Max-Planck-Institut für Bildungsforschung

Max Planck Institute for Human Development and Education

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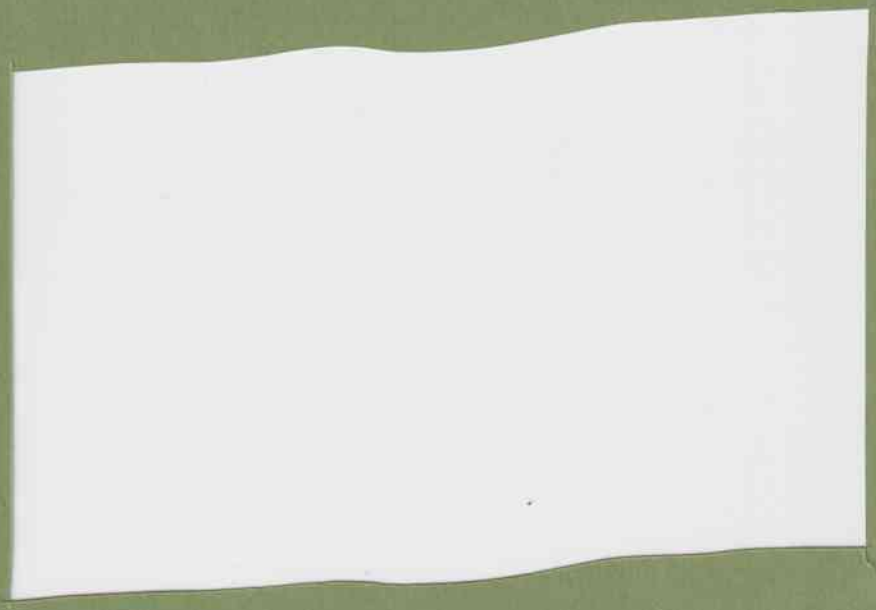
DEVELOPMENTAL DYNAMICS: THE EFFECTS OF INTERNAL AND EXTERNAL CONSTRAINTS ON DEVELOPMENT

No. 42/ES January 1995

Beiträge aus dem Forschungsbereich Entwicklung und Sozialisation
Contributions from the Center for Development and Socialization



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Contents

Abstract

Structural developmental theory has been epistemologically oriented and largely ignored the sources of variability in development needed to account for psychological reality beyond ideal structures of developmental progress. In longitudinal studies it is possible to disentangle the effects due to the internal dynamics and constraints of development and to the influence of external factors – mainly the effects of experience provided through social class, socialization and education.

The present publication is based on a poster workshop at the ISSBD Conference in Amsterdam in July 1994. The poster workshop combined 9 presentations from Project Individual Development and Social Structure covering cognitive, socio-moral and personality development and spanning up to 15 years of development between childhood and adulthood. The posters published here deal with
(a) the internal structure and dynamics of development (stability, consistency, transformation and variability);
(b) personality, socialization and the impact of risk factors on development;
(c) the emergence of interindividual differences in cognitive and socio-moral development.
The final paper presents the theoretical assumptions on which the analyses are predicated.
Thus, the publication is designed to demonstrate and compare, across different domains of development, but within a single theoretical framework, basic patterns and conditions of developmental progression.

Zusammenfassung

Die kognitive Entwicklungstheorie ist ihrer Tradition nach erkenntnistheoretisch orientiert. Folglich hat sie die Varianzquellen kaum beachtet, die zur Erklärung der psychologischen Realität jenseits der idealen Strukturen des Entwicklungsfortschritts notwendig berücksichtigt werden müssen. In Längsschnittuntersuchungen ist es möglich, die Wirkungen der inneren Dynamik und Zwänge der Entwicklung und den Einfluß externer Faktoren, insbesondere den Einfluß der durch Schichtzugehörigkeit, Sozialisation und Bildung vermittelten Erfahrung voneinander zu trennen.

