A**	**III B**	**N**
CBSTI5	Stage Score	22,2 %	55,6 %	0,0 %	16,7 %	5,6 %	18
Region		**South**					
Variable		**II A**	**II B**	**II-III**	**III A**	**III B**	**N**
CBSTI5	Stage Score	12,5 %	62,5 %	0,0 %	12,5 %	12,5 %	24

Table 49
Combinatorial reasoning:
Solution probabilities at age 15
Rural sample

Total Score

Variable		**yes**	**no**	**N**
CBKNW5	all combinations	21,1 %	78,9 %	57

Table 50
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		**male**		**female**	
Variable		**yes**	**N**	**yes**	**N**
CBKNW5	all combinations	90,6 %	32	64,0 %	25

Table 51
Combinatorial reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		**North**		**West**		**South**	
Variable		**yes**	**N**	**yes**	**N**	**yes**	**N**
CBKNW5	all combinations	66,7 %	15	83,3 %	18	83,3 %	24

Table 52
Combinatorial reasoning:
Solution probabilities at age 15
Rural sample

Variable		inadequate	adequate	N
CBNTV5	neutral variable	63,8 %	36,2 %	58

Table 53
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male		female	
Variable		adequate	N	adequate	N
CBNTV5	neutral variable	50,0 %	32	19,2 %	26

Table 54
Combinatorial reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North		
Variable		inadequate	adequate	N
CBNTV5	neutral variable	70,6 %	29,4 %	17

Region		West		
Variable		inadequate	adequate	N
CBNTV5	neutral variable	66,7 %	33,3 %	18

Region		South		
Variable		inadequate	adequate	N
CBNTV5	neutral variable	56,5 %	43,5 %	23

Table 55
Combinatorial reasoning:
Solution probabilities at age 15
Rural sample

Variable		inadequate	semiadequate	adequate	N
CBOPV5	operative variable	45,9 %	31,1 %	23,0 %	61

Table 56
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		**female**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV5	operative variable	46,4 %	25,0 %	28,6 %	28

Gender		**male**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV5	operative variable	45,5 %	36,4 %	18,2 %	33

Table 57
Combinatorial reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		**North**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV5	operative variable	63,2 %	5,3 %	31,6 %	19

Region		**West**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV5	operative variable	44,4 %	44,4 %	11,1 %	18

Region		**South**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV5	operative variable	33,3 %	41,7 %	25,0 %	24

Table 58
Combinatorial reasoning:
Solution probabilities at age 15
Rural sample

Variable		**oscillating**	**reflecting**	**certain**	**N**
CBIMP5	impression of subject	15,6 %	37,5 %	46,9 %	32

Table 59
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		**female**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CBIMP5	impression of subject	15,4 %	30,8 %	53,8 %	13
Gender		**male**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CBIMP5	impression of subject	15,8 %	42,1 %	42,1 %	19

Table 60
Combinatorial reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		**North**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CBIMP5	impression of subject	0,0 %	14,3 %	85,7 %	7
Region		**West**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CBIMP5	impression of subject	9,1 %	63,6 %	27,3 %	11
Region		**South**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CBIMP5	impression of subject	28,6 %	28,6 %	42,9 %	14

Table 61
Combinatorial reasoning:
Solution probabilities at age 15
Rural sample

Variable		**yes**	**N**
CBREC5	recognition school topic	0,0 %	54

Table 62
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male		female	
Variable		yes	N	yes	N
CBREC5	recognition school topic	0,0 %	30	0,0 %	24

Table 63
Combinatorial reasoning:
Solution probabilities at age 15
by gender
Rural sample

Region		North		West		South	
Variable		yes	N	yes	N	yes	N
CBREC5	recognition school topic	0,0 %	18	0,0 %	15	0,0 %	21

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Table 64
Combinatorial reasoning:
Solution probabilities at age 17
Urban sample

Variable		no solution	one combination	both combinations	N
CBSOL6	found solution	0,0 %	37,3 %	62,7 %	59

Table 65
Combinatorial reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating **high**

Variable		no solution	one combination	both combinations	N
CBSOL6	found solution	0,0 %	28,2 %	71,8 %	39

Teacher rating **low**

Variable		no solution	one combination	both combinations	N
CBSOL6	found solution	0,0 %	55,0 %	45,0 %	20

Table 66
Combinatorial reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender **female**

Variable		no solution	one combination	both combinati	N
CBSOL6	found solution	0,0 %	44,1 %	55,9 %	34

Gender **male**

Variable		no solution	one combination	both combinations	N
CBSOL6	found solution	0,0 %	28,0 %	72,0 %	25

Table 67 a
Combinatorial reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		**no solution**	**1 combination**	**both combin.**	**N**
CBSOL6	found solution	0,0 %	40,0 %	60,0%	25

SES		high			
Variable		**no solution**	**one combin.**	**both combin.**	**N**
CBSOL6	found solution	0,0 %	35,3 %	64,7 %	34

Table 67 b
Combinatorial reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	no solut.	1 combin.	2 comb.	N
CBSOL6	found solution	low/low	0,0 %	57,1 %	42,9 %	7
CBSOL6	found solution	low/high	0,0 %	11,1 %	88,9 %	9
CBSOL6	found solution	middle/low	0,0 %	55,6 %	44,4 %	9
CBSOL6	found solution	middle/high	0,0 %	50,0 %	50,0 %	14
CBSOL6	found solution	high/low	0,0 %	25,0 %	75,0 %	12
CBSOL6	found solution	high/low	0,0 %	25,0%	75,0 %	8

Table 68
Combinatorial reasoning:
Solution probabilities at age 17
Urban sample

Variable		7-12	13-19	20-26	N
CBSTP6	number of trials	13,6 %	69,5 %	16,9%	59

Table 69
Combinatorial reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP6	number of trials	12,8 %	74,2 %	12,7 %	39

Teacher rating		low			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP6	number of trials	15,0 %	60 %	25,0 %	20

Table 70
Combinatorial reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		female			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP6	number of trials	8,8 %	70,6 %	20,6 %	34
Gender		**male**			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP6	number of trials	20,0 %	68 %	12 %	25

Table 71 a
Combinatorial reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP6	number of trials	16,0 %	72,0 %	12,0 %	25
SES		**high**			
Variable		**7-12**	**13-19**	**20-26**	**N**
CBSTP6	number of trials	11,8 %	67,7 %	20,5 %	34

Table 71 b
Combinatorial reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	7-12	13-19	20-26	N
CBSSTP6	number of trials	low/low	28,6 %	43, 0%	28,6 %	7
CBSSTP6	number of trials	low/high	11,1 %	88,8 %	0,0 %	9
CBSSTP6	number of trials	middle/low	11,1 %	77,7 %	11,1 %	9
CBSSTP6	number of trials	middle/high	7,1 %	70,7 %	21,3 %	14
CBSSTP6	number of trials	high/low	8,3 %	75,0 %	8,3 %	12
CBSSTP6	number of trials	high/low	25,0 %	50,0 %	25,0 %	8

Table 72
Combinatorial reasoning:
Solution probabilities at age 17
Urban sample

Variable		II A	II B	III A	III B	N
CBSTI6	number of trials	13,6 %	30,5 %	23,7 %	32,3 %	59

Table 73
Combinatorial reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		**high**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTI6	Stage Score	7,7 %	23,1 %	30,8 %	38,5 %	39

Teacher rating		**low**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTI6	Stage Score	25,0 %	45,0 %	10,0 %	20,0 %	20

Table 74
Combinatorial reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		**female**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTI6	Stage Score	17,6 %	38,2 %	20,6 %	23,5 %	34

Gender		**male**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTI6	Stage Score	8,0 %	20,0 %	28,0 %	44,0 %	25

Table 75 a
Combinatorial reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		**low**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTI6	Stage Score	16,0 %	32,0 %	28,0 %	24,0 %	25

SES		**high**				
Variable		**II A**	**II B**	**III A**	**III B**	**N**
CBSTI6	Stage Score	11,8 %	29,4 %	20,6 %	38,2 %	34

Table 75 b
Combinatorial reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	II A	II B	III A	III B	N
CBSTI6	Stage Score	low/low	42,9 %	14,3 %	42,9 %	0,0 %	7
CBSTI6	Stage Score	low/high	0,0 %	22,2 %	22,2 %	55,6 %	9
CBSTI6	Stage Score	middle/low	11,1 %	55,6 %	22,2 %	11,1 %	9
CBSTI6	Stage Score	middle/high	7,1 %	35,7 %	21,4 %	35,7 %	14
CBSTI6	Stage Score	high/low	25,0 %	25,0 %	16,7 %	33,3 %	12
CBSTI6	Stage Score	high/low	0,0 %	25,0 %	25,0 %	50,0 %	8

Table 76
Combinatorial reasoning:
Solution probabilities at age 17
Urban sample

Variable		yes	N
CBKNW6	all combinations	91,2 %	57

Table 77
Combinatorial reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		low		high	
Variable		yes	N	yes	N
CBKNW6	all combinations	90,0 %	20	91,9 %	37

Table 78
Combinatorial reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male		female	
Variable		yes	N	yes	N
CBKNW6	all combinations	88,0 %	25	93,8 %	32

Table 79 a
Combinatorial reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		high	
Variable		yes	N	yes	N
CBKNW6	all combinations	92,0 %	25	90,6 %	32

Table 79 b
Combinatorial reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	no	yes	N
CBKNW6	all combinations	low/low	14,3 %	85,7 %	7
CBKNW6	all combinations	low/high	11,1 %	88,9 %	9
CBKNW6	all combinations	middle/low	0,0 %	100,0 %	9
CBKNW6	all combinations	middle/high	15,4 %	84,6 %	13
CBKNW6	all combinations	high/low	9,1 %	90,9 %	11
CBKNW6	all combinations	high/low	0,0 %	100,0 %	8

Table 80
Combinatorial reasoning:
Solution probabilities at age 17
Urban sample

Variable		inadequate	adequate	N
CBNTV6	neutral variable	40,7 %	59,3 %	59

Table 81
Combinatorial reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		low		high	
Variable		adequate	N	adequate	N
CBNTV6	neutral variable	35,0 %	20	71,8 %	39

Table 82
Combinatorial reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male		female	
Variable		**adequate**	**N**	**adequate**	**N**
CBNTV6	**neutral variable**	76,0 %	25	47,1 %	34

Table 83 a
Combinatorial reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		high	
Variable		**adequate**	**N**	**adequate**	**N**
CBNTV6	**neutral variable**	60,0 %	25	58,8 %	34

Table 83 b
Combinatorial reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	inadequate	adequate	N
CBNTV6	neutral variable	low/low	57,1 %	42,9 %	7
CBNTV6	neutral variable	low/high	22,2 %	77,8 %	9
CBNTV6	neutral variable	middle/low	44,4 %	55,6 %	9
CBNTV6	neutral variable	middle/high	35,7 %	64,3 %	14
CBNTV6	neutral variable	high/low	58,3 %	41,7 %	12
CBNTV6	neutral variable	high/low	25,0 %	75,0 %	8

Table 84
Combinatorial reasoning:
Solution probabilities at age 17
Urban sample

Variable		inadequate	semiadequate	adequate	N
CBOPV6	operative variable	22,0 %	35,6 %	42,4 %	59

Table 85
Combinatorial reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		**high**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV6	operative variable	20,5 %	30,8 %	48,7 %	39
Teacher rating		**low**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV6	operative variable	25,0 %	45,0 %	30,0 %	20

Table 86
Combinatorial reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		**male**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV6	operative variable	20,0 %	24,0 %	56,0 %	39
Gender		**female**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV6	operative variable	23,5 %	44,1 %	32,4 %	20

Table 87 a
Combinatorial reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		**low**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV6	operative variable	24,0 %	40,0 %	36, %	25
SES		**high**			
Variable		**inadequate**	**semiadequate**	**adequate**	**N**
CBOPV6	operative variable	20,6 %	32,4 %	47,1 %	34

Table 87 b
Combinatorial reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	inadequate	semiadequate	adequate	N
CBOPV6	operative variable	low/low	42,9 %	42,9 %	14,3 %	7
CBOPV6	operative variable	low/high	0,0 %	22,2 %	77,8 %	9
CBOPV6	operative variable	middle/low	33,3 %	55,6 %	11,1 %	9
CBOPV6	operative variable	middle/high	21,4 %	35,7 %	42,9 %	14
CBOPV6	operative variable	high/low	16,7 %	41,7 %	41,7 %	12
CBOPV6	operative variable	high/low	25,0 %	12,5 %	62,5 %	8

Table 88
Combinatorial reasoning:
Solution probabilities at age 17
Urban sample

Variable		oscillating	reflecting	certain	N
CBIMP6	impression of subject	11,1 %	38,9 %	50,0 %	36

Table 89
Combinatorial reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating **high**

Variable		oscillating	reflecting	certain	N
CBIMP6	impression of subject	12,0 %	44,0 %	44,0 %	25

Teacher rating **low**

Variable		oscillating	reflecting	certain	N
CBIMP6	impression of subject	9,1 %	27,3 %	63,6 %	11

Table 90
Combinatorial reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender **female**

Variable		oscillating	reflecting	certain	N
CBIMP6	impression of subject	11,1 %	44,4 %	44,4 %	18

Gender **male**

Variable		oscillating	reflecting	certain	N
CRIMP6	impression of subject	11,1 %	33,3 %	55,6 %	18

Table 91 a
Combinatorial reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CBIMP6	impression of subject	7,1 %	42,9 %	50,0 %	14
SES		**high**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP6	impression of subject	13,6 %	36,4 %	50,0 %	22

Table 91b
Combinatorial reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	oscillating	reflecting	certain	
CRIMP6	impression of subject	low/low	33,3 %	66,7 %	0,0 %	3
CRIMP6	impression of subject	low/high	0,0 %	50,0 %	50,0 %	4
CRIMP6	impression of subject	middle/low	0,0 %	28,6 %	71,4 %	7
CRIMP6	impression of subject	middle/high	0,0 %	50,0 %	50,0 %	8
CRIMP6	impression of subject	high/low	25,0 %	50,0 %	25,0 %	8
CRIMP6	impression of subject	high/low	16,7 %	0,0 %	83,3 %	6

Table 92
Combinatorial reasoning:
Solution probabilities at age 17
Urban sample

Variable		yes	N
CBREC6	recognition school topic	27,5 %	51

Table 93
Combinatorial reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		low		high	
Variable		**yes**	**N**	**yes**	**N**
CBREC6	recognition school topic	14,3 %	14	32,4 %	37

Table 94
Combinatorial reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male		female	
Variable		yes	N	yes	N
CBREC6	recognition school topic	36,4 %	22	20,7 %	29

Table 95 a
Combinatorial reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		high	
Variable		yes	N	yes	N
CBREC6	recognition school topic	23,8 %	21	30,0 %	30

Table 95 b
Combinatorial reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	yes	N
CBREC6	recognition school topic	low/low	16,7 %	6
CBREC6	recognition school topic	low/high	50,0 %	8
CBREC6	recognition school topic	middle/low	0,0 %	7
CBREC6	recognition school topic	middle/high	15,4 %	13
CBREC6	recognition school topic	high/low	36,4 %	11
CBREC6	recognition school topic	high/low	50,0 %	6

Table 96
Combinatorial reasoning:
Solution probabilities at age 17
Urban sample

Variable		no idea	Physics	Arithmetic	N
CBSUJ6	school topic	78,4 %	7,8 %	13,7 %	51

Table 97
Combinatorial reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		low			
Variable		no idea	Physics	Arithmetic	N
CBSUJ6	school topic	92,9 %	7,1 %	0,0 %	14
Teacher rating		**high**			
Variable		no idea	Physics	Arithmetic	N
CBSUJ6	school topic	73,0 %	8,1 %	18,9 %	37

Table 98
Combinatorial reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male			
Variable		no idea	Physics	Arithmetic	N
CBSUJ6	school topic	77,3 %	4,5 %	18,2 %	22
Gender		**female**			
Variable		no idea	Physics	Arithmetic	N
CBSUJ6	school topic	79,3 %	10,3 %	10,3 %	29

Table 99 a
Combinatorial reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		no idea	Physics	Arithmetic	N
CBSUJ6	school topic	85,7 %	14,3 %	0,0 %	21
SES		**high**			
Variable		no idea	Physics	Arithmetic	N
CBSUJ6	school topic	73,3 %	3,3 %	23,3 %	30

Table 99 b
Combinatorial reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	no idea	Physics	Arithmetic	N
CBSUJ6	school topic	low/low	100,0 %	0,0 %	0,0 %	6
CBSUJ6	school topic	low/high	62,5 %	37,5 %	0,0 %	8
CBSUJ6	school topic	middle/low	100,0 %	0,0 %	0,0 %	7
CBSUJ6	school topic	middle/high	84,6 %	0,0 %	15,4 %	13
CBSUJ6	school topic	high/low	72,7 %	9,1 %	18,2 %	11
CBSUJ6	school topic	high/low	50,0 %	0,0 %	50,0 %	6

2. Proportions

2.1. Introduction

According to Inhelder & Piaget (1958), the formation of proportional reasoning takes place during the stage of formal operations. This coincidence is explained by the assumption that the formation of the proportionality concept has to be based on the integrated group structure, i.e. the 'structure of the whole', the acquisition of which being essential to the formal stage.

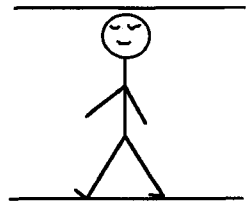
Inhelder and Piaget identify two different aspects of the proportionality concept: a logical and a numerical one. It is the former, i.e. the qualitative notion of both compensation and proportionality which is derived from the group structure that is characteristic for formal operations. The acquisition of this qualitative concept is supposed to lead to the discovery of metrical proportions.
An understanding of proportions is required for several of the tasks that Inhelder and Piaget used to investigate formal-operational reasoning. One of them is the projection of shadows: In this experiment, rings of varying diameters are placed between a light source and a screen. The rings throw shadows the size of which vary in dependence of the rings' diameters and their distance from the light source. The subject is asked to create shadows of equal size by using unequal rings. To solve this task, she has to place the larger ring further from the light and thus to make use of the compensatory relationship between distance and diameter.
Inhelder and Piaget differentiate between five different types of reactions:
At the preoperational stage, the subjects lack the prerequisites for the solution of this task because they fail to understand the formation of shadows. At the two concrete operational stages, the subjects discover both the role of the rings' diameters (II A) and the function of the distance from the light source (II B) but they don't use numerical proportions or products between the two factors to calculate the amount of distance needed for the solution of the task. Instead of this, the subjects rely on a constant difference which they add repeatedly to a starting value. At stage III, the subjects rely on proportional relations implicitly (III A) and explicitly (III B).

Karplus, Karplus & Wollman (1974) used a different task to investigate the development of the proportionality concept a variant of which was administered in the IESS-Study: In this task, the subject is presented with two stick figures of differing size ('Mr. Tall' and 'Mr. Short'), which can be measured in two ways, i.e. by using paper clips or by using buttons. The subject was told the size of both figures in buttons, was asked to measure one of them - Mr. Small - afterwards and finally had to estimate the size the other one. Answers and explanations were evaluated. The latter were analyzed according to a coding scheme that included 10 categories altogether. A description of this coding system is given in section 2.4.

Although most of its categories can be related to the five stages distinguished by Inhelder and Piaget, Karplus, Karplus and Wollman don't take them to represent developmental stages but rather cognitive styles that may reflect recent school experience. Suarez (1977) picked up both the task and coding scheme from Karplus *et al.* (1974) but added another stick figure, Mr. Giant, whose size had to be estimated after the subjects were told the correct size of Mr. Tall.

2.2. Description of the measures: equipment and material

In order to assess children's proportional reasoning ability a paper showing a schematically drawn figure and a chain of paper clips are administered (the figure is six paper clips tall).



2.3. Investigation procedure and instructions

At the beginning of the investigation, the task was introduced by the I in the following way: "The man on the picture is called 'Mr. Middle'. Unfortunately, we have only buttons to measure him. He is four buttons tall. He has been measured from head to toe. Afterwards, we had to measure another taller fellow, who is called 'Mr. Maxi'. He was measured with the same buttons, and he is 6 buttons tall. Finally, we measured a fellow guy. He is called 'Mr. Mini'. He is only three buttons tall.

Now, I want to ask you to do three different things: At first, you have to measure 'Mr. Middle' with this chain of paper clips. Afterwards, you have to tell the size of 'Mr. Maxi' and 'Mr. Mini'. Thus, the question is: How many paper clips tall are 'Mr. Mini' and 'Mr. Maxi' ? At the end, I will ask you to tell me how you figured out the size of the two fellows. If you want to make notes, you can use the paper with the picture of 'Mr. Middle'.
At the end of the investigation, the I asks: 'Does this task remind you of something you learned at school ? In which subject did you learn this? Can you remember the time when you learned these topics ? In which school did this happen? Is this the same school you presently attend?"