Die vorliegende Veröffentlichung beruht auf einem Postersymposium, das das Projekt "Entwicklung und Soziale Struktur" auf der ISSBD Konferenz im Juli 1994 in Amsterdam veranstaltet hat. Auf dem Symposium wurden 9 Poster zur kognitiven, soziomoralischen und Persönlichkeitsentwicklung präsentiert, die einen Entwicklungszeitraum von 15 Jahren von der Kindheit bis zum Erwachsenenalter umfassen. Im Rahmen der genannten Entwicklungsdimensionen behandeln die Poster folgende Fragestellungen:
(a) die interne Struktur und Dynamik der Entwicklung (Stabilität, Konsistenz, Transformation und Variabilität in der Entwicklung);
(b) Persönlichkeitsentwicklung, Sozialisation und Einfluß von Risikofaktoren der Entwicklung;
(c) die Entstehung individueller Unterschiede in der kognitiven und soziomoralischen Entwicklung.
Das Schlußkapitel präsentiert die theoretischen Annahmen, auf denen diese Analysen beruhen.
Die Veröffentlichung soll dazu dienen, grundlegende Bedingungen und Muster der Entwicklung in unterschiedlichen Entwicklungsbereichen in einem einheitlichen theoretischen Rahmen vergleichend zu beschreiben.

Wolfgang Edelstein

Introduction

The present publication consists of 9 posters from project Individual Development and Social Structure displayed in a poster symposium at the ISSBD Conference in Amsterdam in June 1994.

Longitudinal and developmental, these posters concern either the core domain of cognitive developmental theory (cognition and sociomoral reasoning – 3 and 2 posters respectively) or conditions of development including risk factors that affect the development of personality, and thus, directly or indirectly, the course of cognitive and sociomoral growth.

It is this dynamic that founds the claim to innovation in these posters. Contrary to the cognitive developmental tradition mainly concerned with stage, sequence and structural wholeness, our endeavor is oriented towards reconstructing the differential pattern of developmental change. But this orientation is geared towards enriching that tradition rather than relinquishing it.

Thus, the programmatic purpose of these studies is threefold:

(a) on the most elementary level, the reconstruction of the constraints acting in and on development, and thus the construction of a realistic view of the developmental dynamic itself;

(b) on an intermediate level, the reconcertation of the conceptual structures of socialization and development, and

(c) on the level of theory building, the formulation, beyond Piagetian epistemology, of a genuinely Piagetian psychology, reconciling holism with differential psychology in a unified structuralist conceptualization of the development of the person.

Constraint theory

Two things are worth keeping in mind when talking about the notion of *constraints* on development. First, this concept would have no meaning without the maintenance of a normative age-sequential structure. Were development arbitrary and merely dependent on empirical stimuli, no systematic account of constraints on development would be possible. The other aspect is the obverse: In contradistinction to a merely normativistic view (such as in Piaget's and Kohlberg's), the notion of constraints on development introduces variability into the normative paradigm, but variability not as residual or error, but variability systematically accounted for. It enriches the normative and paradigmatic account of age-sequential change with an appraisal of intraindividual and interindividual differences and the causes generating these differences. Using Piaget's theory as a point of departure as these posters do, explicitly or by indirection, the conceptualization of constraints on development resolutely develops the notion of décalage into a *psychological theory of individual differences in development*, differences due to *intrinsic constraints* generated by the developmental process itself, i.e. by the organism confronting the epistemic encounter, or by *external conditions* imposed on the developing subject by socializing experience. A telling example of the latter is the concept of a working model for the interpretation of reality in Bowlby's theory of attachment.

I shall now devote a few moments to characterize these internal and external constraint systems. *Intrinsic constraints* derive from modalities of the task, from the specific construction of the task by the subject as determined by the mode of presentation, by varieties of the stimulus, by variations of procedures and response modalities. Intrinsic constraints on development thus are defined in accordance with the traditions of cognitive psychology. Intrinsic constraints operate

within the act of cognition. They are part and parcel of the structure of cognitive production, and fit into Piaget's theory of assimilation as part of the dynamic of development towards generalization and stabilization of cognitive operations. Intrinsic constraints represent a functionalist version of the dynamic of structural developmental theory, somewhat like Guy Cellérier's (1987) brand of schema theory linking structure to function. The classical décalage function is here represented for example by the task variations presented by the various syllogistic propositions in Schröder and Teo's analysis.

Whereas intrinsic constraints operate on the interface between cognitive subject and object of cognition, *external conditions of development* represent sociocultural constraints operating on the personality, and thus as modifiers of the performance of the subject in interaction with the world. These constraints determine the selection, saliency and constitutive conditions of epistemic experience. They ground enhancing or detrimental conditions of development. In the final analysis they define culturally specific pathways of development, whether these be deprived, enriched, or just divergent, compared to the standard pathway. In the posters of the Iceland project these conditions are represented in the design (sex, social class, etc.). More importantly, they are represented in socialized *personality dispositions* that affect cognitive and sociomoral development as developmental risk factors such as anxiety and depression.