2.4. Scoring instruction and coding rules

2.4.1. Data Selection / Coded information

- The following answers were coded:
- Was the length of 'Mr. Middle' measured correctly ? *(yes/no)*
- The predicted size of 'Mr. Maxi' / 'Mr. Mini'
- The explanation for the size of 'Mr. Maxi' / 'Mr. Mini' (0=unscorable/ 1=arbitrary /*2=additive calculation / 3=conservation of differences / 4=simple scaling / 5= differentiated additive method/ 6=method of differences / 7=differences + estimation / 8=proportion + addition / 9=empirical proportions / 10=additive proportions / 11= proportions)*
- structure-genetic coding: assignment of stage score for explanation *(I A - III B)*
- Does this task remind the subject of something learned at school *(yes / no)*
- From which school subject does the subject know the task ?
- When, i.e. in which class, has this matter been treated ?
- Did this happen at the school the subject presently attends or at a different school ?
- Name of school ?
- Impression of subject *(oscillating / reflexive / certain)*

2.4.2. Coding Systems for the analysis of explanation and for the assignment of the stage-score

<u>Analysis of explanation</u>

arbitrary explanations:	Answers without any reference to the numerical information given in the instruction *example: 'Mr. Maxi is four paper clips tall, because Mr. Maxi is only a name'*
additive calculations:	Answers of this category refer to numerical information and to additive operations but both are applied in a way that is inadequate to solve the given problem *Example: 'Mr. Maxi is 10 paper clips tall, because Mr Middle is 4 buttons and six paper clips tall. Because Mr. Middle is 10 tall altogether too."*
conservation of differences:	Explanations showing that the subject figures out the missing value of the second pair based on the difference between the values of the first one. *Example: 'Mr. Maxi is 8 paper clips tall, because Mr. Middle is 4 buttons and six paper clips tall. I calculated the difference between 4 and 6 and I got 2. There are six buttons for Mr. Maxi, then I added two and I got 8.'*simple scaling: Explanations supposing a proportion of 2:1

	between the two scales without any reference to the numerical information in the instruction *Example: 'A button is twice as tall as a paper clip. Thus Mr. Small is 12 paper clips tall.'*
differentiated additive method:	Responses of this category are based on the differences between the values of the first pair too, but to accommodate for the discrepancy between buttons and paper clips, the differences are multiplied by factor two. *Example: 'Mr. Maxi is to buttons taller than Mr. Middle, thus he must be twice as much taller than Mr. Middle. The double of the two buttons, four paper clips, must be added to the six paper clips, so I get 10 paper clips for Mr. Maxi'.*
Method of differences:	In this type of explanation, the subject focuses on the increasing differences between buttons and paper clips: 2 for Mr. Mini, 3 for Mr. Middle, thus she expects it to be 4 for Mr. Maxi. *Example: 'Mr. Maxi is 15 paper clips tall because Mr. Mini is two paper clips taller than buttons. Mr. Middle is three paper clips taller than buttons, so Mr. Maxi will be four paper clips taller.'*
Differences and estimation:	This category is a variant of the differentiated additive method. The differences are raised somewhat to accommodate to the discrepancy between paper clips and buttons. *Example: 'Mr. Maxi is 16 paper clips tall. Between 6 and 11, the difference amounts to 5. So roughly, 7 + 9 are 16.*
Proportion and addition:	Explanations of this type indicate some insight into simple proportions such as 2:1 or 3:1. But since the task cannot be solved by the application of simple proportions of this kind, the subject tries to find the solution by approximation: *Example: 'Double the size of Mr. Middle are eight buttons but Mr. Maxi is only six buttons tall. Double the size of Mr. Middle are 12 paper clips. The paper clips are smaller than the buttons. 12 paper clips minus 3 paper clips are nine clips. Mr. Maxi is nine paper clips tall.'*
Empirical proportions:	Explanations of this type refer to the fact that a button is about 1,5 as tall as a paper clip. But this relation is not derived directly from the information but is stated empirically or is estimated. *Example: 'The button is about 1,5 as tall as the paper clip. Six paper clips times one and a half are nine paper clips.'*
Additive proportionality:	The subject focuses on the differences in the amount of buttons between Mr. Mini, Mr. Middle and Mr. Maxi. *Example: 'Four buttons divided by two are two buttons; four buttons and two buttons are six buttons. Six paper clips divided by two are three paper clips. Six buttons and three buttons are nine buttons.'*
Proportion:	The proportions between Mr. Mini, Mr. Middle and and Mr. Maxi or between buttons and paper clips are derived from the numerical information provided in the instruction. The task is solved by calculating a

	product. *Example: '4 buttons = 6 paper clips, 2 buttons = 3 paper clips, 6 buttons = 9 paper clips. 2 buttons = 3 paper clips, so I have to calculate 3 * 3 clips, because 3 * 2 buttons = 6 buttons.'*

Structure-genetic Coding

Stage I	*Preoperational*
I A	Arbitrary answers, guessing, lacking explanations illogical conclusions
I B	Random use of numbers, arbitrary additions
Stage II	*Concrete Operations* Main criterion: Reference to differences
II A	Conservation of differences, simple scaling, differentiated additive method
II B	Method of differences
Stage III	*Formal Operations*
III A	Differences and estimations, empirical proportions: 'Concrete proportions'
III B	Reasoning is based entirely on proportions, division and multiplication to find the value in question

Stage II-III was assigned to subjects who could neither be subsumed under stage II nor under stage III unambiguously.

2.5. List of variables

2.5.1. Variables for data of the fifteen year old children

RATIMP5	ProRea: Impression of subject
RATMAX5	ProRea: predicted height of "Mr. Maxi"
RATMIN5	ProRea: predicted height of "Mr. Mini"
RATNR5	ProRea: name of school (number)
RATNSC5	ProRea: explanation of "Mini"-score
RATNST5	ProRea: Mini stage (interviewer)
RATREC5	ProRea: subject recognizes school subject
RATSCH5	ProRea: same school/different school
RATSUJ5	ProRea: school topic
RATWHN5:	ProRea: recognition of school grade
RATXSC5:	ProRea: explanation of "Maxi"-score
RATXST5:	ProRea: Maxi stage (interviewer)
RATXST5B:	ProRea: Maxi stage (coder)

2.5.2. Variables including data of the seventeen year old children

For the measurement of the seventeen-year old children, identical variable labels were used as in the investigation of the fifteen year old pupils, but '5' in the variable name was replaced by a '6'.

2.6. Assessment of the fifteen year old children

Urban sample

Table 1
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	Task	60	75	80	85	90	100	N
RATMAX5	Pred. Height/Mr. Maxi"	3,8 %	1,0 %	38,1 %	1,9 %	49,5 %	5,7 %	105

Table 2
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high						
Variable	Task	60	75	80	85	90	100	N
RATMAX5	Pred. Height/Mr. Maxi"	0 %	0 %	24,5 %	0 %	73,6 %	1,9 %	52
Teacher rating		**low**						
Variable	Task	60	75	80	85	90	100	N
RATMAX5	Pred. Height/Mr. Maxi"	7,7 %	1,9 %	51,9 %	3,9 %	25,0 %	9,6 %	53

Table 3
Proportional reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male						
Variable	Task	60	75	80	85	90	100	N
RATMAX5	Pred. Height/Mr. Maxi"	3,6 %	1,8 %	37,5 %	0,0 %	50,0 %	7,1 %	56
Gender		**female**						
Variable	Task	60	75	80	85	90	100	N
RATMAX5	Pred. Height/Mr. Maxi"	4,1 %	0,0 %	38,8 %	4,1 %	49,0 %	4,1 %	49

Table 4 a
Proportional reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low						
Variable	**Task**	**60**	**75**	**80**	**85**	**90**	**100**	**N**
RATMAX5	Pred. Height/Mr. Maxi"	3,6 %	1,8 %	36,4 %	3,6 %	45,5 %	9,1 %	55

SES		high						
Variable	**Task**	**60**	**75**	**80**	**85**	**90**	**100**	**N**
RATMAX5	Pred. Height/Mr. Maxi"	4,0 %	0,0 %	40,0 %	4,1 %	54,0 %	2,0 %	50

Table 4 b
Proportional reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable	Task	SES	60	75	80	85	90	100	N
RATMAX5	Pred. Height/Mr. Maxi"	low	7,1 %	7,1 %	28,6 %	0,0 %	50,0 %	7,1 %	14
RATMAX5	Pred. Height/Mr. Maxi"	low/h	4,0 %	0,0 %	40,0 %	0,0 %	44,0 %	12,0 %	25
RATMAX5	Pred. Height/Mr. Maxi"	middle	0,0 %	0,0 %	37,5 %	12,5 %	43,8 %	6,3 %	16
RATMAX5	Pred. Height/Mr. Maxi"	mid/h	5,9 %	0,0 %	47,1 %	0,0 %	47,1 %	0,0 %	17
RATMAX5	Pred. Height/Mr. Maxi"	high	5,0 %	0,0 %	40,0 %	0,0 %	50,0 %	5,0 %	20
RATMAX5	Pred. Height/Mr. Maxi"	high/h	0,0 %	0,0 %	30,8 %	0,0 %	69,2 %	0,0 %	13

Table 5
Proportional reasoning:
Solution probabilities at age 15
Urban sample

Variable	Task	25	30	35	40	45	50	55	N
RATMIN5	Pred. Height/Mr. Mini"	0,9 %	5,7 %	1,9 %	7,6 %	52,8 %	28,3 %	2,8 %	106

Table 6
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high							
Variable	**Task**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	0,0%	0,0 %	1,9 %	3,8 %	73,6 %	17,0 %	3,7 %	53

Teacher rating		low							
Variable	**Task**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	1,9 %	11,3 %	1,9 %	11,3%	32,1 %	39,6 %	1,9 %	53

Table 7
Proportional reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male							
Variable	**Task**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	0 %	5,4 %	0 %	5,4 %	57,1 %	30,4 %	1,8 %	56
Gender		**female**							
Variable	**Task**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	2,0 %	6,0 %	4,0 %	10,0%	48,0 %	26,0 %	4,0 %	50

Table 8 a
Proportional reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low							
Variable	**Task**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	0,0 %	7,3 %	1,8 %	7,3 %	47,3 %	32,7 %	3,6 %	55
SES		**high**							
Variable	**Task**	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	2,0 %	3,9 %	2,0 %	7,8 %	58,8 %	23,5 %	2,0 %	51

Table 8 b
Proportional reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable	Task	SES	25	30	35	40	45	50	55	N
RATMIN5	Pred. Height/Mini	low	0 %	7,1 %	7,1 %	7,1 %	50,0%	21,4%	7,1 %	14
RATMIN5	Pred. Height/Mini	low/h	0 %	8,0 %	0 %	4,0 %	40,0%	44,0%	4,0 %	25
RATMIN5	Pred. Height/Mini	middle	0 %	6,3 %	0 %	12,5%	56,2%	25,0%	0 %	17
RATMIN5	Pred. Height/Mini	mid/h	5,6 %	5,6 %	5,6 %	16,7%	50,0%	16,7%	0 %	18
RATMIN5	Pred. Height/Mini	high	0 %	0 %	0 %	5,0 %	60,0%	30,0%	5,0 %	20
RATMIN5	Pred. Height/Mini	high/h	0 %	7,7 %	0 %	0 %	69,2%	23,1%	0 %	13

Table 9
Proportional reasoning:
Solution probabilities at age 15
Urban sample

Variable	0	1	2	3	4	5	6	7	8	9	10	11	N
RATXSC5	0,9 %	5,6 %	7,5 %	24,3%	5,6 %	3,7 %	1,9 %	0,9 %	3,7 %	7,5 %	24,3%	14,0%	107

Table 10
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating **high**

Variable	0	1	2	3	4	5	6	7	8	9	10	11	N
RATXSC5	1,9 %	11,1%	11,1%	33,3%	7,4 %	5,6 %	0 %	1,9 %	3,7 %	3,7 %	20,4%	0 %	53

Teacher rating **low**

Variable	0	1	2	3	4	5	6	7	8	9	10	11	N
RATXSC5	0 %	0 %	3,8 %	15,1%	3,8 %	1,9 %	3,8 %	0 %	3,8 %	11,3%	28,3%	28,3%	54

Table 11
Proportional reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender **male**

Variable	1	2	3	4	5	6	7	8	9	10	11	N
RATXSC5	7,0 %	3,5 %	22,8%	5,3 %	5,3 %	1,8 %	1,8 %	3,5 %	7,0 %	24,6%	17,5%	57

Gender **female**

Variable	0	1	2	3	4	5	6	8	9	10	11	N
RATXSC5	2,0 %	4,0 %	12,0%	26,0%	6,0 %	2,0 %	2,0 %	4,0 %	8,0 %	24,0%	10,0%	50

Table 12 a
Proportional reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES **low**

Variable	1	2	3	4	5	6	7	8	9	10	11	N
RATXSC5	8,9 %	12,5%	16,1%	7,1 %	5,4 %	3,6 %	1,8 %	1,8 %	10,7%	21,4%	8,9 %	56

SES **high**

Variable	0	1	2	3	4	5	6	8	9	10	11	N
RATXSC5	0,0 %	2,0 %	2,0 %	33,3%	3,9 %	2,0 %	0,0 %	5,9 %	3,9 %	27,5%	19,6%	51

Table 12 b

Proportional reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

SES	0	1	2	3	4	5	6	7	8	9	10	11	N
low/l	0 %	7,1%	14,3%	14,3%	0 %	7,1 %	0 %	7,1%	0 %	7,1%	42,9%	0 %	14
low/h	0 %	12,0%	16,0%	20,0%	0 %	8,0 %	8,0 %	0 %	4,0 %	8,0 %	20,0%	4,0%	25
mid/l	5,9%	5,9%	5,9 %	11,8%	23,5%	0 %	0 %	0 %	0 %	17,6%	5,9 %	23,5%	17
mid/h	0 %	0 %	5,6 %	38,9%	5,6 %	5,6 %	0 %	0 %	0 %	5,6 %	16,7%	22,2%	18
high/l	0 %	5 %	0 %	30,0%	5,0 %	0 %	0 %	0 %	5,0 %	0 %	30,0%	25,0%	20
high/h	0 %	0 %	0 %	30,8%	0 %	0 %	0 %	0 %	15,4%	7,7 %	38,5%	7,7 %	13

Table 13
Proportional reasoning:
Solution probabilities at age 15
Urban sample

Variable	0	1	2	3	4	5	6	7	8	9	10	11	N
RATNSC5	2,8 %	6,5 %	7,5 %	19,6%	7,5 %	2,8 %	0,9 %	2,8 %	8,4 %	19,6%	21,5%	0 %	107

Table 14
Proportional reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating high

Variable	0	1	2	3	4	5	6	7	8	9	10	11	N
RATNSC5	3,8 %	0 %	3,8 %	9,4 %	5,7 %	1,9 %	0 %	0 %	5,7 %	11,3%	20,8%	37,7%	53

Teacher rating low

Variable	0	1	2	3	4	5	6	7	8	9	10	11	N
RATNSC5	1,9 %	13,0%	11,1%	29,6%	9,3 %	3,7 %	0 %	1,9 %	0 %	5,6 %	18,5%	5,6%	54

Table 15
Proportional reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender				male								
Variable	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**N**
RATNSC5	1,8 %	7,0 %	3,5 %	17,5%	7,0 %	0 %	3,5 %	1,8 %	1,8 %	7,0 %	22,8%	26,3%	57
Gender				**female**									
Variable	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**N**
RATNSC5	4,0 %	6,0 %	12,0%	22,0%	8,0 %	0 %	2,0 %	0,0 %	4,0 %	10,0%	16,0%	16,0%	50

Table 16 a
Proportional reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES				low									
Variable	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**N**
RATNSC5	1,8 %	8,9 %	10,7%	17,9%	8,9%	3,6 %	0,0 %	1,8 %	0,0 %	12,5%	21,4%	12,5%	56
SES				**high**									
Variable	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**N**
RATNSC5	3,9 %	3,9 %	3,9 %	21,6%	5,9%	2,0%	0,0%	0,0%	5,9%	3,9 %	17,6%	31,4%	51

Table 16 b
Proportional reasoning:
Solution probabilities at age 15
by social class at six categories
Urban sample

Variable	SES	0	1	2	3	4	5	7	8	9	10	11	N
RATNSC5	1	0 %	7,1 %	14,3%	14,3%	0,0 %	7,1%	7,1 %	0 %	7,1 %	28,6%	14,3%	14
RATNSC5	2	0 %	4,0 %	16,0%	28,0%	8,0 %	4,0 %	0 %	0 %	8,0 %	24,0%	8,0 %	25
RATNSC5	3	5,9 %	17,6%	0,0 %	5,9 %	17,6%	0 %	0 %	0 %	23,5%	11,8%	17,6%	17
RATNSC5	4	11,1%	0 %	11,1%	16,7%	5,6 %	5,6 %	0 %	5,6 %	5,6 %	5,6 %	33,3%	18
RATNSC5	5	0 %	5,0 %	0,0 %	25,0%	5,0 %	0 %	0 %	0 %	0 %	25,0%	40,0%	20
RATNSC5	6	0 %	7,7 %	0,0 %	23,1%	7,7 %	0 %	0 %	15,4%	7,7 %	23,1%	15,4%	13

Table 17
Proportional reasoning:
Solution probabilities at age 15
Urban sample

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	4,7 %	10,4 %	33,0 %	10,4 %	2,8 %	23,6 %	15,1 %	106

Table 18
Proportional reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating **high**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	1,9 %	5,7 %	18,9 %	11,3 %	5,7 %	26,4 %	30,2 %	53

Teacher rating **low**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	7,6 %	15,1 %	47,2 %	9,4 %	0 %	20,8 %	0 %	53

Table 19
Proportional reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender **male**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	5,4 %	7,1 %	33,9 %	8,9 %	3,6 %	23,2 %	17,9 %	56

Gender **female**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	4,0 %	14,0 %	32,0 %	12,0 %	2,0 %	24,0 %	12,0 %	50

Table 20 a
Proportional reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES **low**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	7,1 %	12,5%	32,1%	10,7%	1,8%	23,2%	12,5%	56

SES **high**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	2,0%	8,0%	34,0%	10,0%	4,0%	24,0%	18,0%	50

Table 20 b
Proportional reasoning:
Solution probabilities at age 15
by social class at six categories
Urban sample

Variable	Task	SES	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	low	7,1 %	14,3 %	28,6 %	7,1 %	0 %	42,9 %	0 %	14
RATXST5	Maxi stage/Interviewer	low/h	8,0 %	12,0 %	36,0 %	16,0 %	0 %	20,0 %	8,0 %	25
RATXST5	Maxi stage/Interviewer	middle	5,9 %	11,8 %	29,4 %	5,9 %	5,9 %	11,8 %	29,4 %	17
RATXST5	Maxi stage/Interviewer	mid/h	0 %	16,7 %	38,9 %	5,6 %	0,0 %	16,7 %	22,2 %	18
RATXST5	Maxi stage/Interviewer	high	0 %	5,3 %	31,6 %	5,3 %	5,3 %	26,3 %	26,3 %	19
RATXST5	Maxi stage/Interviewer	high/h	7,7 %	0,0 %	30,8 %	23,1 %	7,7 %	30,8 %	0,0 %	13

Table 21
Proportional reasoning:
Solution probabilities at age 15
Urban sample

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	3,8 %	8,6 %	30,8 %	10,6 %	1,9 %	19,2 %	25,0 %	104

Table 22
Proportional reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating **high**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	0 %	5,8 %	15,4 %	11,5 %	3,9 %	19,2 %	44,2 %	52

Teacher rating **low**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	7,7 %	11,5 %	46,2 %	9,6 %	0 %	19,2 %	5,8 %	53

Table 23
Proportional reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender **male**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	1,9 %	5,6 %	29,6 %	9,3 %	3,7 %	18,5 %	31,5 %	50

Gender **female**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	6,0 %	12,0 %	32,0 %	12,0 %	0,0 %	20,0 %	18,0 %	54

Table 24 a
Proportional reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATNST5	Mini stage/Interviewer	7,1%	8,9%	33,9%	8,9%	1,8%	21,4%	17,9%	56

SES		high							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATNST5	Mini stage/Interviewer	0,0%	8,3%	27,1%	12,5%	2,1%	16,7%	33,3%	48

Table 24 b
Proportional reasoning:
Solution probabilities at age 15
by social class at six categories
Urban sample

Variable	Task	SES	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	low	7,1 %	14,3%	28,6%	7,1 %	0 %	28,6%	14,3%	14
RATNST5	Mini stage/Interviewer	low/h	4,0 %	8,0 %	44,0%	8,0 %	0 %	24,0%	12,0%	25
RATNST5	Mini stage/Interviewer	middle	11,8%	5,9 %	23,5%	11,8%	5,9 %	11,8%	29,4%	17
RATNST5	Mini stage/Interviewer	mid/h	0 %	17,6%	29,4%	11,8%	0 %	5,9 %	35,3%	17
RATNST5	Mini stage/Interviewer	high	0 %	0 %	27,8%	0 %	0 %	27,8%	44,4%	18
RATNST5	Mini stage/Interviewer	high/h	0 %	7,7 %	23,1%	30,8%	7,7 %	15,4%	15,4%	13

Table 25
Proportional reasoning:
Solution probabilities at age 15
Urban sample

Variable	Task	oscillating	reflecting	certain	N
RATIMP5	Impression	35,4 %	24,1 %	40,5 %	79

Table 26
Proportional reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	22,2 %	27,8 %	50,0 %	36

Teacher rating		low			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	46,5 %	20,9 %	32,6 %	43

Table 27
Proportional reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	24,4 %	26,8 %	48,8 %	38
Gender		**female**			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	47,4 %	21,1 %	31,6 %	41

Table 28 a
Proportional reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	39,1%	26,1%	34,8%	46
SES		**high**			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	30,3%	21,2%	48,5%	33

Table 28 b
Proportional reasoning:
Solution probabilities at age 15
by social class at six categories
Urban sample

Variable	Task	SES	oscillating	reflecting	certain	N
RATIMP5	Impression	low	36,4 %	36,4 %	27,3 %	11
RATIMP5	Impression	low/h	40,0 %	30,0 %	30,0 %	20
RATIMP5	Impression	middle	40,0 %	13,3 %	46,7 %	15
RATIMP5	Impression	mid/h	28,6 %	28,6 %	42,9 %	14
RATIMP5	Impression	high	38,5 %	7,7 %	53,8 %	13
RATIMP5	Impression	high/h	16,7 %	33,3 %	50,0 %	6

Table 29
Proportional reasoning:
Solution probabilities at age 15
Urban sample

Variable	Task	yes	no	N
RATREC5	Recognition	28,8 %	71,3 %	80

Table 30
Proportional reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high		
Variable	Task	yes	no	N
RATREC5	Recognition	42,5 %	57,5 %	40
Teacher rating		**low**		
Variable	Task	yes	no	N
RATREC5	Recognition	15,0 %	85,0 %	40

Table 31
Proportional reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male		
Variable	Task	yes	no	N
RATREC5	Recognition	30,0 %	70,0 %	40
Gender		**female**		
Variable	Task	yes	no	N
RATREC5	Recognition	27,5 %	72,5 %	40

Table 32 a
Proportional reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		high		
Variable	Task	yes	no	N
RATREC5	Recognition	78,0 %	22,0 %	41
SES		**low**		
Variable	Task	yes	no	N
RATREC5	Recognition	64,1%	35,9%	39

Table 32 b
Proportional reasoning:
Solution probabilities at age 15
by social class at six categories
Urban sample

Variable	Task	SES	no	yes	N
RATREC5	Recognition	low	90,0 %	10,0 %	10
RATREC5	Recognition	low/h	72,2 %	27,8 %	18
RATREC5	Recognition	middle	76,9 %	23,1 %	13
RATREC5	Recognition	mid/h	64,3 %	35,7 %	14
RATREC5	Recognition	high	60,0 %	40,0 %	15
RATREC5	Recognition	high/h	70,0 %	30,0 %	10