Risk and protective factors in development

The concept of *risk factors* in development now raises the question, *how* socialization and ecological conditions generate variability and systematic interindividual differences, i.e. risk and protective factors in development. There seem to be *3 major types of risk factors*:

(a) First, there are specific disturbances of the interaction processes in families, such as those credited to the attachment dynamic. Jacobsen, Hofmann and Edelstein's poster shows how insecurity of attachment, presumably by interfering with exploration, affects cognitive development. However, developmental optimization does not necessarily predict optimal behavioral adjustment in a group at risk. Thus, aggressive disorder may simultaneously represent a protective factor against suicidality.

(b) Second, there are variabilities derived from the pattern of distribution of opportunity in the system of social inequality. Thus, other things being equal, middle class kids benefit from better milieu conditions for development than do lower class kids, as is well known from a large body of research literature. In our analyses, these variations mostly emerge not as main effects, but as interaction effects.

(c) Third, and most interestingly, there are non-normative but systematic configurations of life world conditions that appear to produce high risks. The latter conditions are represented by the posters by Grundmann, Hofmann and Schellhas et al. who demonstrate how risk is generated by socialization conditions deviating from the conditions congruent with class specific expectancies. This is true even for those conditions that are less beneficial in the system of social inequality. Thus non-normative effects within the lower class are even more detrimental than the dominant pattern of lower class socialization.

The differentiation of the constraint system and its consequences is due to the benefits reaped by longitudinal designs. The observation of the emergence and stabilization of individual differences is another benefit. Doors are opened towards both clinical developmental and developmental intervention research. Most important, theoretically, in my view, is the perspective on the causal relationship between micro and macro antecedents of development. This perspective has the potential to transform both developmental description and socialization research so as to ground, in future efforts, an explanatory developmental science linking

individual development, through a constructivist conceptualization of developmentally relevant experience and the opportunity system providing it, with the social and cultural structure.

Project Individual Development and Social Structure. The project from which the posters are derived, is longitudinal study of child and adolescent development in Iceland, begun in 1976. The study is designed to describe and explain socially differentiated courses of development under conditions of accelerated societal change, testing the assumption that individual developmental trajectories depend on systematic, e.g. milieu specific and family related variations and risks. In forder to test this assumption, the development of cognitive and sociocognitive operations, of moral judgment in everyday conflicts, and of a variety of personality dimensions is analyzed in light of the sociocultural conditions of individual development.

Against the background of this general question, the project pursues goals on different levels: (1) the longitudinal description of individual courses of development from middle childhood to adolescence, and in part, to early adulthood in the domains of cognition, social cognition and morality, and personality; (2) the reconstruction of interindividual differences in intraindividual change, within and across domains; (3) the explanation of types of development thus obtained as the consequence of the interaction of internal developmen al dynamics with the context of developmen (internal and external constraints); (4) the analysis of the consequences of development for the adaptation of individuals to contexts of achievement (e.g., the school) and for life success (developmental tasks). Theoretically, the project combines Piaget's and Kohlberg's constructivist developmental theories with an interactionist strategy of analysis of the interface of development and socialization and a risk factor model of developmental psychopathology. In sum, the study investigates the interface between cognitive-developmental and socialization jprocesses in the formation of individual capabilities in social context.

PROJECT "INDIVIDUAL DEVELOPMENT AND SOCIAL STRUCTURE" (IESS)

Concept

This project is a longitudinal study of child and adolescent development in Iceland, begun in 1976. The project is designed to describe and explain socially differentiated courses of development under conditions of accelerated societal change, testing the assumption that individual developmental trajectories depend on systematic, e.g. milieu specific and family related variations and risks. In order to test this assumption, the development of cognitive and sociocognitive operations, of moral judgment in everyday conflicts, and of a variety of personality dimensions is analyzed in light of the sociocultural conditions of individual development.

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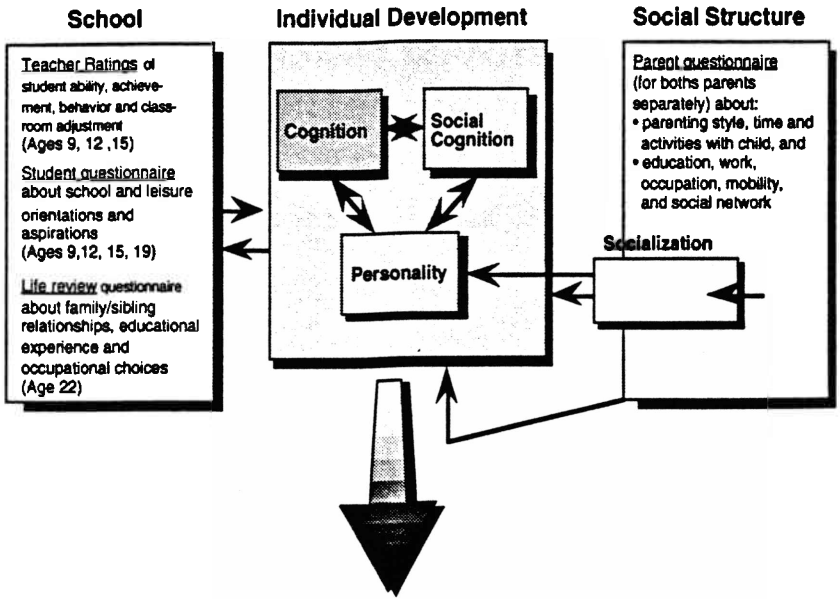
Project IESS: Conceptual Structure and Relationships Among Variables



Longitudinal measurement of **cognitive** development and intelligence (Raven)

Cognitive Concepts	AGE (years) 7	9	12	15	17	Poster number
concrete operations						
conservation	X					
class inclusion	X	X				
verbal classification	X	X	X			
logical multiplication	X	X				
						2 3 4 7 (all variables ages 7 to 15)
early formal operations						
multiple compensation		X	X	X		
syllogistic reasoning		X	X	X	X	*2 5*
pendulum task				X	X	
isolation of variables				X	X	
late formal operations						
proportions				X	X	
combinations				X	X	
correlations				X	X	*6*
intelligence (Raven)	X			X		*2*

Longitudinal measurement of **social cognitive** and **sociomoral** development (selected variables)

Social Cognition	AGE (years) 7	9	12	15	19	Poster number
perspective taking						
spacial perspective (Piaget)	X					
perspective differentation	X	X				
perspective coordination		X				
self concept			X	X	X	
friendship concepts	X	X	X	X	X	
sociomoral development						
moral dilemma (Kohlberg)			X	X	X	*9*
sociomoral conflict (interview)	X	X	X	X	X	*8*

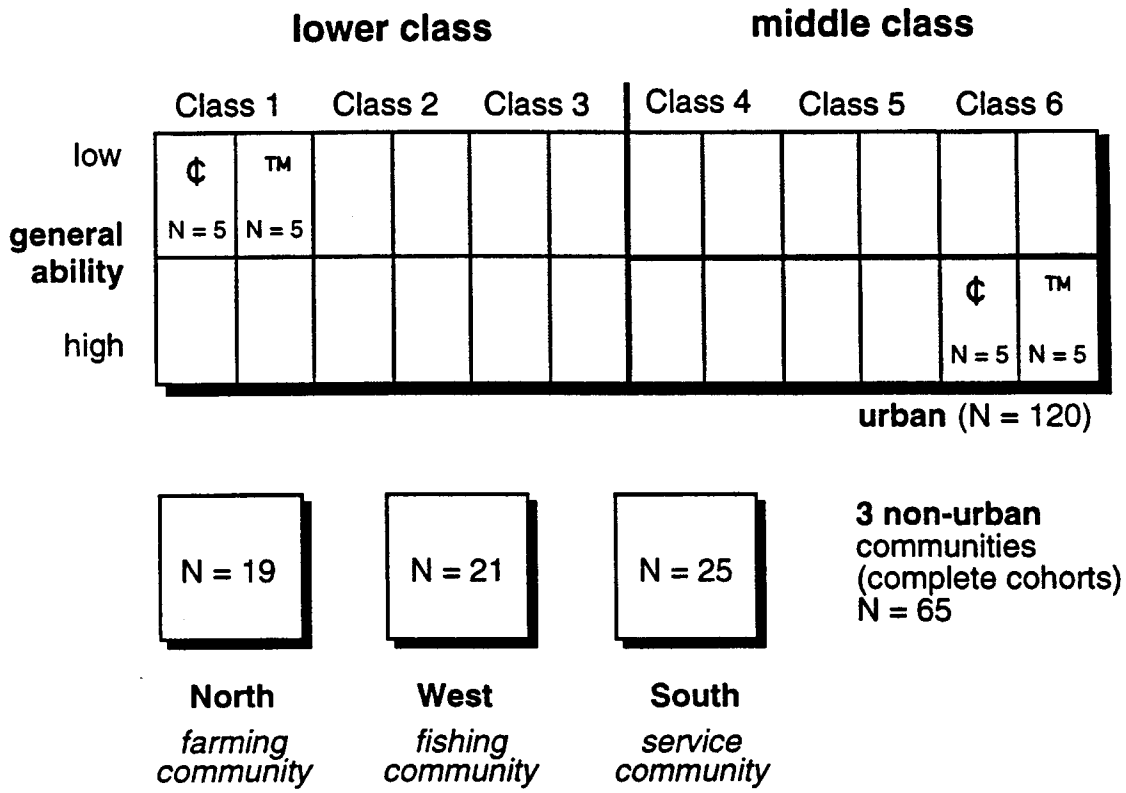
Longitudinal measurement of **personality** development (selected variables)