Table 33
Proportional reasoning:
Solution probabilities at age 15
Urban sample

Variable	Task	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	72,5 %	1,3 %	26,3 %	80

Table 34
Proportional reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating **high**

Variable	Task	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	57,5 %	2,5 %	40,0 %	40

Teacher rating **low**

Variable	Task	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	87,5 %	0 %	12,5 %	40

Table 35
Proportional reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender **male**

Variable	Task	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	72,5 %	0 %	27,5 %	40

Gender **female**

Variable	Task	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	72,5 %	2,5 %	25,0 %	40

Table 36 a
Proportional reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable	**Task**	**Not recognized**	**Physik**	**Arithmetik**	**N**
RATSUJ5	Subject	78,0%	2,4 %	19,5%	41

SES		high			
Variable	**Task**	**Not recognized**	**Physik**	**Arithmetik**	**N**
RATSUJ5	Subject	66,7%	0,0%	33,3%	39

Table 36 b
Proportional reasoning:
Solution probabilities at age 15
by social class at six categories
Urban sample

Variable	Task	SES	Not recognized	Physik	Arithm.	N
RATSUJ5	Subject	low	90,0 %	0 %	10,0 %	10
RATSUJ5	Subject	low/h	72,2 %	0 %	27,8 %	18
RATSUJ5	Subject	middle	76,9 %	7,7 %	15,4 %	13
RATSUJ5	Subject	mid/h	64,3 %	0 %	35,7 %	14
RATSUJ5	Subject	high	66,7 %	0 %	33,3 %	15
RATSUJ5	Subject	high/h	70,0 %	0 %	30,0 %	10

Table 37
Proportional reasoning:
Solution probabilities at age 15
Urban sample

Variable	Task	0	1	4	6	7	8	9	N
RATWHN5	Recognition/ Grade	82,5%	3,8 %	1,3 %	1,3 %	3,8 %	2,5 %	5,0 %	80

Table 38
Proportional reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	Recognition/ Grade	72,5%	0 %	2,5 %	2,5 %	7,5 %	5,0 %	10,0%	40

Teacher rating		low							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	Recognition/ Grade	92,5%	7,5 %	0 %	0 %	0 %	0 %	0 %	40

Table 39
Proportional reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	**Recognition/ Grade**	82,5%	5,0 %	0 %	2,5 %	5,0 %	0 %	5,0 %	40
Gender		**female**							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	Recognition/ Grade	82,5%	2,5 %	2,5 %	0 %	2,5 %	5,0 %	5,0 %	40

Table 40 a
Proportional reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	**Recognition/ Grade**	80,5%	2,4%	2,4%	0,0%	4,9%	2,4%	7,3%	41
SES		**high**							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	Recognition/ Grade	84,6%	5,1%	0,0%	2,6%	2,6%	2,6%	2,6%	39

Table 40 b
Proportional reasoning:
Solution probabilities at age 15
by social class at six categories
Urban sample

Variable	Task	SES	0	1	4	6	7	8	9	N
RATWHN5	Recognition/ Grade	low	90,0%	10,0%	0 %	0 %	0 %	0 %	0 %	10
RATWHN5	Recognition/ Grade	low/h	77,8%	0 %	0 %	0 %	11,1%	0 %	11,1%	18
RATWHN5	Recognition/ Grade	middle	76,9%	0 %	7,7 %	0 %	0 %	7,7 %	7,7 %	13
RATWHN5	Recognition/ Grade	mid/h	85,7%	7,1 %	0 %	0 %	0 %	7,1 %	0 %	14
RATWHN5	Recognition/ Grade	high	80,0%	6,7 %	0 %	0 %	6,7 %	0 %	6,7 %	15
RATWHN5	Recognition/ Grade	high/h	90,0%	0 %	0 %	10,0%	0 %	0 %	0 %	10

Rural Sample

Table 41
Proportional reasoning:
Solution probabilities at age 15
Rural sample

Variable	Task	60	75	80	85	90	100	N
RATMAX5	Pred. Height/Mr. Maxi"	0 %	1,6 %	52,5%	1,6 %	36,1 %	8,2 %	61

Table 42
Proportional reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male						
Variable	**Task**	**60**	**75**	**80**	**85**	**90**	**100**	**N**
RATMAX5	Pred. Height/Mr. Maxi	0 %	3,0 %	42,4%	2,0%	45,5%	6,1%	33
Gender		**female**						
Variable	**Task**	**60**	**75**	**80**	**85**	**90**	**100**	**N**
RATMAX5	Pred. Height/Mr. Maxi"	0 %	0 %	64,3%	0 %	25,0%	10,7%	28

Table 43
Proportional reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North						
Variable	**Task**	**60**	**75**	**80**	**85**	**90**	**100**	**N**
RATMAX5	Pred. Height/Mr. Maxi"	0 %	0 %	57,9%	0 %	31,6%	10,5%	19
Region		**West**						
Variable	**Task**	**60**	**75**	**80**	**85**	**90**	**100**	**N**
RATMAX5	Pred. Height/Mr. Maxi"	0 %	5,6 %	66,7%	0 %	22,2%	5,6 %	18
Region		**South**						
Variable	**Task**	**60**	**75**	**80**	**85**	**90**	**100**	**N**
RATMAX5	Pred. Height/Mr. Maxi"	0 %	0 %	37,5%	4,2 %	50,0%	8,3 %	24

Table 44
Proportional reasoning:
Solution probabilities at age 15
Rural sample

Variable	Task	20	30	40	45	50	55	N
RATMIN5	Pred. Height/Mr. Mini"	1,6 %	6,6 %	14,8%	34,4%	41,0%	1,6 %	61

Table 45
Proportional reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male						
Variable	**Task**	**20**	**30**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	3,0 %	9,1 %	18,2%	39,4%	27,3%	3,0 %	33

Gender		female						
Variable	**Task**	**20**	**30**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	0 %	3,6 %	10,7%	28,6%	57,1%	0 %	28

Table 46
Proportional reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North						
Variable	**Task**	**20**	**30**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	0 %	0 %	0 %	42,1%	57,9%	0 %	19

Region		West						
Variable	**Task**	**20**	**30**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	5,6 %	16,7%	16,7%	27,8%	33,3%	0,0 %	18

Region		South						
Variable	**Task**	**20**	**30**	**40**	**45**	**50**	**55**	**N**
RATMIN5	Pred. Height/Mr. Mini "	0,0 %	4,2 %	25,0%	33,3%	33,3%	4,2 %	24

Table 47
Proportional reasoning:
Solution probabilities at age 15
Rural sample

Variable	1	2	3	4	5	6	7	8	9	10	11	N
RATXSC5	8,2%	19,7%	27,9%	1,6%	4,9%	0 %	0 %	1,6%	6,6%	19,7%	9,8%	61

Table 48
Proportional reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender	male											
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**N**
RATXSC5	6,1%	21,2%	18,2%	0,0%	9,1%	0,0%	0,0%	3,0%	9,1%	24,2%	9,1%	33

Gender	female											
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**N**
RATXSC5	10,7%	17,9%	39,3%	3,6%	0,0%	0,0%	0,0%	0,0%	3,6%	14,3 %	11 %	28

Table 49
Proportional reasoning:
Solution probabilities at age 15
by region
Rural sample

Region	North											
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**N**
RATXSC5	5,3 %	26,3%	31,6%	0,0 %	5,3 %	0,0 %	0,0 %	0,0 %	5,3 %	21,1%	5,3 %	19

Region	West											
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**N**
RATXSC5	5,6 %	22,2%	38,9%	0,0 %	5,6 %	0,0 %	0,0 %	0,0 %	5,6 %	22,2%	0,0%	18

Region	South											
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**N**
RATXSC5	12,5%	12,5%	16,7%	4,2 %	4,2 %	0,0 %	0,0 %	4,2 %	8,3 %	16,7%	20,8%	24

Table 50
Proportional reasoning:
Solution probabilities at age 15
Rural sample

Variable	**1**	**2**	**3**	**4**	**5**	**8**	**9**	**10**	**11**	**N**
RATNSC5	14,8	21,3	21,3	1,6	4,9	1,6	6,6	16,4	11,5	61

Table 51
Proportional reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender				male						
Variable	**1**	**2**	**3**	**4**	**5**	**8**	**9**	**10**	**11**	**N**
RATNSC5	15,2%	18,2%	15,2%	0 %	9,1 %	3,0 %	9,1 %	21,2%	9,1%	33
Gender				**female**						
Variable	**1**	**2**	**3**	**4**	**5**	**8**	**9**	**10**	**11**	**N**
RATNSC5	14,3%	25,0%	28,6%	3,6 %	0 %	0 %	3,6 %	10,7%	14,3%	28

Table 52
Proportional reasoning:
Solution probabilities at age 15
by region
Rural sample

Region				North						
Variable	**1**	**2**	**3**	**4**	**5**	**8**	**9**	**10**	**11**	**N**
RATNSC5	10,5%	26,3%	26,3%	0 %	5,3 %	0 %	5,3 %	26,3%	0 %	19
Region				**West**						
Variable	**1**	**2**	**3**	**4**	**5**	**8**	**9**	**10**	**11**	**N**
RATNSC5	16,7%	33,3%	22,2%	0 %	0 %	0 %	5,6%	16,7%	5,6%	18
Region				**South**						
Variable	**1**	**2**	**3**	**4**	**5**	**8**	**9**	**10**	**11**	**N**
RATNSC5	16,7%	8,3 %	16,7 %	4,2 %	8,3 %	4,2 %	8,3 %	8,3 %	25,0%	24

Table 53
Proportional reasoning:
Solution probabilities at age 15
Rural sample

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	4,9 %	41,0%	14,8%	14,8%	0 %	14,8%	9,8%	61

Table 54
Proportional reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATXST5	Maxi stage/Interviewer	3,0 %	30,3 %	18,2 %	18,2 %	0,0 %	21,2 %	9,1 %	33
Gender		**female**							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATXST5	Maxi stage/Interviewer	7,1 %	53,6 %	10,7 %	10,7 %	0,0 %	7,1 %	10,7 %	28

Table 55
Proportional reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATXST5	Maxi stage/Interviewer	5,3 %	57,9 %	5,3 %	21,1 %	0,0 %	5,3 %	5,3 %	19
Region		**West**							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATXST5	Maxi stage/Interviewer	0,0 %	44,4 %	27,8 %	5,6 %	0,0 %	22,2 %	0,0 %	18
Region		**South**							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATXST5	Maxi stage/Interviewer	8,3 %	25,0 %	12,5 %	16,7 %	0,0 %	16,7 %	20,8 %	24

Table 56
Proportional reasoning:
Solution probabilities at age 15
Rural sample

Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATNST5	Mini stage/Interviewer	11,5 %	39,3 %	11,5 %	14,8 %	0,0 %	11,5 %	11,5 %	61

Table 57
Proportional reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATNST5	Mini stage/Interviewer	12,1 %	30,3 %	12,1 %	18,2 %	0,0 %	18,2 %	9,1 %	33
Gender		**female**							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATNST5	Mini stage/Interviewer	10,7 %	50,0 %	10,7 %	10,7 %	0 %	3,6 %	14,3 %	28

Table 58
Proportional reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATNST5	Mini stage/Interviewer	10,5 %	52,6 %	5,3 %	21,1 %	0 %	10,5 %	0 %	19
Region		**West**							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATNST5	Mini stage/Interviewer	11,1 %	44,4 %	16,7 %	5,6 %	0 %	16,7 %	5,6 %	18
Region		**South**							
Variable	**Task**	**IA**	**IB**	**IIA**	**IIB**	**II-III**	**IIIA**	**IIIB**	**N**
RATNST5	Mini stage/Interviewer	12,5 %	25,0 %	12,5 %	16,7 %	0 %	8,3 %	25,0 %	24

Table 59
Proportional reasoning:
Solution probabilities at age 15
Rural sample

Variable	Task	oscillating	reflecting	certain	N
RATIMP5	Impression	38,5 %	42,3 %	19,2 %	26

Table 60
Proportional reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	43,8 %	37,5 %	18,8 %	16
Gender		**female**			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	30,0 %	50,0 %	20,0 %	10

Table 61
Proportional reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	28,6 %	42,9 %	28,6 %	7
Region		**West**			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	33,3 %	50,0 %	16,7 %	6
Region		**South**			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	46,2 %	38,5 %	15,4 %	13

Table 62
Proportional reasoning:
Solution probabilities at age 15
Rural sample

Variable	Task	yes	no	N
RATREC5	Recognition	18,8 %	81,3 %	32

Table 63
Proportional reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		**male**		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	**Recognition**	21,4 %	78,6 %	14

Gender		**female**		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	**Recognition**	16,7 %	83,3 %	18

Table 64
Proportional reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		**North**		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	Recognition	35,7 %	64,3 %	14

Region		**West**		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	Recognition	0 %	100 %	5

Region		**South**		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	Recognition	7,7 %	92,3 %	13

Table 65
Proportional reasoning:
Solution probabilities at age 15
Rural sample

Variable	**Task**	**Not recognized**	**Physik**	**Arithmetik**	**N**
RATSUJ5	Subject	81,3 %	3,1 %	15,6 %	32

Table 66
Proportional reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		**male**			
Variable	Task	**Not recognized**	**Physik**	**Arithmetik**	**N**
RATSUJ5	Subject	78,6 %	7,1 %	14,3 %	14
Gender		**female**			
Variable	**Task**	**Not recognized**	**Physik**	**Arithmetik**	**N**
RATSUJ5	Subject	83,3 %	0,0 %	16,7 %	18

Table 67
Proportional reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		**North**			
Variable	**Task**	**Not recognized**	**Physik**	**Arithmetik**	**N**
RATSUJ5	Subject	64,3 %	7,1 %	28,6 %	14
Region		**West**			
Variable	**Task**	**Not recognized**	**Physik**	**Arithmetik**	**N**
RATSUJ5	Subject	100 %	0 %	0 %	5
Region		**South**			
Variable	**Task**	**Not recognized**	**Physik**	**Arithmetik**	**N**
RATSUJ5	Subject	92,3 %	0,0 %	7,7 %	13

Table 68
Proportional reasoning:
Solution probabilities at age 15
Rural sample

Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	Recognition/ Grade	84,4 %	0 %	0 %	3,1 %	3,1 %	3,1 %	6,3 %	32

Table 69
Proportional reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		**male**							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	Recognition/ Grade	85,7 %	0,0 %	0,0 %	7,1 %	0,0 %	0,0 %	7,1 %	14
Gender		**female**							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	Recognition/ Grade	83,3 %	0.0 %	0,0 %	0,0 %	5,6 %	5,6 %	5,6 %	18

Table 70
Proportional reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		**North**							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	Recognition/ Grade	64,3 %	0 %	0 %	7,1 %	7,1 %	7,1 %	14,3 %	14
Region		**West**							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	Recognition/ Grade	100 %	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	5
Region		**South**							
Variable	**Task**	**0**	**1**	**4**	**6**	**7**	**8**	**9**	**N**
RATWHN5	Recognition/ Grade	100%	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	13

2.7. Assessment of the seventeen year old children

Urban sample

Table 71
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	Task	70	80	90	100	N
RATMAX6	Pred. Height/Mr. Maxi	3,4 %	33,9 %	61,0 %	1,7 %	59

Table 72
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high				
Variable	Task	70	80	90	100	N
RATMAX6	Pred. Height/Mr. Maxi"	0,0 %	15,4 %	84,6 %	0,0 %	39
Teacher rating		**low**				
Variable	Task	70	80	90	100	N
RATMAX6	Pred. Height/Mr. Maxi"	10,0 %	70,0 %	15,0 %	5,0 %	20

Table 73
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male				
Variable	Task	70	80	90	100	N
RATMAX6	Pred. Height/Mr. Maxi"	4,0 %	16,0 %	80,0 %	0,0 %	25
Gender		**female**				
Variable	Task	70	80	90	100	N
RATMAX6	Pred. Height/Mr. Maxi"	2,9 %	47,1 %	47,1 %	2,9 %	34

Table 74
Proportional reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low				
Variable	**Task**	**70**	**80**	**90**	**100**	**N**
RATMAX6	Pred. Height/Mr. Maxi"	8,0%	36,0%	56,0%	0,0%	25
SES		**high**				
Variable	**Task**	**70**	**80**	**90**	**100**	**N**
RATMAX6	Pred. Height/Mr. Maxi"	0,0%	32,4%	64,7%	2,9%	34

Table 75
Proportional reasoning:
Solution probabilities at age 17
by social class at six categories
Urban sample

Variable	Task	SES	70	80	90	100	N
RATMAX6	Pred. Height/Mr. Maxi"	low	14,3 %	57,1 %	28,6 %	0,0 %	7
RATMAX6	Pred. Height/Mr. Maxi"	low/h	0,0 %	11,1 %	88,9 %	0,0 %	9
RATMAX6	Pred. Height/Mr. Maxi"	middle	11,1 %	44,4 %	44,4 %	0,0 %	9
RATMAX6	Pred. Height/Mr. Maxi"	mid/h	0,0 %	28,6 %	64,3 %	7,1 %	14
RATMAX6	Pred. Height/Mr. Maxi"	high	0,0 %	33,3 %	66,7 %	0,0 %	12
RATMAX6	Pred. Height/Mr. Maxi"	high/h	0,0 %	37,5 %	62,5 %	0,0 %	8

Table 76
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	Task	15	20	40	45	50	N
RATMIN6	Pred. Height/Mr. Mini"	1,7 %	1,7 %	6,8 %	64,4 %	25,4 %	59

Table 77
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high					
Variable	**Task**	**15**	**20**	**40**	**45**	**50**	**N**
RATMIN5	Pred. Height/Mr. Mini "	0,0 %	0,0 %	2,6 %	84,6 %	12,8 %	39
Teacher rating		**low**					
Variable	**Task**	**15**	**20**	**40**	**45**	**50**	**N**
RATMIN5	Pred. Height/Mr. Mini "	5,0 %	5,0 %	15,0 %	25,0 %	50,0 %	20

Table 78
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male					
Variable	**Task**	**15**	**20**	**40**	**45**	**50**	**N**
RATMIN5	Pred. Height/Mr. Mini "	4,0 %	0,0 %	4,0 %	84,0 %	8,0 %	25
Gender		**female**					
Variable	**Task**	**15**	**20**	**40**	**45**	**50**	**N**
RATMIN5	Pred. Height/Mr. Mini "	0,0 %	2,9 %	8,8 %	50,0 %	38,2 %	34

Table 79 a
Proportional reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low					
Variable	**Task**	**15**	**20**	**40**	**45**	**50**	**N**
RATMIN5	Pred. Height/Mr. Mini "	4,0 %	0,0 %	8,0 %	60,0 %	28,0 %	25
SES		**high**					
Variable	**Task**	**15**	**20**	**40**	**45**	**50**	**N**
RATMIN5	Pred. Height/Mr. Mini "	0,0 %	2,9 %	5,9 %	67,6 %	23,5 %	34

Table 79 b
Proportional reasoning:
Solution probabilities at age 17
by social class at six categories
Urban sample

Variable	Task	SES	15	20	40	45	50	N
RATMIN5	Pred. Height/Mr. Mini "	low	14,3%	0,0 %	0,0 %	57,1%	28,6%	7
RATMIN5	Pred. Height/Mr. Mini "	l/h	0,0 %	0,0 %	0,0 %	77,8%	22,2%	9
RATMIN5	Pred. Height/Mr. Mini "	m/l	0,0 %	0,0 %	22,2%	44,4%	33,3%	9
RATMIN5	Pred. Height/Mr. Mini "	m/h	0,0 %	7,1 %	7,1%	71,4%	14,3%	14
RATMIN5	Pred. Height/Mr. Mini "	h/l	0,0 %	0,0 %	0,0%	66,7%	33,3%	12
RATMIN5	Pred. Height/Mr. Mini "	h/h	0,0 %	0,0 %	12,5%	62,5%	25,0%	8

Table 80
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	0	1	2	3	4	8	9	10	11	N
RATXSC6	0,0 %	3,4 %	15,3%	15,3%	5,1 %	3,4 %	1,7 %	18,6%	37,3%	59

Table 81
Solution probability in the concept of proportion
at age 17/ Urban sample
Teacher rating

Teacher rating **high**

Variable	0	1	2	3	4	8	9	10	11	N
RATXSC6	0,0 %	0,0 %	2,6 %	7,7 %	5,1 %	5,1 %	0,0 %	25,6%	53,8%	39

Teacher rating **low**

Variable	0	1	2	3	4	8	9	10	11	N
RATXSC6	0,0 %	10,0%	40,0%	30,0%	5,5 %	0,0 %	5,0 %	5,0 %	5,0 %	20

Table 82
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender **male**

Variable	0	1	2	3	4	8	9	10	11	N
RATXSC6	0,0 %	4,0 %	4,0 %	8,0 %	4,0 %	8,0 %	0,0 %	20,0%	52,0%	25

Gender **female**

Variable	0	1	2	3	4	8	9	10	11	N
RATXSC6	0 %	2,9 %	23,5%	20,6%	5,9 %	0,0 %	2,9 %	17,6%	25,5%	34

Table 83 a
Proportional reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES				low						
Variable	**0**	**1**	**2**	**3**	**4**	**8**	**9**	**10**	**11**	**N**
RATXSC6	0,0 %	8,0 %	16,0%	16,0%	4,0 %	4,0 %	0,0 %	20,0%	32,0%	25

SES				high						
Variable	**0**	**1**	**2**	**3**	**4**	**8**	**9**	**10**	**11**	**N**
RATXSC6	0,0 %	0,0 %	14,7%	14,7%	5,9 %	2,9 %	2,9 %	17,6%	41,2%	34

Table 83 b
Proportional reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable	SES	1	2	3	4	8	9	10	11	N
RATXSC6	1	14,3%	28,6%	14,3%	14,3%	0,0 %	0,0 %	14,3%	14,3%	7
RATXSC6	2	0,0 %	0,0 %	11,1%	0,0 %	11,1%	0,0 %	33,3%	44,4%	9
RATXSC6	3	11,1%	22,2%	22,2%	0,0 %	0,0 %	0,0 %	11,1%	33,3%	9
RATXSC6	4	0,0 %	21,4%	7,1 %	7,1 %	0.0 %	7,1 %	7,1 %	50,0%	14
RATXSC6	5	0,0 %	8,3 %	16,7%	8,3 %	8,3 %	0,0 %	16,7%	41,7%	12
RATXSC6	6	0,0 %	12,5%	25,0%	0,0 %	0,0 %	0,0 %	37,5%	25,0%	8

Table 84
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	0	1	2	3	4	6	8	9	10	11	N
RATNSC5	0,0 %	6,9 %	15,3%	11,9%	3,4 %	1,7 %	1,7 %	1,7 %	18,6%	39,0%	59

Table 85
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating				high							
Variable	**0**	**1**	**2**	**3**	**4**	**6**	**8**	**9**	**10**	**11**	**N**
RATNSC6	0,0 %	2,6 %	5,1 %	5,1 %	2,6 %	2,6 %	2,6 %	0,0 %	23,1%	56,4%	39

Teacher rating				low							
Variable	**0**	**1**	**2**	**3**	**4**	**6**	**8**	**9**	**10**	**11**	**N**
RATNSC6	0,0 %	15,0%	35,0%	25,0%	5,0 %	0,0 %	0,0 %	5,0 %	10,0%	5,0%	20

Table 86
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender				male							
Variable	**0**	**1**	**2**	**3**	**4**	**6**	**8**	**9**	**10**	**11**	**N**
RATNSC6	0,0 %	4.0 %	8,0 %	4,0 %	0,0 %	4,0 %	4,0 %	0,0 %	24,0%	52,0%	25
Gender				**female**							
Variable	**0**	**1**	**2**	**3**	**4**	**6**	**8**	**9**	**10**	**11**	**N**
RATNSC6	0,0 %	8,8 %	20,6%	17,6%	5,9 %	0,0 %	0,0 %	2,9 %	14,7%	29,4%	34

Table 87 a
Proportional reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES				low							
Variable	**0**	**1**	**2**	**3**	**4**	**6**	**8**	**9**	**10**	**11**	**N**
RATNSC6	0,0 %	16,0%	16,0%	8,0%	4,0%	0,0%	4,0%	4,0%	16,0%	32,0%	25
SES				**high**							
Variable	**0**	**1**	**2**	**3**	**4**	**6**	**8**	**9**	**10**	**11**	**N**
RATNSC6	0,0 %	0,0%	14,7%	14,7%	2,9%	2,9%	0,0%	0,0%	20,6%	44,1%	34

Table 87 b
Proportional reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable	SES	0	1	2	3	4	6	8	9	10	11	N
RATNSC6	1	0,0 %	28,6%	14,3%	0,0 %	14,3%	0,0 %	0,0 %	14,3%	14,3%	14,3%	7
RATNSC6	2	0,0 %	11,1%	0,0 %	11,1%	0,0 %	0,0 %	11,1%	0,0 %	11,1%	66,6%	9
RATNSC6	3	0,0 %	11,1%	33,3%	11,1%	0,0 %	0,0 %	0,0 %	0,0 %	22,2%	22,2%	9
RATNSC6	4	0,0 %	0,0%	21,4%	7,1 %	0,0 %	7,1 %	0,0 %	0,0 %	14,3%	60,0%	14
RATNSC6	6	0,0 %	0,0%	8,3 %	16,7%	8,3 %	0,0 %	0,0 %	0,0 %	26,0%	41,7%	12
RATNSC6	6	0,0 %	0,0%	12,6%	25,0%	0,0 %	0,0 %	0,0 %	0,0 %	25,0%	37,5%	8

Table 88
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	3,4 %	16,9%	16,9%	6,8 %	0,0 %	22,0%	33,9%	59

Table 89
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating **high**

Variable	Task	IA	IB	IIA	IIB	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	0,0 %	2,6 %	10,3 %	7,7 %	30,8 %	48,7 %	39

Teacher rating **low**

Variable	Task	IA	IB	IIA	IIB	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	10,0 %	45,0 %	30,0 %	5,0 %	5,0 %	5,0 %	20

Table 90
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender **male**

Variable	Task	IA	IB	IIA	IIB	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	4,0 %	4,0 %	8,0 %	12,0 %	24,0 %	48,0 %	25

Gender **female**

Variable	Task	IA	IB	IIA	IIB	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	2,9 %	26,5 %	23,5 %	2,9 %	20,6 %	23,5 %	34

Table 91 a
Proportional reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES **low**

Variable	Task	IA	IB	IIA	IIB	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	8,0 %	16,0%	16,0%	8,0%	28,0%	24,0%	25

SES **high**

Variable	Task	IA	IB	IIA	IIB	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	0,0 %	17,6%	17,6%	5,9%	17,6%	41,2%	34

Table 91b
Proportional reasoning:
Solution probabilities at age 17
by social class at six categories
Urban sample

Variable	Task	SES	IA	IB	IIA	IIB	IIIA	IIIB	N
RATXST5	Maxi stage/Interviewer	low	14,3 %	28,6 %	28,6 %	0,0 %	14,3 %	14,3 %	7
RATXST5	Maxi stage/Interviewer	low/h	0,0 %	0,0 %	11,1 %	11,1 %	55,6 %	22,2 %	9
RATXST5	Maxi stage/Interviewer	middle	11,1 %	22,2 %	11,1 %	11,1 %	11,1 %	33,3 %	9
RATXST5	Maxi stage/Interviewer	mid/h	0,0 %	21,4 %	14,3 %	7,1 %	7,1 %	50,0 %	14
RATXST5	Maxi stage/Interviewer	high	0,0 %	8,3 %	25,0 %	8,3 %	16,7 %	41,7 %	12
RATXST5	Maxi stage/Interviewer	high/h	0,0 %	25,0 %	12,5 %	0,0 %	37,5 %	25,0 %	8

Table 92
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	Task	IA	IB	IIA	IIB	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	5,1 %	16,9 %	15,3 %	5,1 %	18,6 %	39,0 %	59

Table 93
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating **high**

Variable	Task	IA	IB	IIA	IIB	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	2,6 %	2,6 %	10,3 %	7,7 %	20,5 %	56,4 %	39

Teacher rating **low**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	10,0 %	45,0 %	25,0 %	0,0 %	0,0 %	15,0 %	5,0 %	20

Table 94
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender **male**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	4,0 %	4,0 %	8,0 %	12,0 %	0,0 %	20,0 %	52,0 %	25

Gender **female**

Variable	Task	IA	IB	IIA	IIB	II-III	IIIA	IIIB	N
RATNST5	Mini stage/Interviewer	5,9 %	26,5 %	20,6 %	0,0 %	0,0 %	17,6 %	29,4 %	34

Table 95
Proportional reasoning:
Solution probabilities at age 17
by social class at six categories
Urban sample

Variable	SES	IA	IB	IIA	IIB	II-III	IIIA	III B	N
RATNST5	low	14,3 %	28,6 %	14,3 %	0,0 %	0,0 %	28,6 %	14,3 %	7
RATNST5	low/h	11,1 %	0,0 %	11,1 %	11,1 %	0,0 %	11,1 %	55,6 %	9
RATNST5	middle	11,1 %	22,2 %	22,2 %	0,0 %	0,0 %	22,2 %	22,2 %	9
RATNST5	mid/h	0,0 %	21,4 %	7,1 %	7,1 %	0,0 %	14,3 %	50,0 %	14
RATNST5	high	0,0 %	8,3 %	25,0 %	8,3 %	0,0 %	16,7 %	41,7 %	12
RATNST5	high/h	0,0 %	25,0 %	12,5 %	0,0 %	0,0 %	25,0 %	37,5 %	8

Table 96
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	Task	oscillating	reflecting	certain	N
RATIMP5	Impression	7,9 %	31,6 %	60,5 %	38

Table 97
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating **high**

Variable	Task	oscillating	reflecting	certain	N
RATIMP5	Impression	10,3 %	31,0 %	58,6 %	29

Teacher rating **low**

Variable	Task	oscillating	reflecting	certain	N
RATIMP5	Impression	0,0 %	33,3 %	66,7 %	9

Table 98
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender **male**

Variable	Task	oscillating	reflecting	certain	N
RATIMP5	Impression	12,5 %	25,0 %	62,5 %	16

Gender **female**

Variable	Task	oscillating	reflecting	certain	N
RATIMP5	Impression	4,5 %	36,4 %	59,1 %	22

Table 98
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	12,5 %	25,0 %	62,5 %	16
Gender		**female**			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	4,5 %	36,4 %	59,1 %	22

Table 99 a
Proportional reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	16,7 %	33,3 %	50,0 %	18
SES		**high**			
Variable	**Task**	**oscillating**	**reflecting**	**certain**	**N**
RATIMP5	Impression	0,0 %	3,0 %	70,0%	20

Table 99 b
Proportional reasoning:
Solution probabilities at age 17
by social class at six categories
Urban sample

Variable	Task	SES	oscillating	reflecting	certain	N
RATIMP5	Impression	low	20,0 %	40,0 %	40,0 %	5
RATIMP5	Impression	low/h	11,1 %	11,1 %	77,8 %	9
RATIMP5	Impression	middle	25,0 %	75,0 %	0,0 %	4
RATIMP5	Impression	mid/h	0,0 %	50,0 %	50,0 %	6
RATIMP5	Impression	high	0,0 %	33,3 %	66,7 %	9
RATIMP5	Impression	high/h	0,0 %	0,0 %	100,0 %	5

Table 100
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	Task	yes	no	N
RATREC5	Recognition	51,2 %	48,8 %	43

Table 101
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	Recognition	53,1 %	46,9 %	32

Teacher rating		low		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	Recognition	36,4 %	63,6 %	11

Table 102
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	Recognition	55,0 %	45,0 %	20

Gender		female		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	Recognition	43,5 %	56,5 %	23

Table 103 a
Proportional reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	Recognition	60,0 %	40,0 %	20

SES		high		
Variable	**Task**	**yes**	**no**	**N**
RATREC5	Recognition	43,5 %	56,5 %	23

Table 103 b
Proportional reasoning:
Solution probabilities at age 17
by social class at six categories
Urban sample

Variable	Task	SES	no	yes	N
RATREC5	Recognition	low	60,0 %	40,0 %	5
RATREC5	Recognition	low/h	33,3 %	66,7 %	9
RATREC5	Recognition	middle	100,0 %	0,0 %	6
RATREC5	Recognition	mid/h	37,5 %	62,5 %	8
RATREC5	Recognition	high	55,6 %	44,4 %	9
RATREC5	Recognition	high/h	33,3 %	66,7 %	6

Table 104
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	Task	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	53,5 %	2,3 %	44,2 %	43

Table 105
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating high

Variable	Task	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	46,9 %	3,1 %	50,0 %	32

Teacher rating low

Variable	Task	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	72,7 %	0,0 %	27,3 %	11

Table 106
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender male

Variable	Task	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	45,0 %	0,0 %	55,0 %	20

Gender female

Variable	Task	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	60,9 %	4,3 %	34,8 %	23

Table 107 a
Proportional reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable	**Task**	**Not recognized**	**Physik**	**Arithmetik**	**N**
RATSUJ5	Subject	60,0 %	5,0 %	35,0 %	20

SES		high			
Variable	**Task**	**Not rec.**	**Physik**	**Arithmetik**	**N**
RATSUJ5	Subject	47,8 %	0,0 %	52,2 %	23

Table 107 b
Proportional reasoning:
Solution probabilities at age 17
by social class at six categories
Urban sample

Variable	Task	SES	Not recognized	Physik	Arithmetik	N
RATSUJ5	Subject	low	60,0 %	0,0 %	40,0 %	5
RATSUJ5	Subject	low/h	33,3 %	11,1 %	55,6 %	9
RATSUJ5	Subject	middle	100,0 %	0,0 %	0,0 %	6
RATSUJ5	Subject	mid/h	37,5 %	0,0 %	62,5 %	8
RATSUJ5	Subject	high	66,7 %	0,0 %	33,3 %	9
RATSUJ5	Subject	high/h	33,3 %	0,0 %	66,7 %	6

Table 108
Proportional reasoning:
Solution probabilities at age 17
Urban sample

Variable	Task	0	1	7	9	10	11	N
RATWHN6	Recognition/ Grade	76,7%	2,3 %	4,7 %	9,3 %	4,7 %	2,3 %	43

Table 109
Proportional reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high						
Variable	**Task**	**0**	**1**	**7**	**9**	**10**	**11**	**N**
RATWHN6	Recognition/ Grade	75,0%	0,0 %	3,1 %	12,5%	6,3 %	3,1 %	32

Teacher rating		low						
Variable	**Task**	**0**	**1**	**7**	**9**	**10**	**11**	**N**
RATWHN6	Recognition/ Grade	81,8%	9,1 %	9,1 %	0,0 %	0,0 %	0,0 %	11

Table 110
Proportional reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male						
Variable	**Task**	**0**	**1**	**7**	**9**	**10**	**11**	**N**
RATWHN6	Recognition/ Grade	80,0 %	0,0 %	0,0 %	15,0 %	5,0 %	0,0 %	20
Gender		**female**						
Variable	**Task**	**0**	**1**	**7**	**9**	**10**	**11**	**N**
RATWHN6	Recognition/ Grade	73,9%	4,3 %	8,7 %	4,3 %	4,3 %	4,3 %	23

Table 111 a
Proportional reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low						
Variable	**Task**	**0**	**1**	**7**	**9**	**10**	**11**	**N**
RATWHN6	Recognition/ Grade	80,0 %	0,0 %	5,0 %	10,0 %	5,0 %	0,0 %	20
SES		**high**						
Variable	**Task**	**0**	**1**	**7**	**9**	**10**	**11**	**N**
RATWHN6	Recognition/ Grade	73,9 %	4,3 %	4,3 %	8,7 %	4,3 %	4,3 %	23

Table 111 b
Proportional reasoning:
Solution probabilities at age 17
by social class at six categories
Urban sample

Variable	SES	0	1	7	9	10	11	N
RATWHN6	low	80,0 %	0,0 %	20,0 %	0,0 %	0,0 %	0,0 %	5
RATWHN6	low/h	66,7 %	0,0 %	0,0 %	22,2 %	11,1 %	0,0 %	9
RATWHN6	middle	100,0 %	0,0 %	0,0 %	0,0 %	0,0 %	0,0 %	6
RATWHN6	mid/h	75,0 %	0,0 %	0,0 %	12,5 %	12,5 %	0,0 %	8
RATWHN6	high	77,8 %	11,1 %	0,0 %	0,0 %	0,0 %	11,1 %	9
RATWHN6	high/h	66,7 %	0,0 %	16,7 %	16,7 %	0,0 %	0,0 %	6

3. Correlations

3.1. Introduction

Inhelder & Piaget (1958) analyzed the formation of the correlation concept in the context of their research on the development of formal operational reasoning. They take the acquisition of the propositional combinatorial system, i.e. the acquisition of the 16 binary operations to be a prerequisite for the understanding of correlation. Both the total of the 16 binary operations and the subset that is involved in the correlation concept can be derived from the logical product of negation and affirmation of two propositions p and q.

This product can be illustrated by the cells of a double entry table: The elements of the logical product correspond to the four cells (pq v -pq v p-q v -p-q). The operation of equivalence (pq v -p-q) and reciprocal exclusion (-pq v p-q), i.e. the two diagonals of the double entry table, are part of the logical structure of correlation. To decide if two features are correlated, the subject has to compare the positive instances, i.e. the cases in the first diagonal, to the negative instances, which can be located in the second diagonal of a two entry table. Thus, she must place pq v -p-q in opposition to p-q v -pq, which requires the ability to separate these two combinations from the entire set of the 16 possible combinations, i.e. it requires formal operational reasoning. Therefore, it is not constructed in the cognition of most adults.

Inhelder & Piaget studied the correlation concept with the following task: The subject is presented 40 cards showing faces. Both coloring of hair and eyes are varied so that four association patterns emerge: a (blue eyes and blond hair), b (blue eyes and brown hair), c (brown eyes and blond hair) and d (brown eyes and brown hair). The cards were presented in sets with different relative frequencies of each pattern (4, 0, 0 and 4 vs. 4, 4, 4, 4 vs. 13, 8, 3, 8).

Two formal operational substages in the development of correlation are described by Inhelder & Piaget (1958): At stage III A, the subject can recognize single associations between features, but he is not able to recognize the relationship between these associations: Thus, the subject is not able to realize that a and d or b and c are reciprocal, consequently, he compares a to b or d to c when deciding about a possible association, but fails to compute the ratio between the two diagonals a+d and b+c. The elaborate concept of correlation as proportion between two sums is created at stage III B: Here, the subject understands the reciprocity between both a and d and b and c and the relationship of inversion between both types of cases. The number of positive instances, a+d, is directly related to the negative instances, b+c.

3.2. Description of the measures: equipment and materials

To measure the concept 'correlation', four piles of pictures with mice were presented. The animals were of similar shape and expression, but fur and eye colour varied between dark or light. Four combinations of correlation between eye colour and fur were possible:
(a) light fur, light eyes
(b) light fur, dark eyes
(c) dark fur, light eyes
(d) dark fur, dark eyes
The I prepares the test by composing the picture piles in the following way:

	(a)	(b)	(c)	(d)	
Pile (0):	4	3	3	2	Preparatory set
Pile (1):	6	0	0	6	Mixed pile with perfect correlation
Pile (2):	4	1	2	5	Mixed pile with partial correlation
Pile (3):	3	3	3	3	Equal distribution, no correlation

3.3. Investigation procedures and task instructions

Pile (0)
The I starts by mixing pile (0) and distributes the pictures such that four rows with three cards each lie in front of the S.
I: "Can you sort the cards in a way you consider it to be most natural ?"
After the S has sorted the cards, the I asks: "According to what principle did you sort the cards?". The I collects the cards afterwards and places them aside.
Pile (1)
The I arranges the cards of pile (1) in front of the S by placing them in the following way:
a d d
a d a
d a a
d a d
I: "When you look at these cards, you think there is a relationship between fur and eye colour?"
The S answers.
I: "Why do you think there is a relationship / no relationship between fur colour and eye colour of the animals you see on these cards?". The S. answers.
I: "Which cards/ which animals confirm this relationship?". The S. answers.
I: "Can you predict the eye colour from the colour of the fur?". The S. answers.

I: "Let's look at the next pile!". The former pile is left on the table.

Pile (2)

Keeping sufficient distance from pile (1,) the I orders the pictures of file (2) in the following way:

a d d
a b c
c a d
d a d

I: "When you look at these cards, you think there is a relationship between fur and eye colour?"

The S answers.

I: "Why do you think there is a relationship / no relationship between fur colour and eye colour of the animals you see on these cards?". The S. answers.

I: "How do you know?". The S. answers.

I: "Which animals confirm this relationship?". The S. answers.

In case the answer to the first question is negative, the I asks: "Which animals would confirm this relationship ?". The S. answers.

If some cards are ignored ('discrepant animals'), the I asks: "What about the other animals?".

In case the S gives no answer, pile (2) is finished.

Otherwise, the I asks: "How many animals do confirm this relationship altogether? The S. answers.

I: "Can you explain this generally: How is the relationship between eye and fur colour on these cards?". S. explains.

I: "Can you predict the eye colour form the colour of the fur?". The S. answers.

I: "Let's look at the next pile!". The cards are left on the table.

Pile (3)

The I puts the cards from pile (3) on the table keeping sufficient distance from the pictures of the former rounds.

c d b
a b d
b a c
c d a

I: "When you look at these cards, do you think there is a relationship between fur and eye colour?"

The S answers.

I: "Why do you think so ? Can you explain it ?".The S. answers.
I: "Are there any animals left that confirm this relationship ? How many animals confirm this relationship?". The S. answers.
I: "What about the other animals ? How many of the remaining animals confirm this relationship?".
I: "Can you explain this generally: How is the relationship between eye and fur colour ?" S. explains.
If the S. recognized a relationship between pile (1) and pile (2), the I asks:
"If you compare pile (1) and pile (2), do you think the relationship in pile (2) is smaller, is equal or is greater than in pile (1) ?". The S answers.
I: "How do you know that ? Can you explain it ?". The S answers.
At the end of the investigation, the I asks:
"Do the tasks remind you of something you learned in school? In which subject did you learn this ? Can you remember the time you learned these matters ? In which school did this happen? Is this the same school you presently attend ?"

3.4. Scoring instructions and coding rules

The following answers were coded:
Pile (0)
Explanation of the sorting *(unsystematic/ figurative/ systematic)*
Pile (1)

- Correct prediction *(yes/no)*
- Adequacy of explanation *(adequate / inadequate)*
- Correct recognition of relationship *(yes/no)*
- Adequacy of explanation *(adequate / inadequate)*
- Confirming cases 'A' *(not mentioned/ mentioned/ not documented)*
- Confirming cases 'B' *(not mentioned/ mentioned/ not documented)*
- Confirming cases 'C' *(not mentioned/ mentioned/ not documented)*
- Confirming cases 'D' *(not mentioned/ mentioned/ not documented)*
- Number of cases confirming relationship

Pile (2)

- Correct recognition of relationship *(yes/no)*
- Adequacy of explanation *(adequate / inadequate)*
- Correct prediction *(yes/no)*
- Adequacy of explanation *(adequate/inadequate)*
- Confirming cases 'A' *(not mentioned/ mentioned/ not documented)*

- Confirming cases 'B' *(not mentioned/ mentioned/ not documented)*
- Confirming cases 'C' *(not mentioned/ mentioned/ not documented)*
- Confirming cases 'D' *(not mentioned/ mentioned/ not documented)*
- Number of cases confirming relationship
- Non-confirming cases 'A' *(not mentioned/ mentioned/ not documented)*
- Non-confirming cases 'B' *(not mentioned/ mentioned/ not documented)*
- Non-confirming cases 'C' *(not mentioned/ mentioned/ not documented)*
- Non-confirming cases 'D' *(not mentioned/ mentioned/ not documented)*
- Number of cases not confirming relationship

Pile (3)

- Correct recognition of relationship *(yes/no)*
- Adequacy of explanation *(adequate / inadequate)*
- Confirming cases 'A' *(not mentioned/ mentioned/ not documented)*
- Confirming cases 'B' *(not mentioned/ mentioned/ not documented)*
- Confirming cases 'C' *(not mentioned/ mentioned/ not documented)*
- Confirming cases 'D' *(not mentioned/ mentioned/ not documented)*
- Number of cases confirming relationship
- Non-confirming cases 'A' *(not mentioned/ mentioned/ not documented)*
- Non-confirming cases 'B' *(not mentioned/ mentioned/ not documented)*
- Non-confirming cases 'C' *(not mentioned/ mentioned/ not documented)*
- Non-confirming cases 'D' *(not mentioned/ mentioned/ not documented)*
- Number of cases not confirming relationship

Comparison between pile (1) and pile (2)

- Relationship between pile (1) and pile (2) *(equal/ higher/ lower)*
- Adequacy of explanation *(adequate / inadequate)*
- Transformation: Correlation stronger in pile (2) *(Transformation inadequate/ transformation by compensation / negation of non-confirming cases/ both)*
- Transformation: Correlation lower in pile (2) *(Transformation inadequate/ transformation by compensation / negation of non-confirming cases/ both)*
- Does subject know tasks from school ? *(Yes/ No)*
- From which subject does the subject know the tasks ?
- From which class ?
- Same / different school as presently attended ?
- Name of school ?
- Impression of subject (oscillating/ reflexive/ certain)

Structure-genetic coding

Stage I	*preoperational* non-probabilistic
Stage II	*concrete-operational* Subject notices a correlation in pile (1), but in the explanation only one feature combination is considered (either (a) or (d)). In pile (2) or (3) similar argumentation but without adequate relating of features.
Stage III	*formal operations*
III A	Complementary events are treated as valid cases ((a) and (d)). For pile (2) S denies any relationship between the features because of the deviant combinations. Deterministic conceptualization of relationship
III A,B	Same as above, but without deterministic conceptualization. Emerging concept of probability. In pile (2) a relationship between the features is stated.
III B	As above, but when comparing the sets the relationships are estimated correctly with regard to both negative and positive cases.