Social Cognition	AGE (years) 7	9	12	15	19	22	Poster number
anxiety (Sarason)							
general (GASC)	X	X	X	X	X		
familial (FASC)	X	X	X	X			*1 4*
locus of control (Nowicki & Strickland)	X	X	X	X	X		
coping / defending	X	X	X	X	X		
depressive reactions	X	X	X	X		X	*1 3*
security of attachment	X						*2*
child personality Q-sort (Block & Block))	X						
ego strength (Björnsson)	X	X	X	X	X		
ego development (Loevinger)						X	

Note. Measures used in the poster workshop are printed in *italics*.

Project IESS - Sampling Design

Social Class



The sample of 7-year-old first-graders in urban Iceland (n=121) was stratified according to the following factors: teacher assessed ability level at school entry (high vs. low), sex, and social class (six levels). The sample also included all 7-year-olds from three non-urban communities (n=65). Each community is characterized by a different socioecological structure: a sheep-farming community in the North, a fishing community in the West, and a trade and service community in the South. After four surveys in the metropolitan area (1976, 1978, 1981, 1984) and in the rural communities (1978, 1980, 1983, 1986), the cumulative attrition rate was approximately 8 percent (15 individuals). In 1987, a further measure of the cognitive development of individuals in both sample groups was taken. In 1989, data were again collected using the socio-moral interview and the student questionnaire. Finally, data based on a life review questionnaire focussing on vocational development, socialization, and personality development were collected in 1990/91, when the group was 22 years old.

DYNAMICS IN COGNITIVE DEVELOPMENT: SOURCES OF INTRAINDIVIDUAL DIFFERENCES IN SYLLOGISTIC REASONING

Eberhard Schröder, & Thomas Teo

Abstract

The present contribution focuses on the emergence of individual differences in cognitive development. These differences represent the effects of intrinsic as well as of external constraints on cognitive development. While intrinsic constraints on development derive either from modalities of the task itself, or the representation and conceptualization of the task by the subject, external constraints represent the antecedent, social and ecological conditions of development. These constraints affect the accessibility of experiences that are relevant and necessary for cognitive growth.
Regarding intrinsic constraints on development it is shown that (1) depending on the contextuation and experiential content of the task, different patterns of developmental change were observed and that (2) contextuation and form of the syllogistic argument interact over time. External constraints on development (represented by developmental status at the onset of schooling at age 7, rural vs. urban origin, social class, and gender) affect development in various ways. Thus, rural children and children with low developmental status develop more slowly and reach lower levels of competence from age 9 through 17. Gender does not influence the emergence of syllogistic reasoning directly. However, large gender differences were found in the emergence and the amount of individual differences between slow and advanced developers depending on the context of the task and the emergence of formal thought in adolescence.

Introduction

The present study is a longitudinal analysis of change both in intraindividual development and in interindividual differences in syllogistic reasoning from childhood to late adolescence. On the one hand, the question of intrinsic constraints in cognitive development is addressed in order to demonstrate how cognitive development proceeds over time depending on the form and the contextuation of the tasks. On the other hand, developmental paths are traced back to differences in developmental prerequisites and to differences in the social, ecological, and the gender specific lifeworlds of the children. These factors represent a set of external constraints that affect the epigenetic, ecological, and social transmission of cognitive development. The analysis will focus on the emergence, and stability, of individual differences in cognition due to gender socialization.
We distinguish intrinsic constraints on development that derive either from modalities of the task itself, or the conceptualization of the task by the cognitive subject (see Tab. 1) depending on the presentation, the differences in the stimulus, the procedural scheme of task administration, and response modalities. Differences due to the mental representation and the conceptualization of the content of a task are related to the dimensions or domains of application, the context of the tasks and the knowledge systems to which such cognitive processes refer. Whereas intrinsic constraints are located in the interface between the cognitive subject and the object of knowledge, external constraints are conceptualized as socio-cultural modifiers of these cognitive interactions. These constraints or conditions determine the socio-cultural transmission of cognitive development, i.e. the availability of knowledge-related experience and of objects of knowledge, and thus may promote or block the acquisition of cognitive structures.

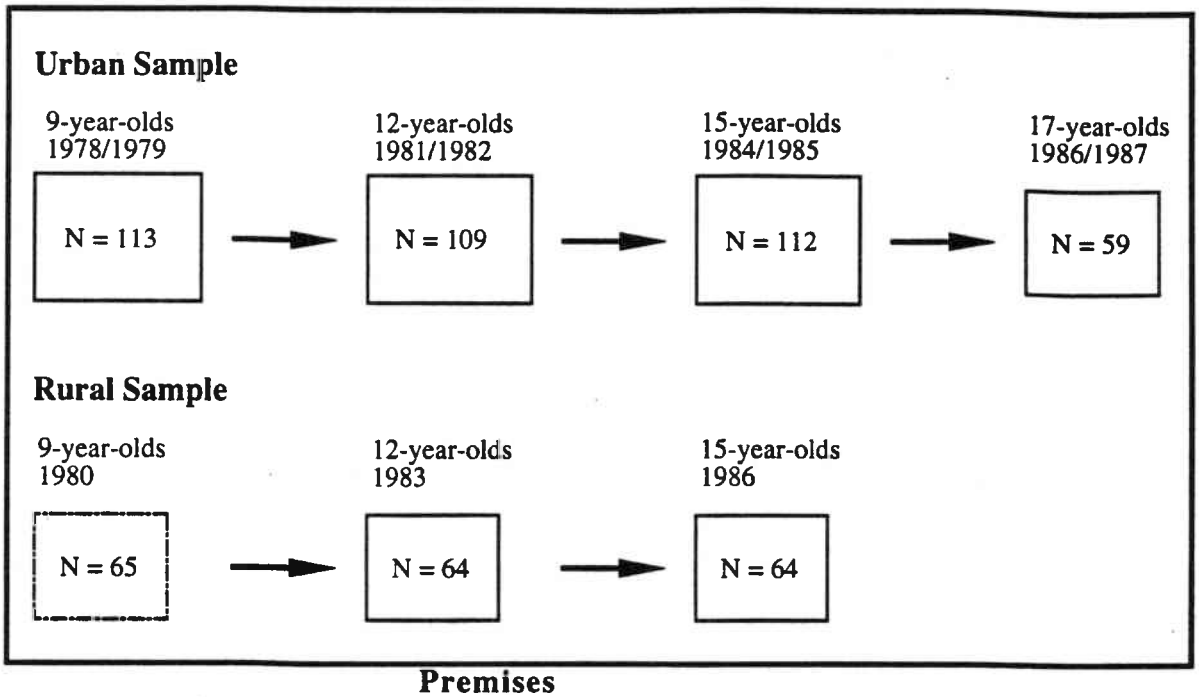
Table 1: Intrinsic and External Constraints on Cognitive Development

Intrinsic Constraints	**(inherent to cognitive interaction)**
Mode of Presentation:	Experimental setting versus verbal concepts
Mode of Performance:	Judgment versus explanation
Form of proposition:	Different forms of deduction
Procedure:	Reproductive versus explorative
Content:	Different experiential tasks
Contextuation:	Experiential versus abstract
Reference:	Reference to self or others
Structure of knowledge:	Expertise
External Constraints	**(antecedent to cognitive interaction)**
Developmental prerequisites:	Low versus high initial developmental status
Gender:	Girls versus boys
Social class:	Lower versus middle class
Ecology:	Urban versus rural

Method

In order to maximize variations or differences in performance within the individual various intrinsic constraints were introduced in the measurement design of the longitudinal study, specifically variations in content, contextuation and form of proposition.
To examine the development of children's deductive reasoning strategies, a number of syllogistic propositions were administered to the urban and non-urban sample at ages 9, 12, and 15 and to the urban sample again at age 17 (see Tab. 2). Three syllogistic tasks were selected for the present analyses. The first proposition referred to an experiential context available to all school children. The second is based on a counterintuitive statement beyond concrete experience. The third included abstractly symbolized content. For each task four basic forms of syllogistic arguments were presented: Modus ponens, negation of antecedent, affirmation of consequent, and modus tollens. Subjects were asked to judge the arguments, and then to justify their judgements. The following analyses are based on the justifications of the judgments.
The sampling design of the study was chosen to maximize individual differences due to external constraints on development, with variations in developmental status, social class, social ecology, and gender representing what were hypothesized to be major determinants of the experiential input relevant to development. Although the rural sample was not stratified according to developmental status at the onset of schooling, it was possible to reclassify the sample according to the selection attributes developmental status and gender that were used in the urban sample.