3.5. List of variables

3.5.1. Variables at age fifteen (fifth measurement occasion)

CRSORT5	explanation of sorting
CRPRE51	prediction of set 1
CRPRA51	adequacy of prediction of set 1
CRPRA52	adequacy of prediction of set 2
CRJUD51	judgment of correlation set 1
CRJUD52	judgment of correlation set 2
CRJUD53	judgment of correlation set 3
CRJUA51	adequacy of explanation set 1
CRJUA52	adequacy of explanation set 2
CRJUA53	adequacy of explanation set 3
CRCON51A	confirming cases "A"
CRCON51B	confirming cases "B"
CRCON51C	confirming cases "C"
CRCON51D	confirming cases "D"
CRCON52A	confirming cases "A"
CRCON52B	confirming cases "B"
CRCON52C	confirming cases "C"
CRCON52D	confirming cases "D"
CRCON53A	confirming cases "A"
CRCON53B	confirming cases "B"
CRCON53C	confirming cases "C"
CRCON53D	confirming cases "D"
CRDIS52A	disconfirming cases "A"
CRDIS52B	disconfirming cases "B"
CRDIS52C	disconfirming cases "C"
CRDIS52D	disconfirming cases "D"
CRDIS53A	disconfirming cases "A"
CRDIS53B	disconfirming cases "B"
CRDIS53C	disconfirming cases "C"
CRDIS53D	disconfirming cases "D"
CRCNR51	number of confirming cases
CRCNR52	number of confirming cases
CRCNR53	number of confirming cases
CRDNR52	number of disconfirming cases

CRDNR53	number of disconfirming cases
CRSTA5	stage score (interviewer)
CRSTB5	stage score (coder)
CRCOMP5	comparison sets I and II
CRCOMA5	adequacy of explanation
CRTRA5	transforms, stronger set II
CRTRWE5	transforms, weaker in set II
CRREC5	recognition of school topic
CRSUJ5	school topic
CRWHN5	recognition of school grade
CRNR5	name of school (number)
CRPRT52	prompted by prediction
CRSCH5	same/different school
CRIMP5	impression of subject

Derived information

To investigate the different solution patterns the following variables were created:

PATT51	pile (1)/ confirming
PATT52	pile (2)/ confirming
PATT53	pile (3)/ confirming
DPATT52	pile (2)/ disconfirming
DPATT53	pile (3)/ disconfirming

These pattern variables were created from variables CRCON51A-CRCON51D, CRCON52A-CRCON52D, CRCON53A-CRCON53D, CRDIS52A- CRDIS52D and CRDIS53A-CRDIS3D which provide information about the confirming and disconfirming cases. The new variables indicate which type of correlation the children considered as evidence for the relationship of the two features in question for one of the three piles. Thus, a value 1001 for PATT51 means that the subject refers to cases of type a and d as confirming information for pile (1). DPATT52 '0100', the combination of disconfirming cases for pile (2), refers to the following pattern: 'Case a not mentioned/ case b mentioned/ case c not mentioned/ case d not mentioned'

3.5.2. Variables at age seventeen (sixth measurement occasion)

For the measurement of the seventeen-year old adolescents, identical variable names and labels were used as in the investigation of the fifteen year old pupils, but '5' in the variable name was replaced by '6'.

3.6. Assessment of the fifteen year old children

Urban sample

Table 1
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		correct	N
CRPRE51	Prediction of Set 1	0.935	107
CRPRA51	Adequacy of Prediction / Set 1	0.873	102
CRPRA52	Adequacy of Prediction / Set 2	0.238	105

Table 2
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high		low	
Variable		correct	N	correct	N
CRPRE51	Prediction of Set 1	1.00	53	0.870	54
CRPRA51	Adequacy of Prediction / Set 1	0.940	50	0.808	52
CRPRA52	Adequacy of Prediction / Set 2	0.308	52	0.170	53

Table 3
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male		female	
Variable		correct	N	correct	N
CRPRE51	Prediction of Set 1	0.912	57	0.960	50
CRPRA51	Adequacy of Prediction / Set 1	0.870	54	0.875	48
CRPRA52	Adequacy of Prediction / Set 2	0.200	55	0.280	50

Table 4
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class		low		high	
Variable		correct	N	correct	N
CRPRE51	Prediction of Set 1	0.946	56	0.922	51
CRPRA51	Adequacy of Prediction / Set 1	0.891	55	0.851	47
CRPRA52	Adequacy of Prediction / Set 2	0.214	56	0.260	50

Table 5
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Social class		low/low		low/high		middle/low	
Variable		correct	N	correct	N	correct	N
CRPRE51	Prediction of Set 1	0.929	14	0.960	25	0.941	16
CRPRA51	Adequacy of Prediction / Set 1	0.857	14	0.917	24	0.882	17
CRPRA52	Adequacy of Prediction / Set 2	0.214	14	0.200	25	0.235	17

Social class		middle/high		high/low		high/high	
Variable		correct	N	correct	N	correct	N
CRPRE51	Prediction of Set 1	0.944	18	0.850	20	1.00	13
CRPRA51	Adequacy of Prediction / Set 1	0.941	16	0.722	18	0.917	12
CRPRA52	Adequacy of Prediction / Set 2	0.444	18	0.11	18	0.231	13

Table 6
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		yes	N
CRJUD51	Judgment of Correlation / Set 1	0.962	106
CRJUD52	Judgment of Correlation / Set 2	0.243	107
CRJUD53	Judgment of Correlation / Set 3	0.219	105
CRJUA51	Adequacy of Explanation / Set 1	0.481	106
CRJUA52	Adequacy of Explanation / Set 2	0.121	107
CRJUA53	Adequacy of Explanation / Set 3	0.245	106

Table 7
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high		low	
Variable		correct	N	correct	N
CRJUD51	Judgment of Correlation / Set 1	0.981	53	0.941	53
CRJUD52	Judgment of Correlation / Set 2	0.208	53	0.278	54
CRJUD53	Judgment of Correlation / Set 3	0.151	53	0.288	52
CRJUA51	Adequacy of Explanation / Set 1	0.585	53	0.377	53
CRJUA52	Adequacy of Explanation / Set 2	0.170	53	0.074	53
CRJUA53	Adequacy of Explanation / Set 3	0.321	53	0.170	53

Table 8
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male		female	
Variable		correct	N	correct	N
CRJUD51	Judgment of Correlation / Set 1	0.946	56	0.98	49
CRJUD52	Judgment of Correlation / Set 2	0.281	57	0.200	50
CRJUD53	Judgment of Correlation / Set 3	0.286	56	0.143	49
CRJUA51	Adequacy of Explanation / Set 1	0.536	56	0.420	50
CRJUA52	Adequacy of Explanation / Set 2	0.140	57	0.100	50
CRJUA53	Adequacy of Explanation / Set 3	0.268	56	0.220	50

Table 9
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class		low		high	
Variable		correct	N	correct	N
CRJUD51	Judgment of Correlation / Set 1	0.964	55	0.961	51
CRJUD52	Judgment of Correlation / Set 2	0.250	56	0.235	51
CRJUD53	Judgment of Correlation / Set 3	0.286	56	0.143	49
CRJUA51	Adequacy of Explanation / Set 1	0.418	55	0.549	51
CRJUA52	Adequacy of Explanation / Set 2	0.523	56	0.477	51
CRJUA53	Adequacy of Explanation / Set 3	0.214	56	0.280	50

Table 10
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Social class		low/low		low/high		middle/low	
Variable		yes	N	yes	N	yes	N
CRJUD51	Judgment of Correlation / Set 1	1.000	13	1.000	25	0.882	17
CRJUD52	Judgment of Correlation / Set 2	0.214	14	0.280	25	0.235	17
CRJUD52	Judgment of Correlation / Set 3	0.286	14	0.320	25	0.235	17
CRJUA51	Adequacy of Explanation / Set 1	0.308	13	0.440	25	0.471	17
CRJUA52	Adequacy of Explanation / Set 2	0.071	14	0.120	25	0.176	17
CRJUA52	Adequacy of Explanation / Set 3	0.143	14	0.240	25	0.235	17

Social class		middle/high		high/low		high/high	
Variable		yes	N	yes	N	yes	N
CRJUD51	Judgment of Correlation / Set 1	0.944	18	0.950	20	1.000	13
CRJUD52	Judgment of Correlation / Set 2	0.333	18	0.100	20	0.308	13
CRJUD52	Judgment of Correlation / Set 3	0.176	17	0.053	19	0.231	13
CRJUA51	Adequacy of Explanation / Set 1	0.611	18	0.450	20	0.615	13
CRJUA52	Adequacy of Explanation / Set 2	0.222	18	0.000	20	0.154	13
CRJUA52	Adequacy of Explanation / Set 3	0.222	18	0.316	19	0.308	13

Table 11
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		0000	0001	1000	1001	1011	N
PATT51	Pattern 1	0.019	0.057	0.001	0.906	0.001	106

Table 12
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high					
Variable		0000	0001	1000	1001	1011	N
PATT51	Pattern 1	0.000	0.038	0.000	0.942	0.019	52

Teacher rating		low					
Variable		0000	0001	1000	1001	1011	N
PATT51	Pattern 1	0.037	0.074	0.019	0.870	0.000	54

Table 13
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male					
Variable		**0000**	**0001**	**1000**	**1001**	**1011**	**N**
PATT51	Pattern 1	0.035	0.070	0.018	0.877	0.000	57
Gender		**female**					
Variable		**0000**	**0001**	**1000**	**1001**	**1011**	**N**
PATT51	Pattern 1	0.000	0.041	0.000	0.939	0.020	49

Table 14
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Gender		low					
Variable		**0000**	**0001**	**1000**	**1001**	**1011**	**N**
PATT51	Pattern 1	1,8 %	8,9 %	1,8 %	85,7 %	1,8 %	56
Gender		**high**					
Variable		**0000**	**0001**	**1000**	**1001**	**1011**	**N**
PATT51	Pattern 1	2,0 %	2,0 %	0,0 %	96,0 %	0,0 %	50

Table 15
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		Social clas	0000	0001	1000	1001	1011	N
PATT51	Pattern 1	low/l	0.000	0.071	0.071	0.857	0.000	14
PATT51	Pattern 1	low/h	0.000	0.160	0.000	0.800	0.040	25
PATT51	Pattern 1	middle/l	0.059	0.000	0.000	0.941	0.000	17
PATT51	Pattern 1	middle/h	0.000	0.000	0.000	1.000	0.000	17
PATT51	Pattern 1	high/l	0.050	0.000	0.000	0.950	0.000	20
PATT51	Pattern 1	high/h	0.000	0.077	0.000	0.923	0.000	13

Table 16
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		0000	0001	0101	1000	1001	1011	1111	N
PATT52	Pattern 2	0.003	0.003	0.015	0.015	0.848	0.045	0.015	66

Table 17
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low							
Variable		0000	0001	0101	1000	1001	1011	1111	N
PATT52	Pattern 2	0.031	0.000	0.000	0.031	0.938	0.000	0.000	32
Teacher rating		**high**							
Variable		0000	0001	0101	1000	1001	1011	1111	N
PATT52	Pattern 2	0.029	0.059	0.029	0.000	0.765	0.088	0.029	34

Table 18
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male							
Variable		0000	0001	0101	1000	1001	1011	1111	N
PATT52	Pattern 2	0.054	0.054	0.027	0.000	0.811	0.027	0.027	37
Gender		**female**							
Variable		0000	0001	0101	1000	1001	1011	1111	N
PATT52	Pattern 2	0.000	0.000	0.000	0.034	0.897	0.069	0.000	29

Table 19
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class		low							
Variable		0000	0001	0101	1000	1001	1011	1111	N
PATT52	Pattern 2	0,0 %	0,0 %	3,1 %	0,0 %	90,6%	3,1%	3,1 %	32
Social class		**high**							
Variable		0000	0001	0101	1000	1001	1011	1111	N
PATT52	Pattern 2	5,9 %	5,9 %	0,0 %	2,9 %	79,4 %	5,9 %	0,0 %	34

Table 20
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable	SES	0000	0001	0101	1000	1001	1011	1111	N
PATT52	low/low	0.000	0.000	0.000	0.000	0.889	0.111	0.000	9
PATT52	low/high	0.000	0.000	0.091	0.000	0.909	0.000	0.000	11
PATT52	middle/high	0.000	0.000	0.000	0.000	0.917	0.000	0.083	12
PATT52	middle/low	0.000	0.077	0.000	0.077	0.769	0.077	0.000	13
PATT52	high/low	0.167	0.000	0.000	0.000	0.750	0.083	0.000	12
PATT52	high/high	0.000	0.111	0.000	0.000	0.889	0.000	0.000	9

Table 21
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		0001	1001	1011	1111	N
PATT53	Pattern 1	0.024	0.756	0.024	0.171	41

Table 22
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low				
Variable		0001	1001	1011	1111	N
PATT53	Pattern 1	0.000	0.813	0.000	0.188	16
Teacher rating		**high**				
Variable		0001	1001	1011	1111	N
PATT53	Pattern 1	0.040	0.720	0.040	0.160	25

Table 23
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male				
Variable		0001	1001	1011	1111	N
PATT53	Pattern 1	0.000	0.826	0.043	0.130	23
Gender		**female**				
Variable		0001	1001	1011	1111	N
PATT53	Pattern 1	0.056	0.667	0.000	0.222	18

Table 24
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class		low				
Variable		**0001**	**1001**	**1011**	**1111**	**N**
PATT53	Pattern 1	3,8 %	73,1 %	3,8 %	15,4 %	25

Social class		high				
Variable		**0001**	**1001**	**1011**	**1111**	**N**
PATT53	Pattern 1	0,0 %	80,0 %	0,0 %	20,0 %	15

Table 25
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		Social cla	0001	1001	1011	1111	N
PATT53	Pattern 1	low/low	0.000	0.571	0.143	0.143	7
PATT53	Pattern 1	low/high	0.091	0.727	0.000	0.182	11
PATT53	Pattern 1	middle/low	0.000	0.875	0.000	0.125	8
PATT53	Pattern 1	middle/high	0.000	0.875	0.000	0.125	8
PATT53	Pattern 1	high/low	0.000	0.750	0.000	0.250	4
PATT53	Pattern 1	high/high	0.000	0.667	0.000	0.333	3

Table 26
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		0000	0010	0100	0110	1000	1110	N
DPATT52	Pattern 2	0.044	0.029	0.044	0.853	0.015	0.015	68

Table 27
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low						
Variable		**0000**	**0010**	**0100**	**0110**	**1000**	**1110**	**N**
DPATT52	Pattern 2	0.030	0.000	0.030	0.939	0.000	0.000	33

Teacher rating		high						
Variable		**0000**	**0010**	**0100**	**0110**	**1000**	**1110**	**N**
DPATT52	Pattern 2	0.057	0.057	0.057	0.771	0.029	0.029	35

Table 28
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender	**male**						
Variable	**0000**	**0010**	**0100**	**0110**	**1000**	**1110**	**N**
DPATT52 Pattern 2	0.079	0.053	0.026	0.789	0.026	0.026	38
Gender	**female**						
Variable	**0000**	**0010**	**0100**	**0110**	**1000**	**1110**	**N**
DPATT52 Pattern 2	0.000	0.000	0.067	0.933	0.000	0.000	30

Table 29
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class	**low**						
Variable	**0000**	**0010**	**0100**	**0110**	**1000**	**1110**	**N**
DPATT52 Pattern 2	2,9 %	2,9 %	2,9 %	88,6 %	2,9 %	0,0 %	35
Social class	**high**						
Variable	**0000**	**0010**	**0100**	**0110**	**1000**	**1110**	**N**
DPATT52 Pattern 2	6,1 %	3,0 %	6,1 %	81,8 %	0,0 %	3,0 %	33

Table 30
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable	**SES**	**0000**	**0010**	**0100**	**0110**	**1000**	**1110**	**N**
DPATT52 Pattern 2	low/low	0.000	0.000	0.111	0.889	0.000	0.000	9
DPATT52 Pattern 2	low/high	0.000	0.071	0.000	0.857	0.071	0.000	14
DPATT52 Pattern 2	middle/low	0.083	0.000	0.000	0.917	0.000	0.000	12
DPATT52 Pattern 2	middle/high	0.000	0.083	0.083	0.833	0.000	0.000	12
DPATT52 Pattern 2	high/low	0.167	0.000	0.083	0.750	0.000	0.000	12
DPATT52 Pattern 2	high/high	0.000	0.000	0.000	0.889	0.000	0.111	9

Table 31
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable	0000	0100	0110	1001	N
DPATT53 Pattern 3	0.114	0.029	0.800	0.057	35

Table 32
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating	low				
Variable	0000	0100	0110	1001	N
DPATT53 Pattern 3	0.143	0.048	0.762	0.048	21
Teacher rating	**high**				
Variable	0000	0100	0110	1001	N
DPATT53 Pattern 3	0.071	0.000	0.857	0.071	14

Table 33
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender	male				
Variable	0000	0100	0110	1001	N
DPATT53 Pattern 3	0.091	0.045	0.818	0.045	22
Gender	**female**				
Variable	0000	0100	0110	1001	N
DPATT53 Pattern 3	0.154	0.000	0.769	0.077	13

Table 34
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class	low				
Variable	0000	0100	0110	1001	N
DPATT53 Pattern 3	13,6 %	4,5 %	77,3 %	4,5 %	22
Social class	**high**				
Variable	0000	0100	0110	1001	N
DPATT53 Pattern 3	7,7 %	0,0 %	84,6 %	7,7 %	13

Table 35
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	0000	0100	0110	1001	N
DPATT53	Pattern 3	low/low	0.000	0.200	0.800	0.000	5
DPATT53	Pattern 3	low/high	0.222	0.000	0.778	0.000	9
DPATT53	Pattern 3	middle/low	0.125	0.000	0.750	0.125	8
DPATT53	Pattern 3	middle/high	0.000	0.000	0.857	0.143	7
DPATT53	Pattern 3	high/low	0.250	0.000	0.750	0.000	4
DPATT53	Pattern 3	high/high	0.000	0.000	1.000	0.000	2

Table 36
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		0	6	12	N
CRCNR51	Number confirming cases	0.010	0.067	0.924	105

Table 37
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low			
Variable		0	6	12	N
CRCNR51	Number confirming cases	0.000	0.038	0.962	52
Teacher rating		**high**			
Variable		0	6	12	N
CRCNR51	Number confirming cases	0.019	0.094	0.887	53

Table 38
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male			
Variable		0	6	12	N
CRCNR51	Number confirming cases	0.018	0.089	0.893	56
Gender		**female**			
Variable		0	6	12	N
CRCNR51	Number confirming cases	0.000	0.041	0.959	49

Table 39
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class		low			
Variable		**0**	**6**	**12**	**N**
CRCNR51	Number confirming cases	0.016	0.095	0.778	57
Social class		**high**			
Variable		**0**	**6**	**12**	**N**
CRCNR51	Number confirming cases	0.000	0.018	0.857	49

Table 40
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	0	6	12	N
CRCNR51	Number confirming cases	low/low	0.000	0.143	0.857	14
CRCNR51	Number confirming cases	low/high	0.000	0.160	0.840	21
CRCNR51	Number confirming cases	middle/low	0.059	0.000	0.941	17
CRCNR51	Number confirming cases	middle/high	0.000	0.000	1.000	17
CRCNR51	Number confirming cases	high/low	0.000	0.000	1.000	19
CRCNR51	Number confirming cases	high/high	0.000	0.077	0.923	13

Table 41
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		4	5	6	9	10	11	12	N
CRCNR52	Number confirming cases	0.019	0.038	0.019	0.846	0.019	0.038	0.019	52

Table 42
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low							
Variable		**4**	**5**	**6**	**9**	**10**	**11**	**12**	**N**
CRCNR52	Number confirming cases	0.038	0.000	0.00	0.962	0.000	0.00	0.00	26
Teacher rating		**high**							
Variable		**4**	**5**	**6**	**9**	**10**	**11**	**12**	**N**
CRCNR52	Number confirming cases	0.000	0.077	0.038	0.731	0.038	0.077	0.038	26

Table 43
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male							
Variable		**4**	**5**	**6**	**9**	**10**	**11**	**12**	**N**
CRCNR52	Number confirming cases	0.000	0.074	0.037	0.815	0.000	0.037	0.037	27
Gender		**female**							
Variable		**4**	**5**	**6**	**9**	**10**	**11**	**12**	**N**
CRCNR52	Number confirming cases	0.040	0.000	0.000	0.880	0.040	0.040	0.000	25

Table 44
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class		low							
Variable		**4**	**5**	**6**	**9**	**10**	**11**	**12**	**N**
CRCNR52	Number confirming cases	0.000	0.000	0.040	0.880	0.000	0.040	0.040	25
Social class		**high**							
Variable		**4**	**5**	**6**	**9**	**10**	**11**	**12**	**N**
CRCNR52	Number confirming cases	0.037	0.074	0.000	0.815	0.037	0.037	0.000	27

Table 45
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable	Social class	4	5	6	9	10	11	12	N
CRCNR52	low/low	0.000	0.000	0.000	0.833	0.000	0.167	0.000	6
CRCNR52	low/high	0.000	0.000	0.111	0.889	0.000	0.000	0.000	9
CRCNR52	middle/low	0.000	0.000	0.000	0.900	0.000	0.000	0.100	10
CRCNR52	middle/high	0.091	0.091	0.000	0.727	0.091	0.000	0.000	11
CRCNR52	high/low	0.000	0.000	0.000	0.889	0.000	0.111	0.000	9
CRCNR52	high/high	0.000	0.143	0.000	0.857	0.000	0.000	0.000	7

Table 46
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		3	6	9	12	N
CRCNR53	Number confirming cases	0,032	0,645	0,065	0,258	31

Table 47
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low				
Variable		3	6	9	12	N
CRCNR53	Number confirming cases	0.000	0.692	0.077	0.231	13
Teacher rating		**high**				
Variable		3	6	9	12	N
CRCNR53	Number confirming cases	0.056	0.611	0.056	0.278	18

Table 48
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		low				
Variable		3	6	9	12	N
CRCNR53	Number confirming cases	0.000	0.765	0.059	0.176	17
Gender		**high**				
Variable		3	6	9	12	N
CRCNR53	Number confirming cases	0.071	0.500	0.071	0.357	14

Table 49
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Gender		low				
Variable		3	6	9	12	N
CRCNR53	Number confirming cases	0.050	0.650	0.050	0.250	20
Gender		**high**				
Variable		3	6	9	12	N
CRCNR53	Number confirming cases	0.000	0.636	0.091	0.273	11

Table 50
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable			3	6	9	12	N
CRCNR53	Number confirming cases	low/low	0.000	0.500	0.250	0.250	4
CRCNR53	Number confirming cases	low/high	0.100	0.700	0.000	0.200	10
CRCNR53	Number confirming cases	midd./low	0.000	0.667	0.000	0.333	6
CRCNR53	Number confirming cases	midd./high	0.000	0.667	0.167	0.167	6
CRCNR53	Number confirming cases	high/low	0.000	0.667	0.000	0.333	3
CRCNR53	Number confirming cases	high/high	0.000	0.500	0.000	0.500	2

Table 51
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		0	1	2	3	4	7	N
CRDNR52	Number disconfirm. cases	0.019	0.056	0.056	0.833	0.019	0.019	54

Table 52
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating **low**

Variable		0	1	2	3	4	7	N
CRDNR52	Number disconfirm. cases	0.000	0.037	0.037	0.926	0.000	0.000	27

Teacher rating **high**

Variable		0	1	2	3	4	7	N
CRDNR52	Number disconfirm. cases	0.037	0.074	0.074	0.741	0.037	0.037	27

Table 53
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender **male**

Variable		0	1	2	3	4	7	N
CRDNR52	Number disconfirm. cases	0.036	0.036	0.071	0.786	0.036	0.036	28

Gender **female**

Variable		0	1	2	3	4	7	N
CRDNR52	Number disconfirm. cases	0.000	0.077	0.038	0.885	0.000	0.000	26

Table 54
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class		low						
Variable		**0**	**1**	**2**	**3**	**4**	**7**	**N**
CRDNR52	Number disconfirm. cases	0.036	0.036	0.036	0.857	0.036	0.000	28
Social class		**high**						
Variable		**0**	**1**	**2**	**3**	**4**	**7**	**N**
CRDNR52	Number disconfirm. cases	0.000	0.076	0.076	0.750	0.000	0.038	26

Table 55
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable	SES	0	1	2	3	4	7	N
CRDNR52	low/low	0.000	0.167	0.000	0.833	0.000	0.000	6
CRDNR52	low/high	0.000	0.000	0.083	0.833	0.083	0.000	12
CRDNR52	middle/low	0.100	0.000	0.000	0.900	0.000	0.000	10
CRDNR52	middle/high	0.000	0.100	0.200	0.700	0.000	0.000	10
CRDNR52	high/low	0.000	0.111	0.000	0.889	0.000	0.000	9
CRDNR52	high/low	0.000	0.000	0.000	0.857	0.000	0.143	7

Table 56
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		0	3	6	12	N
CRDNR53	Number disconfirm. cases	0,120	0,080	0,760	0,040	25

Table 57
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low				
Variable		**0**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirm. cases	0.091	0.091	0.818	0.000	11
Teacher rating		**high**				
Variable		**0**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirm. cases	0.143	0.071	0.714	0.071	14

Table 58
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male				
Variable		**0**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirm. cases	0.125	0.063	0.813	0.000	16
Gender		**female**				
Variable		**0**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirm. cases	0.111	0.111	0.667	0.111	9

Table 59
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class		low				
Variable		**0**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirm. cases	0.125	0.063	0.750	0.063	16
Social class		**high**				
Variable		**0**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirm. cases	0.111	0.111	0.777	0.000	9

Table 60
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	0	3	6	12	N
CRDNR53	Number disconfirm. cases	low/l	0.000	0.333	0.667	0.000	3
CRDNR53	Number disconfirm. cases	low/h	0.143	0.000	0.857	0.000	7
CRDNR53	Number disconfirm. cases	midd./l	0.167	0.000	0.667	0.167	6
CRDNR53	Number disconfirm. cases	midd./h	0.000	0.200	0.800	0.000	5
CRDNR53	Number disconfirm. cases	high/l	0.333	0.000	0.667	0.000	3
CRDNR53	Number disconfirm. cases	high/h	0.000	0.000	1.000	0.000	1

Table 61
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	0.018	0.351	0.300	0.153	0.108	111

Table 62
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		low					
Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	0.000	0.346	0.308	0.173	0.173	52
Teacher rating		**high**					
Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	0.039	0.411	0.333	0.156	0.059	51

Table 63
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male					
Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	0.019	0.352	0.333	0.185	0.111	54
Gender		**female**					
Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	0.020	0.408	0.306	0.143	0.122	49

Table 64
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class		high					
Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	0.036	0.345	0.327	0.127	0.164	55
Social class		**low**					
Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	0.000	0.417	0.313	0.208	0.063	48

Table 65
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	low/low	0.140	0.280	0.280	0.070	0.210	14
CRSTA5	low/high	0.000	0.375	0.375	0.125	0.125	24
CRSTA5	middle/low	0.000	0.333	0.278	0.167	0.167	17
CRSTA5	middle/high	0.000	0.222	0.333	0.333	0.111	18
CRSTA5	high/low	0.000	0.589	0.294	0.118	0.000	17
CRSTA5	high/low	0.000	0.462	0.308	0.154	0.077	13

Table 66
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		same	stronger	N
CRCOMP5	Comparison between I and II	0.026	0.974	38

Table 67
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high			low		
Variable		same	stronger	N	same	stronger	N
CRCOMP5	Comparison between I and II	0.000	1.000	21	0.059	0.941	17

Table 68
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male			female		
Variable		same	stronger	N	same	stronger	N
CRCOMP5	Comparison between I and II	0,0 %	1000 %	20	5,6 %	94,4 %	18

Table 69
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class		low			high		
Variable		same	stronger	N	same	stronger	N
CRCOMP5	Comparison between I and II	0.050	0.950	20	0.000	1.000	18

Table 70
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable	Social class	same	stronger	N
CRCOMP5	low/low	0.000	1.000	4
CRCOMP5	low/high	0.111	0.889	9
CRCOMP5	middle/low	0.000	1.000	7
CRCOMP5	middle/high	0.000	1.000	10
CRCOMP5	high/low	0.000	1.000	4
CRCOMP5	high/low	0.000	1.000	4

Table 71
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		correct	N
CRCOMA5	Adequacy of Explanation	0.833	36

Table 72
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high		low	
Variable		correct	N	correct	N
CRCOMA5	Adequacy of Explanation	0.727	22	1.000	14

Table 73
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender	male		female	
Variable	correct	N	correct	N
CRCOMA5 Adequacy of Explanation	0.889	18	0.778	18

Table 74
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Social class	low		high	
Variable	correct	N	correct	N
CRCOMA5 Adequacy of Explanation	0.789	19	0.882	17

Table 75
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Social class	low/low		low/high		middle/low	
Variable	yes	N	yes	N	yes	N
CRCOMA5 Adequacy of Explanation	0.800	5	0.875	8	0.667	6

Social class	middle/high		high/low		high/high	
Variable	yes	N	yes	N	yes	N
CRCOMA5 Adequacy of Explanation	0.800	10	1.000	4	1.000	

Table 76
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable	inadequate	comparison	negation	both	N
CRTRANS Transforms, str. Set II	24.3 %	2,7 %	32,4 %	40,5 %	37
CRTRWES Transforms, str. Set II	36,8 %	10,5 %	13,2 %	39,5 %	38

Table 77
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high				
Variable		**inadequate**	**comparison**	**negation**	**both**	**N**
CRTRANS	Transforms, stronger Set II	22,7 %	0,0 %	36,4 %	40,9 %	22
CRTRWES	Transforms, weaker Set II	22,7 %	13,6 %	18,2 %	45,5 %	22
Teacher rating		**low**				
Variable		**inadequate**	**comparison**	**negation**	**both**	**N**
CRTRANS	Transforms, stronger Set II	26,7 %	6,7 %	26,7 %	40,0 %	15
CRTRWES	Transforms, weaker Set II	56,3 %	6,3 %	6,3 %	31,3 %	16

Table 78
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male				
Variable		**inadequate**	**comparison**	**negation**	**both**	**N**
CRTRANS	Transforms, stronger Set II	10,5 %	5,3 %	31,6 %	52,6 %	19
CRTRWES	Transforms, weaker Set II	25,0 %	10,0 %	15,0 %	50,0 %	20
Gender		**female**				
Variable		**inadequate**	**comparison**	**negation**	**both**	**N**
CRTRANS	Transforms, stronger Set II	38,9 %	0,0 %	33,3 %	27,8 %	18
CRTRWES	Transforms, weaker Set II	50,0 %	11,1 %	11,1 %	27,8 %	18

Table 79
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low				
Variable		**inadequate**	**comparison**	**negation**	**both**	**N**
CRTRANS	Transforms, stronger Set II	21,1 %	0,0 %	36,8 %	42,1 %	19
CRTRWES	Transforms, weaker Set II	40,0 %	10,0 %	15,0 %	35,0 %	20
SES		**high**				
Variable		**inadequate**	**comparison**	**negation**	**both**	**N**
CRTRANS	Transforms, stronger Set II	27,8 %	5,6 %	27,8 %	38,9 %	18
CRTRWES	Transforms, weaker Set II	33,3 %	11,1 %	11,1 %	44,4 %	18

Table 80
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable	Social class	inadequate	comparison	negation	both	N
CRTRANS	low/low	20,0 %	0,0 %	0,0 %	80,0 %	5
CRTRANS	low/high	28,6 %	0,0 %	28,6 %	42,9 %	7
CRTRANS	middle/low	14,3 %	0,0 %	71,4 %	14,3 %	7
CRTRANS	middle/high	30,0 %	0,0 %	30,0 %	40,0 %	10
CRTRANS	high/low	50,0 %	25,0 %	25,0 %	0,0 %	4
CRTRANS	high/low	0,0 %	0,0 %	25,0 %	75,0 %	4

Table 81
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable	Social class	inad. trf.	comparison.	negat. disc.	both	N
CRTRWES	low/low	20,0 %	0,0 %	0,0 %	80,0 %	5
CRTRWES	low/high	50,0 %	12,5 %	12,5 %	25,0 %	8
CRTRWES	middle/low	42,9 %	14,3 %	28,6 %	14,3	7
CRTRWES	middle/high	30,0 %	10,0 %	0,0 %	60,0 %	10
CRTRWES	high/low	50,0 %	25,0 %	25,0 %	0,0 %	4
CRTRWES	high/low	25,0 %	0.0 %	25,0 %	50,0 %	4

Table 82
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		correct	N
CRREC5	Recognition of School Topic	0.812	101

Table 83
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high		low	
Variable		correct	N	correct	N
CRREC5	Recognition of School Topic	0.220	50	0.157	51

Table 84
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		male		female	
Variable		correct	N	correct	N
CRREC5	Recognition of School Topic	0.185	54	0.191	47

Table 85
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		high	
Variable		correct	N	correct	N
CRREC5	Recognition of School Topic	0.241	54	0.128	47

Table 86
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low/low		low/high		middle/low	
Variable		yes	N	yes	N	yes	N
CRREC5	Recognition of School Topic	0.231	13	0.167	24	0.353	17

SES		middle/high		high/low		high/high	
Variable		yes	N	yes	N	yes	N
CRREC5	Recognition of School Topic	0.118	17	0.158	19	0.091	11

Table 87
Correlational reasoning:
Solution probabilities at age 15
Urban sample

Variable		oscillating	reflecting	certain	N
CRIMP5	impression of subject	13,3 %	33,3 %	53,3 %	75

Table 88
Correlational reasoning:
Solution probabilities at age 15
by teacher rating
Urban sample

Teacher rating		high			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP5	impression of subject	4,9 %	29,3 %	65,9 %	41
Teacher rating		**low**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP5	impression of subject	23,5 %	38,2 %	38,2 %	34

Table 89
Correlational reasoning:
Solution probabilities at age 15
by gender
Urban sample

Gender		female			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP5	impression of subject	18,4 %	28,9 %	52,6 %	38
Gender		**male**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP5	impression of subject	8,1 %	37,8 %	54,1 %	3
					7

Table 90
Correlational reasoning:
Solution probabilities at age 15
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP5	impression of subject	0.190	0.381	0.429	42
SES		**high**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP5	impression of subject	0.061	0.273	0.667	33

Table 91
Correlational reasoning:
Solution probabilities at age 15
by social class in six categories
Urban sample

Variable		SES	oscillatin	reflecting	certain	N
CRIMP5	impression of subject	low/low	36,4 %	18,2 %	45,5 %	11
CRIMP5	impression of subject	low/high	16,7 %	38,9 %	44,4 %	18
CRIMP5	impression of subject	middle/low	7,7 %	53,8 %	38,5 %	13
CRIMP5	impression of subject	middle/high	8,3 %	41,7 %	50,0 %	12
CRIMP5	impression of subject	high/low	7,7 %	23,1 %	69,2 %	13
CRIMP5	impression of subject	high/low	0,0 %	12,5 %	87,5 %	8

Rural Sample

Table 92
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		yes	N
CRPRE51	Prediction of Set 1	0.934	61

Table 93
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male		female	
Variable		yes	N	yes	N
CRPRE51	Prediction of Set 1	0.909	33	0.964	28

Table 94
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North		West	
Variable			N	yes	N
CRPRE51	Prediction of Set 1	0.947	19	0.889	18

Region		South	
Variable		yes	N
CRPRE51	Prediction of Set 1	0.958	24

Table 95
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		correct	N
CRPRE51	Prediction of Set 1	0.934	61
CRPRA51	Adequacy of Prediction	0.885	61
CRPRA52	Adequacy of Prediction	0.377	61

Table 96
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male		female	
Variable		correct	N	correct	N
CRPRE51	Prediction of Set 1	0.909	33	0.964	28
CRPRA51	Adequacy of Prediction	0.848	33	0.929	28
CRPRA52	Adequacy of Prediction	0.33	33	0.439	28

Table 97
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North		West	
Variable		correct	N	correct	N
CRPRE51	Prediction of Set 1	0.947	19	0.889	18
CRPRA51	Adequacy of Prediction	0.895	19	0.833	18
CRPRA52	Adequacy of Prediction	0.421	19	0.22	18

Region		South	
Variable		correct	N
CRPRE51	Prediction of Set 1	0.958	24
CRPRA51	Adequacy of Prediction	0.917	24
CRPRA52	Adequacy of Prediction	0.459	24

Table 98
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		yes	N
CRJUD51	Judgment of Correlation Set 1	0.950	61
CRJUD52	Judgment of Correlation Set 2	0.167	60
CRJUD53	Judgment of Correlation Set 3	0.180	61

Table 99
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male		female	
Variable		correct	N	correct	N
CRJUD51	Judgment of Correlation Set 1	0.969	32	0.929	28
CRJUD52	Judgment of Correlation Set 2	0.121	33	0.222	27
CRJUD53	Judgment of Correlation Set 3	0.152	33	0.214	28

Table 100
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North		West	
Variable		correct	N	correct	N
CRJUD51	Judgment of Correlation Set 1	1.000	19	0.833	18
CRJUD52	Judgment of Correlation Set 2	0.167	18	0.111	18
CRJUD53	Judgment of Correlation Set 3	0.105	19	0.278	18

Region		South	
Variable		yes	N
CRJUD51	Judgment of Correlation Set 1	1.000	23
CRJUD52	Judgment of Correlation Set 2	0.208	24
CRJUD53	Judgment of Correlation Set 3	0.167	24

Table 101
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		adequat	semiad.	inad.	N
CRJUA51	Adequacy of Explanation 1	51,7 %	36,7 %	11,7 %	60
CRJUA52	Adequacy of Explanation 2	23,0 %	0,0 %	77,0 %	61
CRJUA53	Adequacy of Explanation 3	39,3 %	0,0 %	60,7 %	61

Table 102
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male				female			
Variable		adequa	semiad	inad.	N	adequa	semiad	inad.	N
CRJUA51	Adequacy of Explanation 1	51,5 %	36,4 %	12,1 %	33	51,9 %	37,0 %	11,1 %	27
CRJUA52	Adequacy of Explanation 2	21,2 %	0,0 %	78,8 %	33	25,0 %	0,0 %	75,0 %	28
CRJUA53	Adequacy of Explanation 3	36,4 %	0,0 %	63,6 %	33	42,9 %	0,0 %	57,1 %	28

Table 103
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North				West			
Variable		ad.	semi.	inad.	N	ad.	semi.	inad.	N
CRJUA51	Adequacy of Explanation 1	44,4 %	44,4 %	11,1 %	18	44,4 %	28,9 %	16,7 %	18
CRJUA52	Adequacy of Explanation 2	26,3 %	0,0 %	73,7 %	19	22,2 %	0,0%	77,8 %	18
CRJUA53	Adequacy of Explanation 3	47,4 %	0,0 %	52,6 %	19	33,3 %	0,0 %	66,7 %	18

Region		South			
Variable		adequat	semiadequate	inadequate	N
CRJUA51	Adequacy of Explanation 1	62,5 %	29,2 %	08,3 %	24
CRJUA52	Adequacy of Explanation 2	20,8 %	0,0 %	79,2 %	24
CRJUA53	Adequacy of Explanation 3	37,5 %	0,0 %	62,5 %	24

Table 104
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		0001	1000	1001	N
PATT51	Pattern 1	3,5 %	1,8 %	94,7 %	57

Table 105
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male				female			
Variable		0001	1000	1001	N	0001	1000	1001	N
PATT51	Pattern 1	6,3 %	3,1 %	90,6 %	32	0,0 %	0,0 %	100 %	25

Table 106
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North							
Variable		0001	1000	1001	N	0001	1000	1001	N
PATT51	Pattern 1	10,5 %	0,0 %	100,0 %	15	0,0 %	0,0 %	89,5 %	19

Region		South			
Variable		0001	1000	1001	N
PATT51	Pattern 1	0,0 %	4,3 %	95,7 %	23

Table 107
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		0000	0001	0101	1000	1001	1011	1111	N
PATT52	Pattern 2	9,5 %	2,4 %	0,0 %	0,0 %	85,7 %	0,0 %	2,4 %	42

Table 108
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male				
Variable		0000	0001	1001	1111	N
PATT52	Pattern 2	13,0 %	4,3 %	82,6 %	0,0 %	23

Gender		female				
Variable		0000	0001	1001	1111	N
PATT52	Pattern 2	5,3 %	0,0 %	89,5 %	5,3 %	19

Table 109
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North				
Variable		0000	0001	1001	1111	N
PATT52	Pattern 2	13,3 %	6,7 %	73,3 %	6,7 %	15

Region		West				
Variable		0000	0001	1001	1111	N
PATT52	Pattern 2	10,0 %	0,0 %	90,0 %	0,0 %	10

Region		South				
Variable		0000	0001	1001	1111	N
PATT52	Pattern 2	5,9 %	0,0 %	94,1 %	0,0 %	17

Table 110
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		0000	0001	1111	N
PATT53	Pattern 3	6,9 %	89,7 %	3,4 %	29

Table 111
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male			
Variable		0000	0001	1111	N
PATT53	Pattern 3	13,3 %	86,7 %	0,0 %	15

Gender		female			
Variable		0000	0001	1111	N
PATT53	Pattern 3	0,0 %	92,9 %	7,1 %	14

Table 112
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		**North**			
Variable		**0000**	**0001**	**1111**	**N**
PATT53	Pattern 3	0,0 %	88,9 %	11,1 %	9

Region		**West**			
Variable		**0000**	**0001**	**1111**	**N**
PATT53	Pattern 3	14,3 %	85,7 %	0,0 %	7

Region		**South**			
Variable		**0000**	**0001**	**1111**	**N**
PATT53	Pattern 3	7,7 %	92,3 %	0,0 %	13

Table 113
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		**0000**	**0001**	**0010**	**0101**	**0110**	**1100**	**1111**	**N**
DPATT52	Pattern 2	2,0 %	2,0 %	4,1 %	2,0 %	85,7 %	2,0 %	2,0 %	49

Table 114
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		**male**			
Variable		**0000**	**1001**	**1111**	**N**
DPATT52	Pattern 2	13,3 %	86,7 %	0,0 %	15

Gender		**female**			
Variable		**0000**	**1001**	**1111**	**N**
DPATT52	Pattern 2	0,0 %	92,9 %	7,1 %	14

Table 115
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region	**North**			
Variable	**0000**	**1001**	**1111**	**N**
DPATT52 Pattern 2	0,0 %	88,9 %	11,1 %	9
Region	**West**			
Variable	**0000**	**1001**	**1111**	**N**
DPATT52 Pattern 2	14,3 %	85,7 %	0,0 %	7
Region	**South**			
Variable	**0000**	**1001**	**1111**	**N**
DPATT52 Pattern 2	7,7 %	92,3 %	0,0 %	13

Table 116
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable	**0000**	**0010**	**0100**	**110**	**1111**	**N**
DPATT53 Pattern 3	6,5 %	6,5 %	3,2 %	77,4 %	6,5 %	31

Table 117
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender	**male**					
Variable	**0000**	**0010**	**0100**	**0110**	**1111**	**N**
DPATT53 Pattern 3	0,0 %	6,7 %	0,0 %	80,0 %	13,3 %	15
Gender	**female**					
Variable	**0000**	**0010**	**0100**	**0110**	**1111**	**N**
DPATT53 Pattern 3	12,5 %	6,3 %	6,3 %	75,0 %	0,0 %	16