Table 2: Measurement Design and Description of Task



	Premises
Experiential task:	If there is a fire drill at school, the schoolbell rings.
Counterintuitive task:	During the summer it snows constantly in Iceland.
Abstract task:	If I travel to A, I pass B.

Four basic forms of a syllogistic statement (Example: Experiential task)

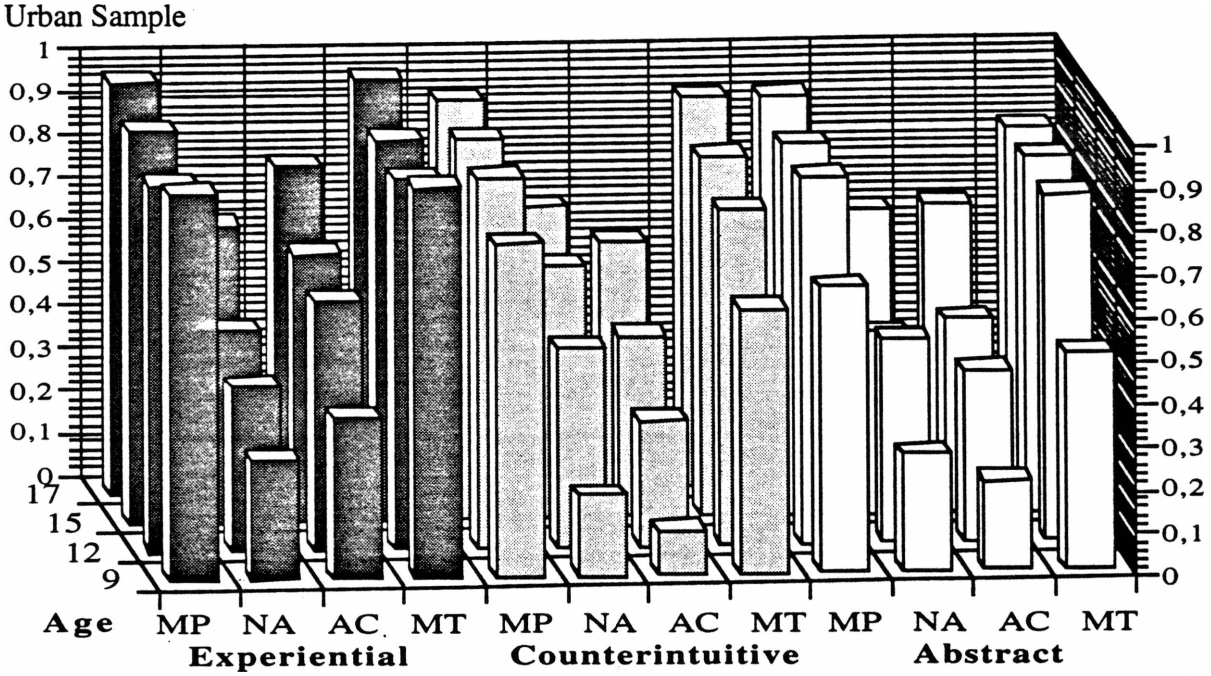
Affirmation of antecedent (modus ponens): MP	There is a fire drill at school. Does the school bell ring? Correct answer: **Yes.**
Negation of antecedent: NA	There is no fire drill at school. Does the school bell ring? Correct answer: **Maybe.**
Affirmation of consequent: AC	The school bell rings. Is there a fire drill at school? Correct answer: **Maybe.**
Negation of consequent (modus tollens): MT	The school bell does not ring. Is there a fire drill at school? Correct answer: **No.**

Results

Interaction of form and context: While in the case of the experiential task the affirmation of the consequent is easier than the negation of the antecedent, in the counterintuitive task the reverse is true. Contrary to these large differences, intraindividual differences between forms were not found in the abstract task (see Fig. 1 and 2).