Table 118
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region	North					
Variable	0000	0010	0100	0110	1111	N
DPATT53 Pattern 3	20,0 %	0,0 %	10,0 %	70,0 %	0,0 %	10
Region	**West**					
Variable	0000	0010	0100	0110	1111	N
DPATT53 Pattern 3	0,0 %	25,0 %	0,0 %	62,5 %	12,5 %	8
Region	**South**					
Variable	0000	0010	0100	0110	1111	N
DPATT53 Pattern 3	0,0 %	0,0 %	0,0 %	92,3 %	7,7 %	13

Table 119
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable	6	12	N
CRCNR51 Number confirming Cases	5,3 %	94,7 %	57

Table 120
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender	male		
Variable	6	12	N
CRCNR51 Number confirming Cases	9,4 %	90,6 %	32
Gender	**female**		
Variable	6	12	N
CRCNR51 Number confirming Cases	0,0 %	100,0 %	25

Table 121
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North		
Variable		6	12	N
CRCNR51	Number confirming Cases	10,5 %	89,5 %	19
Region		West		
Variable		6	12	N
CRCNR51	Number confirming Cases	0,0 %	100,0 %	15
Region		South		
Variable		6	12	N
CRCNR51	Number confirming Cases	4,3 %	95,7 %	23

Table 122
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		0	5	8	9	12	N
CRCNR52	Number confirming Cases	9,5 %	2,4 %	2,4 %	83,3 %	2,4 %	42

Table 123
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male					
Variable		0	5	8	9	12	N
CRCNR52	Number confirming Cases	13,0 %	4,3 %	4,3 %	78,3 %	0,0 %	23
Gender		female					
Variable		0	5	8	9	12	N
CRCNR52	Number confirming Cases	5,3 %	0,0 %	0,0 %	89,5 %	5,3 %	19

Table 124
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region	North						
Variable		0	5	8	9	12	N
CRCNR52	Number confirming Cases	13,3 %	6,7 %	0,0 %	73,3 %	6,7 %	15
Region	**West**						
Variable		0	5	8	9	12	N
CRCNR52	Number confirming Cases	10,0 %	0,0 %	10,0	80,0 %	0,0 %	10
Region	**South**						
Variable		0	5	8	9	12	N
CRCNR52	Number confirming Cases	5,9 %	0,0 %	0,0 %	94,1 %	0,0 %	17

Table 125
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		0	6	12	N
CRCNR53	Number confirming Cases	6,9 %	89,7 %	3,4 %	29

Table 126
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender	male				
Variable		0	6	12	N
CRCNR53	Number confirming Cases	13,3 %	86,7 %	0,0 %	15
Gender	**female**				
Variable		0	6	12	N
CRCNR53	Number confirming Cases	0,0 %	92,9 %	7,1 %	14

Table 127
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North			
Variable		0	6	12	N
CRCNR53	Number confirming Cases	0,0 %	88,9 %	11,1 %	9
Region		**West**			
Variable		0	6	12	N
CRCNR53	Number confirming Cases	14,3 %	85,7 %	0,0 %	7
Region		**South**			
Variable		0	6	12	N
CRCNR53	Number confirming Cases	7,7 %	92,3 %	0,0 %	13

Table 128
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		0	1	2	3	4	7	N
CRDNR52	Number disconfirming cases	0.019	0.056	0.056	0.833	0.019	0.019	54

Table 129
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male						
Variable		0	1	2	3	5	12	N
CRDNR52	Number disconfirming cases	0,0 %	4,2 %	4,2 %	83,3 %	4,2 %	4,2 %	24
Gender		**female**						
Variable		0	1	2	3	5	12	N
CRDNR52	Number disconfirming cases	4,2 %	4,2 %	4,2 %	83,3 %	0,0 %	4,2 %	24

Table 129
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North						
Variable		**0**	**1**	**2**	**3**	**5**	**12**	**N**
CRDNR52	Number disconfirming cases	5,9 %	5,9 %	0,0 %	76,5 %	5,9 %	5,9 %	17
Region		**West**						
Variable		**0**	**1**	**2**	**3**	**5**	**12**	**N**
CRDNR52	Number disconfirming cases	0,0 %	0,0 %	14,3 %	78,6 %	0,0 %	71, %	14
Region		**South**						
Variable		**0**	**1**	**2**	**3**	**5**	**12**	**N**
CRDNR52	Number disconfirming cases	0,0 %	5,9 %	0,0 %	94,1 %	0,0 %	0,0 %	17

Table 130
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		**0**	**1**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirming cases	6,5 %	3,2 %	6,5 %	74,2 %	9,7 %	31

Table 131
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male					
Variable		**0**	**1**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirming cases	0,0 %	0,0 %	6,7 %	80,0 %	13,3 %	15
Gender		**female**					
Variable		**0**	**1**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirming cases	12,5 %	6,3 %	6,3 %	68,8 %	6,3 %	16

Table 131
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North					
Variable		**0**	**1**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirming cases	20,0 %	10,0 %	0,0 %	70,0 %	0,0 %	10
Region		**West**					
Variable		**0**	**1**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirming cases	0,0 %	0,0 %	25,0 %	62,5 %	12,5 %	8
Region		**South**					
Variable		**0**	**1**	**3**	**6**	**12**	**N**
CRDNR53	Number disconfirming cases	0,0 %	0,0 %	0,0 %	84,6 %	15,4 %	13

Table 132
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	1,6 %	32,8 %	35,9 %	18,8 %	3,1 %	64

Table 133
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male					
Variable		**I**	**II**	**IIIA**	**IIIAB**	**IIIB**	**N**
CRSTA5	Stage Score	0,0 %	25,7 %	45,7 %	14,3 %	2,9 %	31
Gender		**female**					
Variable		**I**	**II**	**IIIA**	**IIIAB**	**IIIB**	**N**
CRSTA5	Stage Score	3,4 %	41,4 %	24,1 %	24,1 %	3,4 %	28

Table 140
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North					
Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	5,3 %	36,8 %	21,1 %	26,3 %	5,3 %	18
Region		**West**					
Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	0,0 %	30,0 %	40,0 %	15,0 %	5,0 %	18
Region		**South**					
Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA5	Stage Score	0,0 %	32,0 %	44,0 %	16,0 %	0,0 %	23

Table 141
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		correct	N
CRCOMA5	Adequacy of Explanation	0.738	61

Table 142
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male		female	
Variable		correct	N	correct	N
CRCOMA5	Adequacy of Explanation	0.788	33	0.679	28

Table 143
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North		West		South	
Variable		correct	N	correct	N	correct	N
CRCOMA5	Adequacy of Explanation	0.684	19	0.722	18	0.792	24

Table 144
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		inadequate	comparisoı	negative	both	N
CRTRANS	Transforms, stronger Set II	39,3 %	1,6 %	29,5 %	29,5 %	61
CRTRWES	Transforms, weaker Set II	83,6 %	3,3 %	0,0 %	13,1 %	61

Table 145
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male				
Variable		inadequate	comparisoı	negative	both	N
CRTRANS	Transforms, stronger Set II	30,3 %	3,0 %	33,3 %	33,3 %	33
CRTRWES	Transforms, weaker Set II	84,9 %	6,1 %	0,0 %	9,1 %	33
Gender		**female**				
Variable		inadequate	comparisoı	negative	both	N
CRTRANS	Transforms, stronger Set II	50,0 %	0,0 %	25,0 %	25,0 %	28
CRTRWES	Transforms, weaker Set II	82,1 %	0,0 %	0,0 %	17,9 %	28

Table 146
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North				
Variable		inadequate	comparisoı	negative	both	N
CRTRANS	Transforms, stronger Set II	42,1 %	0,0 %	26,3 %	31,6 %	19
CRTRWES	Transforms, weaker Set II	78,9 %	5,3 %	0,0 %	15,8 %	19
Region		**West**				
Variable		inadequate	comparisoı	negative	both	N
CRTRANS	Transforms, stronger Set II	33,3 %	0,0 %	27,8 %	38,9 %	18
CRTRWES	Transforms, weaker Set II	94,4 %	0,0 %	0,0 %	5,6 %	18
Region		**South**				
Variable		inadequate	comparisoı	negative	both	N
CRTRANS	Transforms, stronger Set II	41,7 %	4,2 %	33,3 %	20,8 %	24
CRTRWES	Transforms, weaker Set II	79,2 %	4,2 %	0,0 %	16,7 %	24

Table 147
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		correct	N
CRREC5	Recognition of School Topic	0.037	54

Table 149
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		male		female	
Variable		correct	N	correct	N
CRREC5	Recognition of School Topic	0.032	31	0.043	23

Table 150
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North		West		South	
Variable		correct	N	correct	N	correct	N
CRREC5	Recognition of School Topic	0.125	16	0.000	16	0.000	22

Table 151
Correlational reasoning:
Solution probabilities at age 15
Rural sample

Variable		oscillating	reflecting	certain	N
CRIMP5	impression of subject	14,3 %	54,3 %	31,4 %	35

Table 152
Correlational reasoning:
Solution probabilities at age 15
by gender
Rural sample

Gender		female			
Variable		oscillating	reflecting	certain	N
CRIMP5	impression of subject	14,3 %	57,1 %	28.6 %	14
Gender		**male**			
Variable		oscillating	reflecting	certain	N
CRIMP5	impression of subject	14,3 %	52,4 %	33,3 %	21

Table 153
Correlational reasoning:
Solution probabilities at age 15
by region
Rural sample

Region		North			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP5	impression of subject	0,0 %	16,7 %	83,3 %	6
Region		**West**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP5	impression of subject	5,9 %	64,7 %	29,4 %	17
Region		**South**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP5	impression of subject	33,3 %	58,3 %	8,3 %	12

3.7. Investigation of the seventeen year old children

Urban sample

Table 154
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		yes	N
CRPRE61	Prediction of Set 1	1.000	58

Table 155
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high		low	
Variable		yes	N	yes	N
CRPRE61	Prediction of Set 1	1.000	39	1.000	19

Table 156
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male		female	
Variable		yes	N	yes	N
CRPRE61	Prediction of Set 1	1.000	25	1.000	33

Table 157
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		high	
Variable		yes	N	yes	N
CRPRE61	Prediction of Set 1	1.000	25	1.000	33

Table 158
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

SES		low/low		low/high		middle/low	
Variable		yes	N	yes	N	yes	N
CRPRE61	Prediction of Set 1	1.000	7	1.000	9	1.000	9

SES		middle/high		high/low		high/high	
Variable		yes	N	yes	N	yes	N
CRPRE61	Prediction of Set 1	1.000	13	1.000	12	1.000	8

Table 159
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		correct	N
CRPRA61	Adequacy of Prediction	1.000	57
CRPRA62	Adequacy of Prediction	0.500	58

Table 160
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high		low	
Variable		correct	N	correct	N
CRPRA61	Adequacy of Prediction	1.000	38	1.000	19
CRPRA62	Adequacy of Prediction	0.553	38	0.400	20

Table 161
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender	male		female	
Variable	correct	N	correct	N
CRPRA61 Adequacy of Prediction	1.000	25	1.000	32
CRPRA62 Adequacy of Prediction	0.708	24	0.353	34

Table 162
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES	low		high	
Variable	correct	N	correct	N
CRPRA61 Adequacy of Prediction	1.000	25	1.000	32
CRPRA62 Adequacy of Prediction	0.400	25	0.576	33

Table 163
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

SES	low/low		low/high		middle/low	
Variable	yes	N	yes	N	yes	N
CRPRA61 Adequacy of Prediction	1.000	7	1.000	9	1.000	9
CRPRA62 Adequacy of Prediction	0.571	7	0.333	9	0.333	9

SES	middle/high		high/low		high/high	
Variable	yes	N	yes	N	yes	N
CRPRA61 Adequacy of Prediction	1.000	12	1.000	12	1.000	8
CRPRA61 Adequacy of Prediction	0.538	13	0.583	12	0.625	8

Table 164
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		yes	N
CRJUD61	Judgment of Correlation Set 1	1.000	59
CRJUD62	Judgment of Correlation Set 2	0.169	59
CRJUD63	Judgment of Correlation Set 3	0.103	58

Table 165
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high		low	
Variable		correct	N	correct	N
CRJUD61	Judgment of Correlation Set 1	1.000	39	1.000	20
CRJUD62	Judgment of Correlation Set 2	0.205	39	0.100	20
CRJUD63	Judgment of Correlation Set 3	0.053	38	0.200	20

Table 166
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male		female	
Variable		correct	N	correct	N
CRJUD61	Judgment of Correlation Set 1	1.000	25	1.000	34
CRJUD62	Judgment of Correlation Set 2	0.120	25	0.206	34
CRJUD63	Judgment of Correlation Set 3	0.125	24	0.088	34

Table 167
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		high	
Variable		correct	N	correct	N
CRJUD61	Judgment of Correlation Set 1	1.000	25	1.000	34
CRJUD62	Judgment of Correlation Set 2	0.280	25	0.088	34
CRJUD63	Judgment of Correlation Set 3	0.120	25	0.091	33

Table 168
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

SES		low/low		low/high		middle/low	
Variable		yes	N	yes	N	yes	N
CRJUD61	Judgment of Correlation Set 1	1.000	7	1.000	9	1.000	9
CRJUD62	Judgment of Correlation Set 2	0.143	7	0.111	9	0.111	9
CRJUD62	Judgment of Correlation Set 3	0.143	7	0.222	9	0.000	9

SES		middle/high		high/low		high/high	
Variable		yes	N	yes	N	yes	N
CRJUD61	Judgment of Correlation Set 1	1.000	14	1.000	12	1.000	8
CRJUD62	Judgment of Correlation Set 2	0.071	14	0.250	12	0.375	8
CRJUD62	Judgment of Correlation Set 3	0.071	14	0.000	11	0.250	8

Table 169
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		inadequate	semiadequate	adequate	N
CRJUA61	Adequacy of Explanation Set 1	1,7 %	48,3 %	50,0 %	58
CRJUA62	Adequacy of Explanation Set 2	77,6 %	0,0 %	22,4 %	58
CRJUA63	Adequacy of Explanation Set 3	87.9 %	0,0 %	12,1 %	58

Table 170
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high				low			
Variable		inadequat	semi.	adequat	N	inadequat	semi.	adequat	N
CRJUA61	Adequacy of Explanation 1	0,0 %	39,5 %	60,5 %	38	5,0 %	65,0 %	30,0 %	20
CRJUA62	Adequacy of Explanation 2	68,4 %	0,0 %	31,6 %	38	95,0 %	0,0 %	31,6 %	20
CRJUA63	Adequacy of Explanation 3	92,1 %	0,0 %	7,9 %	38	80,0 %	0,0 %	20,0 %	20

Table 171
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male				female			
Variable		inadequat	semiad.	adequat	N	inadequat	semiad.	adequat	N
CRJUA61	Adequacy of Explanation 1	0,0 %	37,5 %	62,5 %	24	2,9 %	55,9 %	41,2 %	34
CRJUA62	Adequacy of Explanation 2	64,0 %	0,0 %	36,0 %	25	87,9 %	0,0 %	12,1 %	33
CRJUA63	Adequacy of Explanation 3	87,5 %	0,0 %	12,5 %	24	88,2 %	0,0 %	11,8 %	34

Table 172
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low				high			
Variable		inadequat	semiad.	adequat	N	inadequat	semiad.	adequat	N
CRJUA61	Adequacy of Explanation 1	0.040	0.520	0.440	25	0.000	0.455	0.545	33
CRJUA62	Adequacy of Explanation 2	0.875	0.000	0.125	24	0.706	0.000	0.294	34
CRJUA63	Adequacy of Explanation 3	0.840	0.000	0.160	25	0.909	0.000	0.091	33

Table 173
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

SES		low/low				low/high			
Variable		inadequat	semiad.	adequat	N	inadequat	semiad.	adequat	N
CRJUA61	Adequacy of Explanation 1	14,3 %	42,9 %	42,9 %	7	0,0 %	66,7 %	33,3 %	9
CRJUA62	Adequacy of Explanation 2	83,3 %	0,0 %	16,7 %	6	88,9 %	0,0 %	11,1 %	9
CRJUA63	Adequacy of Explanation 3	71,4 %	0,0 %	28,6 %	7	88,9 %	0,0 %	11,1 %	9

SES		middle/low				middle/high			
Variable		inadequat	semiad.	adequat	N	inadequat	semiad.	adequat	N
CRJUA61	Adequacy of Explanation 1	0,00 %	44,4 %	55,6 %	9	0,0 %	53,8 %	46,2 %	13
CRJUA62	Adequacy of Explanation 2	88,9 %	0,0 %	11,1 %	9	71,4 %	0,0 %	28,6 %	14
CRJUA63	Adequacy of Explanation 3	88,9 %	0,0 %	11,1 %	9	92,9 %	0,0 %	7,1 %	14

SES		high/low				high/high			
Variable		inadequat	semiad.	adequat	N	inadequat	semiad.	adequat	N
CRJUA61	Adequacy of Explanation 1	0,0 %	50,0 %	50,0 %	12	0,0 %	25,0 %	75,0 %	8
CRJUA62	Adequacy of Explanation 2	66,7 %	0,0 %	33,3 %	12	75,0 %	0,0 %	25,0 %	8
CRJUA63	Adequacy of Explanation 3	90,9 %	0,0 %	9,1 %	11	87,5 %	0,0 %	12,5 %	8

Table 174
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		1000	1001	N
PATT61	Pattern 1	1,7 %	98,3 %	59

Table 175
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high		
Variable		1000	1001	N
PATT61	Pattern 1	0,0 %	100%	39

Teacher rating		low		
Variable		1000	1001	N
PATT61	Pattern 1	5,0 %	95,0 %	20

Table 176
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male		
Variable		1000	1001	N
PATT61	Pattern 1	0,0 %	100 %	25

Gender		female		
Variable		1000	1001	N
PATT61	Pattern 1	2,9 %	97,1 %	34

Table 177
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		
Variable		1000	1001	N
PATT61	Pattern 1	4,0 %	96,0 %	25

SES		high		
Variable		1000	1001	N
PATT61	Pattern 1	0,0 %	100,0 %	34

Table 178
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

Variable		Social class	1000	1001	N
PATT61	Pattern 1	low/low	14,3 %	85,7 %	7
PATT61	Pattern 1	low/high	0,0 %	100 %	9
PATT61	Pattern 1	middle/low	0,0 %	100 %	9
PATT61	Pattern 1	middle/high	0,0 %	100 %	14
PATT61	Pattern 1	high/low	0,0 %	100 %	12
PATT61	Pattern 1	high/high	0,0 %	100 %	8

Table 179
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		0000	0010	1001	N
PATT62	Pattern 2	13,2 %	2,6 %	84,2 %	38

Table 180
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		low			
Variable		0000	0010	1001	N
PATT62	Pattern 2	0,0 %	11,1 %	88,9 %	9
Teacher rating		**high**			
Variable		0000	0010	1001	N
PATT62	Pattern 2	17,2 %	0,0 %	82,8 %	29

Table 181
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male			
Variable		0000	0010	1001	N
PATT62	Pattern 2	4,5 %	4,5 %	90,9 %	22
Gender		**female**			
Variable		0000	0010	1001	N
PATT62	Pattern 2	25,0 %	0,0 %	75,0 %	16

Table 182
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		**0000**	**0010**	**1001**	**N**
PATT62	Pattern 2	20,0 %	6,7 %	73,3 %	15
SES		**high**			
Variable		**0000**	**0010**	**1001**	**N**
PATT62	Pattern 2	8,7 %	0,0 %	91,3 %	23

Table 183
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		0000	0010	1001	N
PATT62	low/low	0,0 %	0,0 %	100 %	4
PATT62	low/high	20,0 %	0,0 %	80,0 %	5
PATT62	middle/high	33,3 %	16,7 %	50,0 %	6
PATT62	middle/low	0,0 %	0,0 %	100,0 %	9
PATT62	high/low	25,0 %	0,0 %	75,0 %	8
PATT62	high/high	0,0 %	0,0 %	100,0 %	6

Table 184
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		0000	1001	1111	N
PATT63	Pattern 3	13,3 %	73,3 %	13,3 %	15

Table 185
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high			
Variable		**0000**	**1001**	**1111**	**N**
PATT63	Pattern 3	25,0 %	62,5 %	12,5 %	8
Teacher rating		**low**			
Variable		**0000**	**1001**	**1111**	**N**
PATT63	Pattern 3	0,0 %	85,7 %	14,3 %	7

Table 186
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male			
Variable		**0001**	**1001**	**1111**	**N**
PATT63	Pattern 3	16,7 %	66,7 %	16,7 %	6

Gender		female			
Variable		**0001**	**1001**	**1111**	**N**
PATT63	Pattern 3	11,1 %	77,8 %	11,1 %	9

Table 187
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		**0001**	**1001**	**1111**	**N**
PATT63	Pattern 3	14,3 %	85,7 %	0,0 %	7

SES		high			
Variable		**0001**	**1001**	**1111**	**N**
PATT63	Pattern 3	12,5 %	62,5 %	25,0 %	8

Table 188
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	0000	1001	1111	N
PATT63	Pattern 3	low/low	0,0 %	100,0 %	0,0 %	2
PATT63	Pattern 3	low/high	0,0 %	100,0 %	0,0 %	1
PATT63	Pattern 3	middle/high	25,0 %	75,0 %	0,0 %	4
PATT63	Pattern 3	middle/low	33,3 %	66,7 %	0,0 %	3
PATT63	Pattern 3	high/low	0,0 %	100,0 %	0,0 %	2
PATT63	Pattern 3	high/high	0,0 %	33,3 %	66,7 %	3

Table 189
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		0010	0110	1001	1111	N
DPATT62	Pattern 2	2,6 %	89,7 %	5,1 %	2,6 %	39

Table 190
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating	**high**				
Variable	**0001**	**0110**	**1001**	**1110**	**N**
DPATT62 Pattern 2	0,0 %	89,7 %	6,9 %	3,4 %	29
Teacher rating	**low**				
Variable	**0001**	**0110**	**1001**	**1110**	**N**
DPATT62 Pattern 2	10,0 %	90,0 %	0,0 %	0,0 %	10

Table 191
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender	**male**				
Variable	**0001**	**0110**	**1001**	**1110**	**N**
DPATT62 Pattern 2	4,5 %	95,5 %	0,0 %	0,0 %	22
Gender	**female**				
Variable	**0001**	**0110**	**1001**	**1110**	**N**
DPATT62 Pattern 2	0,0 %	82,4 %	11,8 %	5,9 %	17

Table 192
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES	**low**				
Variable	**0001**	**0110**	**1001**	**1110**	**N**
DPATT62 Pattern 2	6,7 %	80,0 %	6,7 %	6,7 %	15
SES	**high**				
Variable	**0001**	**0110**	**1001**	**1110**	**N**
DPATT62 Pattern 2	0,0 %	95,8 %	4,2 %	0,0 %	24

Table 193
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable	SES	0001	0110	1001	1110	N
DPATT62 Pattern 2	low/low	0,0 %	75,0 %	25,0 %	0,0 %	4
DPATT62 Pattern 2	low/high	0,0 %	100,0 %	0,0 %	0,0 %	5
DPATT62 Pattern 2	middle/high	16,7 %	66,7 %	0,0 %	16,7 %	6
DPATT62 Pattern 2	middle/low	0,0 %	90,0 %	10,0 %	0,0 %	10
DPATT62 Pattern 2	high/low	0,0 %	100,0 %	0,0 %	0,0 %	8
DPATT62 Pattern 2	high/high	0,0 %	100,0 %	0,0 %	0,0 %	6

Table 194
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable	0000	0010	0110	1001	1111	N
DPATT63 Pattern 3	13,3 %	6,7 %	60,0 %	6,7 %	13,3 %	15

Table 195
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating	high					
Variable	0000	0010	0110	1001	1111	N
DPATT63 Pattern 3	12,5 %	0,0 %	50,0 %	12,5 %	25,0 %	8
Teacher rating	**low**					
Variable	0000	0010	0110	1001	1111	N
DPATT63 Pattern 3	14,3 %	14,3 %	71,4 %	0,0 %	0,0 %	7

Table 196
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender	male					
Variable	0000	0010	0110	1001	1111	N
DPATT63 Pattern 3	16,7 %	16,7 %	50,0 %	0,0 %	16,7 %	6
Gender	**female**					
Variable	0000	0010	0110	1001	1111	N
DPATT63 Pattern 3	11,1 %	0,0 %	66,7 %	11,1 %	11,1 %	9

Table 197
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low					
Variable		**0000**	**0010**	**0110**	**1001**	**1111**	**N**
DPATT63	Pattern 3	0,0 %	14,3 %	71,4 %	0,0 %	14,3 %	7
SES		**high**					
Variable		**0000**	**0010**	**0110**	**1001**	**1111**	**N**
DPATT63	Pattern 3	25,0 %	0,0 %	50,0 %	12,5 %	12,5 %	8

Table 198
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		Social class	0000	0010	0110	1001	1111	N
DPATT63	Pattern 3	low/low	0,0 %	0, 0 %	100,0 %	0,0 %	0,0 %	2
DPATT63	Pattern 3	low/high	0,0 %	0, 0 %	100,0 %	0,0 %	0,0 %	1
DPATT63	Pattern 3	middle/high	0,0 %	25,0 %	50,0 %	0,0 %	25,0 %	4
DPATT63	Pattern 3	middle/low	0,0 %	0,0 %	33,3 %	33,3 %	33,3 %	3
DPATT63	Pattern 3	high/low	0,0 %	0, 0 %	100,0 %	0,0 %	0,0 %	2
DPATT63	Pattern 3	high/high	66,7 %	0,0 %	33,3 %	0,0 %	0,0 %	3

Table 199
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		6	12	N
CRCNR61	Number confirming Cases	1,7 %	98,3 %	59

Table 200
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high		
Variable		**6**	**12**	**N**
CRCNR61	Number confirming Cases	0,0 %	100,0 %	39
Teacher rating		**low**		
Variable		**6**	**12**	**N**
CRCNR61	Number confirming Cases	5,0 %	95,0 %	20

Table 201
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male		
Variable		**6**	**12**	**N**
CRCNR61	Number confirming Cases	0,0 %	100,0 %	25
Gender		**female**		
Variable		**6**	**12**	**N**
CRCNR61	Number confirming Cases	2,9 %	97,1 %	34

Table 202
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		
Variable		**6**	**12**	**N**
CRCNR61	Number confirming Cases	0.040	0.960	25
SES		**high**		
Variable		**6**	**12**	**N**
CRCNR61	Number confirming Cases	0.000	1.000	34

Table 203
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		Social class	6	12	N
CRCNR61	Number confirming Cases	low/low	14,3 %	85,7 %	7
CRCNR61	Number confirming Cases	low/high	0,0 %	100,0 %	9
CRCNR61	Number confirming Cases	middle/low	0,0 %	100,0 %	9
CRCNR61	Number confirming Cases	middle/high	0,0 %	100,0 %	14
CRCNR61	Number confirming Cases	high/low	0,0 %	100,0 %	12
CRCNR61	Number confirming Cases	high/high	0,0 %	100,0 %	8

Table 204
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		0	1	2	9	N
CRCNR62	Number confirming Cases	15,4 %	2,6 %	2,6 %	79,5 %	39

Table 206
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		**high**				
Variable		**0**	**1**	**2**	**9**	**N**
CRCNR62	Number confirming Cases	17,2 %	0,0 %	3,4 %	79,3 %	29
Teacher rating		**low**				
Variable		**0**	**1**	**2**	**9**	**N**
CRCNR62	Number confirming Cases	10,0 %	10,0 %	0,0 %	80,0 %	10

Table 206
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		**male**				
Variable		**0**	**1**	**2**	**9**	**N**
CRCNR62	Number confirming Cases	4,5 %	4,5 %	0,0 %	90,9 %	22
Gender		**female**				
Variable		**0**	**1**	**2**	**9**	**N**
CRCNR62	Number confirming Cases	29,4 %	0,0 %	5,9 %	64,7 %	17

Table 207
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		**low**				
Variable		**0**	**1**	**2**	**9**	**N**
CRCNR62	Number confirming Cases	0.200	0.067	0.000	0.733	15
SES		**high**				
Variable		**0**	**1**	**2**	**9**	**N**
CRCNR62	Number confirming Cases	0.125	0.000	0.042	0.833	24

Table 208
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable	SES	0	1	2	9	N
CRCNR62	low/low	0,0 %	0,0 %	0,0 %	100,0 %	4
CRCNR62	low/high	20,0 %	0,0 %	0,0 %	80,0 %	5
CRCNR62	middle/low	33,3 %	16,7 %	0,0 %	50,0 %	6
CRCNR62	middle/high	10,0 %	0,0 %	10,0%	80,0 %	10
CRCNR62	high/low	25,0 %	0,0 %	0,0 %	75,0 %&8	8
CRCNR62	high/high	0,0 %	0,0 %	0,0 %	100,0 %	6

Table 209
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		0	2	6	12	N
CRCNR63	Number confirming Cases	13,3 %	13,3 %	60,0 %	13,3 %	15

Table 210
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high				
Variable		0	2	6	12	N
CRCNR63	Number confirming Cases	25,0 %	12,5 %	50,0 %	12,5 %	8
Teacher rating		low				
Variable		0	2	6	12	N
CRCNR63	Number confirming Cases	0,0 %	14,3 %	71,4 %	14,3 %	7

Table 211
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male				
Variable		0	2	6	12	N
CRCNR63	Number confirming Cases	16,7 %	16,7 %	50,0 %	16,7 %	6
Gender		female				
Variable		0	2	6	12	N
CRCNR63	Number confirming Cases	11,1 %	11,1 %	66,7 %	11,1 %	9

Table 212
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low				
Variable		**0**	**2**	**6**	**12**	**N**
CRCNR63	Number confirming Cases	0.143	0.143	0.714	0.000	7
SES		**high**				
Variable		**0**	**2**	**6**	**12**	**N**
CRCNR63	Number confirming Cases	0.125	0.125	0.500	0.250	8

Table 213
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		SES	0	2	6	12	N
CRCNR63	Number confirming Cases	low/low	0,0 %	0,0 %	100,0 %	0,0 %	2
CRCNR63	Number confirming Cases	low/high	0,0 %	0,0 %	100,0 %	0,0 %	1
CRCNR63	Number confirming Cases	midd./low	25,0 %	25,0 %	50,0 %	0,0 %	4
CRCNR63	Number confirming Cases	midd./high	33,3 %	33,3 %	33,3 %	0,0 %	3
CRCNR63	Number confirming Cases	high/low	0,0 %	0,0 %	100,0 %	0,0 %	2
CRCNR63	Number confirming Cases	high/high	0,0 %	0,0 %	33,3 %	66,7 %	3

Table 214
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		1	2	3	12	N
CRDNR62	Number disconfirming cases	2,6 %	5,2 %	87,2 %	5,1 %	39

Table 215
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high				
Variable		**1**	**2**	**3**	**12**	**N**
CRDNR62	Number disconfirming cases	0,0 %	3,4 %	89,7 %	6,9 %	29
Teacher rating		**low**				
Variable		**1**	**2**	**3**	**12**	**N**
CRDNR62	Number disconfirming cases	10,0 %	10,0 %	80,0 %	0,0 %	10

Table 216
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		**male**				
Variable		**1**	**2**	**3**	**12**	**N**
CRDNR62	Number disconfirming cases	4,5 %	0,0 %	95,5 %	0,0 %	22
Gender		**female**				
Variable		**1**	**2**	**3**	**12**	**N**
CRDNR62	Number disconfirming cases	0,0 %	11,8 %	76,5 %	11,8 %	17

Table 217
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		**low**				
Variable		**1**	**2**	**3**	**12**	**N**
CRDNR62	Number disconfirming cases	0.067	0.000	0.800	0.133	15
SES		**high**				
Variable		**1**	**2**	**3**	**12**	**N**
CRDNR62	Number disconfirming cases	0.000	0.083	0.917	0.000	24

Table 218
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable	**Social class**	**1**	**2**	**3**	**12**	**N**
CRDNR62	low/low	0,0 %	0,0 %	100,0 %	0,0 %	4
CRDNR62	low/high	0,0 %	0,0 %	80,0 %	20,0 %	5
CRDNR62	middle/low	16,7 %	0,0 %	66,7 %	16,7 %	6
CRDNR62	middle/high	0,0 %	20,0 %	80,0 %	0, 0 %	10
CRDNR62	high/low	0,0 %	0,0 %	100,0 %	0,0 %	8
CRDNR62	high/low	0,0 %	0,0 %	100,0 %	0,0 %	6

Table 219
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		0	1	2	6	12	N
CRDNR63	Number disconfirm. cases	13,3 %	6,7 %	6,7 %	60,0 %	13,3 %	15

Table 220
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high					
Variable		0	1	2	6	12	N
CRDNR63	Number disconfirm. cases	12,5 %	0,0 %	12,5 %	50,0 %	25,0 %	8
Teacher rating		low					
Variable		0	1	2	6	12	N
CRDNR63	Number disconfirm. cases	14,3 %	14,3 %	0,0 %	71,4 %	0,0 %	7

Table 221
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male					
Variable		0	1	2	6	12	N
CRDNR63	Number disconfirm. cases	16,7 %	16,7 %	0,0 %	50,0 %	16,7 %	6
Gender		female					
Variable		0	1	2	6	12	N
CRDNR63	Number disconfirm. cases	11,1 %	0,0 %	11,1 %	66,7 %	11,1 %	9

Table 222
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low					
Variable		0	1	2	6	12	N
CRDNR63	Number disconfirm. cases	0.000	0.143	0.000	0.714	0.143	7
SES		high					
Variable		0	1	2	6	12	N
CRDNR63	Number disconfirm. cases	0.250	0.000	0.125	0.500	0.125	8

Table 223
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		Social	0	1	2	6	12	N
CRDNR63	Number disconfirm. cases	low/l	0,0 %	0,0 %	0,0 %	100,0 %	0,0 %	2
CRDNR63	Number disconfirm. cases	low/h	0,0 %	0,0 %	0,0 %	100,0 %	0,0 %	1
CRDNR63	Number disconfirm. cases	midd./l	0,0 %	25,0 %	0,0 %	50,0 %	25,0 %	4
CRDNR63	Number disconfirm. cases	midd./h	0,0 %	0,0 %	33,3 %	33,3 %	33,3 %	3
CRDNR63	Number disconfirm. cases	high/l	0,0 %	0,0 %	0,0 %	100,0 %	0,0 %	2
CRDNR63	Number disconfirm. cases	high/h	66,7 %	0,0 %	0,0 %	33,3 %	0,0 %	3

Table 224
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA6	Stage Score	1,7 %	12,4%	14,0 %	15,7 %	5,0 %	121

Table 225
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		**high**					
Variable		**I**	**II**	**IIIA**	**IIIAB**	**IIIB**	**N**
CRSTA6	Stage Score	0,0 %	13,3 %	16,7 %	25,0 %	10,0 %	60
Teacher rating		**low**					
Variable		**I**	**II**	**IIIA**	**IIIAB**	**IIIB**	**N**
CRSTA6	Stage Score	3,3 %	11,5 %	11,5%	6,6 %	0,0 %	61

Table 226
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		**male**					
Variable		**I**	**II**	**IIIA**	**IIIAB**	**IIIB**	**N**
CRSTA6	Stage Score	1,6 %	3,1 %	10,9 %	15,6 %	7,8 %	64
Gender		**female**					
Variable		**I**	**II**	**IIIA**	**IIIAB**	**IIIB**	**N**
CRSTA6	Stage Score	1,8 %	22,8 %	17,5 %	15,8 %	1,8 %	57

Table 227
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low					
Variable		**I**	**II**	**IIIA**	**IIIAB**	**IIIB**	**N**
CRSTA6	Stage Score	0.080	0.400	0.240	0.280	0.000	25
SES		**high**					
Variable		**I**	**II**	**IIIA**	**IIIAB**	**IIIB**	**N**
CRSTA6	Stage Score	0.000	0.147	0.324	0.353	0.176	34

Table 228
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		I	II	IIIA	IIIAB	IIIB	N
CRSTA6	low/low	0,0 %	16,7 %	11,1 %	11,1 %	0,0 %	18
CRSTA6	low/high	0,0 %	14,8 %	11,1 %	7,4 %	0,0 %	27
CRSTA6	middle/low	11,1 %	16,7 %	5,6 %	16,7 %	0,0 %	18
CRSTA6	middle/high	0,0 %	10,0 %	25,0 %	25,0 %	10,0 %	20
CRSTA6	high/low	0,0 %	9,5 %	19,0 %	19,0 %	9,5 %	21
CRSTA6	high/low	0,0 %	5,9 %	11,8 %	17,6 %	11,8 %	17

Table 229
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		weaker	stronger	N
CRCOMP6	Comparison between I and II	1,7 %	98,3 %	59

Table 230
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high			low		
Variable		**weaker**	**stronger**	**N**	**weaker**	**stronger**	**N**
CRCOMP6	Comparison between I and II	0,0 %	100,0 %	39	5,0 %	95,0 %	20

Table 231
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male			female		
Variable		weaker	stronger	N	weaker	stronger	N
CRCOMP6	Comparison between I and II	0,0 %	100,0 %	25	2,9 %	97,1 %	34

Table 232
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			high		
Variable		weaker	stronger	N	weaker	stronger	N
CRCOMP6	Comparison between I and II	0,0 %	100,0 %	25	2,9 %	97,1 %	20

Table 233
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable	Social class	weaker	stronger	N
CRCOMP6	low/low	0,0 %	100,0 %	7
CRCOMP6	low/high	0,0 %	100,0 %	9
CRCOMP6	middle/low	0,0 %	100,0 %	9
CRCOMP6	middle/high	0,0 %	100,0 %	14
CRCOMP6	high/low	8,3 %	91,7 %	12
CRCOMP6	high/low	0,0 %	100,0 %	8

Table 234
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		correct	N
CRCOMA6	Adequacy of Explanation	0.814	59

Table 235
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high		low	
Variable		correct	N	correct	N
CRCOMA6	Adequacy of Explanation	0.846	39	0.750	20

Table 236
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender	male		female	
Variable	correct	N	correct	N
CRCOMA6 Adequacy of Explanation	0.960	25	0.706	34

Table 237
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES	low		high	
Variable	correct	N	correct	N
CRCOMA6 Adequacy of Explanation	0.800	25	0.824	34

Table 238
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

SES	low/low		low/high		middle/low	
Variable	yes	N	yes	N	yes	N
CRCOMA6 Adequacy of Explanation	0.857	7	0.778	9	0.778	9

SES	middle/high		high/low		high/high	
Variable	yes	N	yes	N	yes	N
CRCOMA6 Adequacy of Explanation	0.929	14	0.750	12	0.750	8

Table 239
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable	inad. trf.	comparisoı	negat.	disc both	N
CRTRANS Transforms, str. Set II	30,5 %	1,7 %	30,5 %	37,3 %	59
CRTRWES Transforms, we. Set II	64,4 %	3,4 %	8,5 %	23,7 %	59

Table 240
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating	high				
Variable	**inad. trf.**	**comparison**	**negat.**	**disc both**	**N**
CRTRANS Transforms, str. Set II	20,5 %	2,6 %	35,9 %	41,0 %	39
CRTRWES Transforms, we. Set II	56,4 %	5,1 %	12,8 %	25,6 %	39

Teacher rating	low				
Variable	**inad. trf.**	**comparison**	**negat.**	**disc both**	**N**
CRTRANS Transforms, str. Set II	50,0 %	0,0 %	20,0 %	30,0 %	20
CRTRWES Transforms, we. Set II	80,0 %	0,0 %	0,0 %	20,0 %	20

Table 241
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender	male				
Variable	**inad. trf.**	**comparison**	**negat.**	**disc both**	**N**
CRTRANS Transforms, str. Set II	20,0 %	0,0 %	32,0 %	48,0 %	25
CRTRWES Transforms, we. Set II	48,0 %	8,0 %	12,0 %	32,0 %	25

Gender	female				
Variable	**inad. trf.**	**comparison**	**negat.**	**disc both**	**N**
CRTRANS Transforms, str. Set II	38,2 %	2,9 %	29,4 %	29,4 %	34
CRTRWES Transforms, we. Set II	76,5 %	0,0 %	5,9 %	17,6 %	34

Table 242
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES	low				
Variable	**inad. trf.**	**comparison**	**negat.**	**disc both**	**N**
CRTRANS Transforms, str. Set II	36,0 %	4,0 %	12,0 %	48,0 %	25
CRTRWES Transforms, we. Set II	72,0 %	4,0 %	4,0 %	20,0 %	25

SES	high				
Variable	**inad. trf.**	**comparison**	**negat.**	**disc both**	**N**
CRTRANS Transforms, str. Set II	26,5 %	0,0 %	44,1 %	29,4 %	34
CRTRWES Transforms, we. Set II	58,8 %	2,9 %	11,8 %	26,5 %	34

Table 243
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable	Social class	inad. trf.	comparison	negat. disc.	both	N
CRTRANS	low/low	28,6 %	0,0 %	14,3 %	57,1 %	7
CRTRANS	low/high	33,3 %	0,0 %	22,2 %	44,4 %	9
CRTRANS	middle/low	44,4 %	11,1 %	0,0 %	44,4 %	9
CRTRANS	middle/high	35,7 %	0,0 %	21,4 %	42,9 %	14
CRTRANS	high/low	25,0 %	0,0 %	66,7 %	8,3 %	12
CRTRANS	high/low	12,5 %	0,0 %	50,0 %	37,5 %	8

Table 244
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable	Social class	inad. trf.	comparison	negat. disc.	both	N
CRTRWES	low/low	57,1 %	14,3 %	14,3 %	14,3 %	7
CRTRWES	low/high	66,7 %	0,0 %	0,0 %	33,3 %	9
CRTRWES	middle/low	88,9 %	0,0 %	0,0 %	11,1 %	9
CRTRWES	middle/high	64,3 %	0,0 %	7,1 %	28,6 %	14
CRTRWES	high/low	50,0 %	8,3 %	16,7 %	25,0 %	12
CRTRWES	high/low	62,5 %	0,0 %	12,5 %	25,0 %	8

Table 245
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		correct	N
CRREC6	Recognition of School Topic	0.232	56

Table 246
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high		low	
Variable		correct	N	correct	N
CRREC6	Recognition of School Topic	0.183	38	0.333	18

Table 247
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		male		female	
Variable		correct	N	correct	N
CRREC6	Recognition of School Topic	0.174	23	0.273	33

Table 248
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low		high	
Variable		correct	N	correct	N
CRREC6	Recognition of School Topic	0.217	23	0.242	33

Table 249
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low/low		low/high		middle/low	
Variable		yes	N	yes	N	yes	N
CRREC6	Recognition of School Topic	0.333	6	0.111	9	0.250	8

SES		middle/high		high/low		high/high	
Variable		yes	N	yes	N	yes	N
CRREC6	Recognition of School Topic	0.231	13	0.083	12	0.500	8

Table 250
Correlational reasoning:
Solution probabilities at age 17
Urban sample

Variable		oscillating	reflecting	certain	N
CRIMP6	impression of subject	7,5 %	45,0 %	47,5 %	40

Table 251
Correlational reasoning:
Solution probabilities at age 17
by teacher rating
Urban sample

Teacher rating		high			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP6	impression of subject	3,6 %	53,6 %	42,9 %	28
Teacher rating		**low**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP6	impression of subject	16,7 %	25,0 %	58,3 %	12

Table 252
Correlational reasoning:
Solution probabilities at age 17
by gender
Urban sample

Gender		female			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP6	impression of subject	0,0 %	50,0 %	50,0 %	18
Gender		**male**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP6	impression of subject	13,6 %	40,9 %	45,5 %	22

Table 253
Correlational reasoning:
Solution probabilities at age 17
by social class in two categories: low (SES 1-3), high (SES 4-6)
Urban sample

SES		low			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP6	impression of subject	0,0 %	46,7 %	53,3 %	15
SES		**high**			
Variable		**oscillating**	**reflecting**	**certain**	**N**
CRIMP6	impression of subject	12,0 %	44,0 %	44,0 %	25

Table 254
Correlational reasoning:
Solution probabilities at age 17
by social class in six categories
Urban sample

Variable		Social class	oscillating	reflecting	certain	
CRIMP6	impression of subject	low/low	0,0 %	40,0 %	60,0 %	5
CRIMP6	impression of subject	low/high	0,0 %	75,0 %	25,0 %	4
CRIMP6	impression of subject	middle/low	0,0 %	33,3 %	66,7 %	6
CRIMP6	impression of subject	middle/high	28,6 %	28,6 %	42,9 %	7
CRIMP6	impression of subject	high/low	9,1 %	54,5 %	36,4 %	11
CRIMP6	impression of subject	high/low	0,0 %	42,9 %	57,1 %	7

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