Figure 1: Distribution of Syllogistic Arguments over Time

Urban Sample



Rural Sample

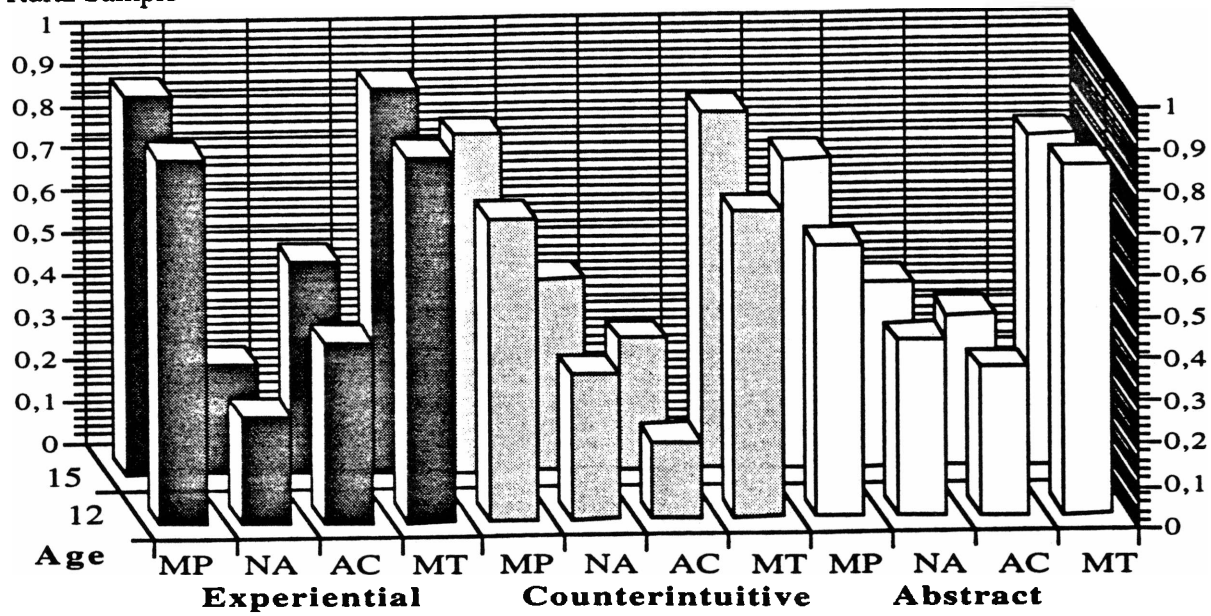
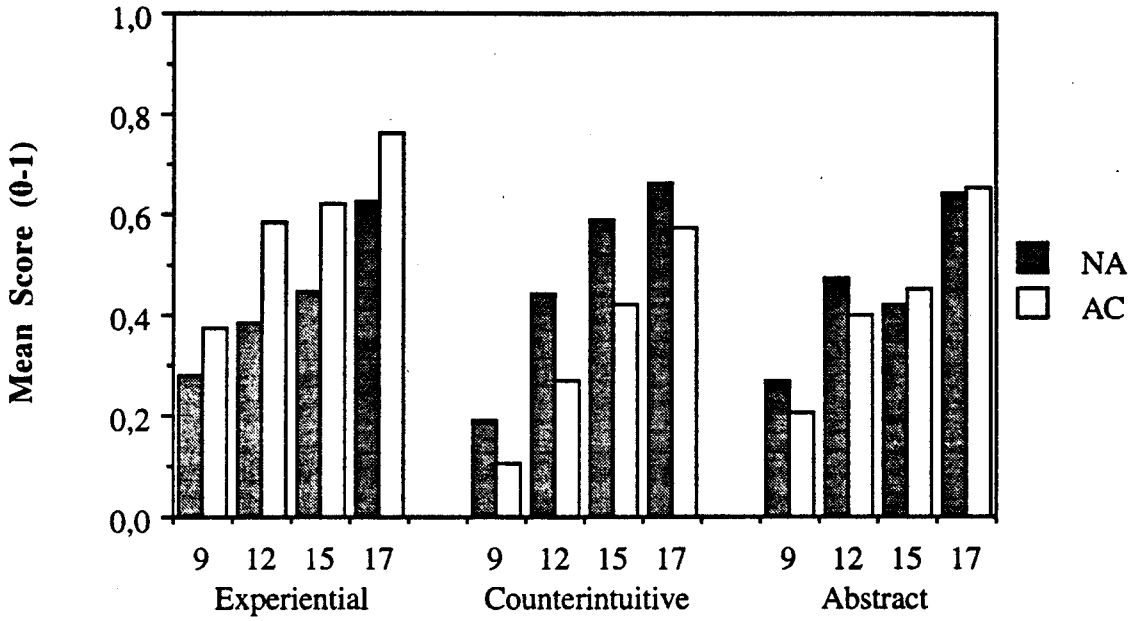
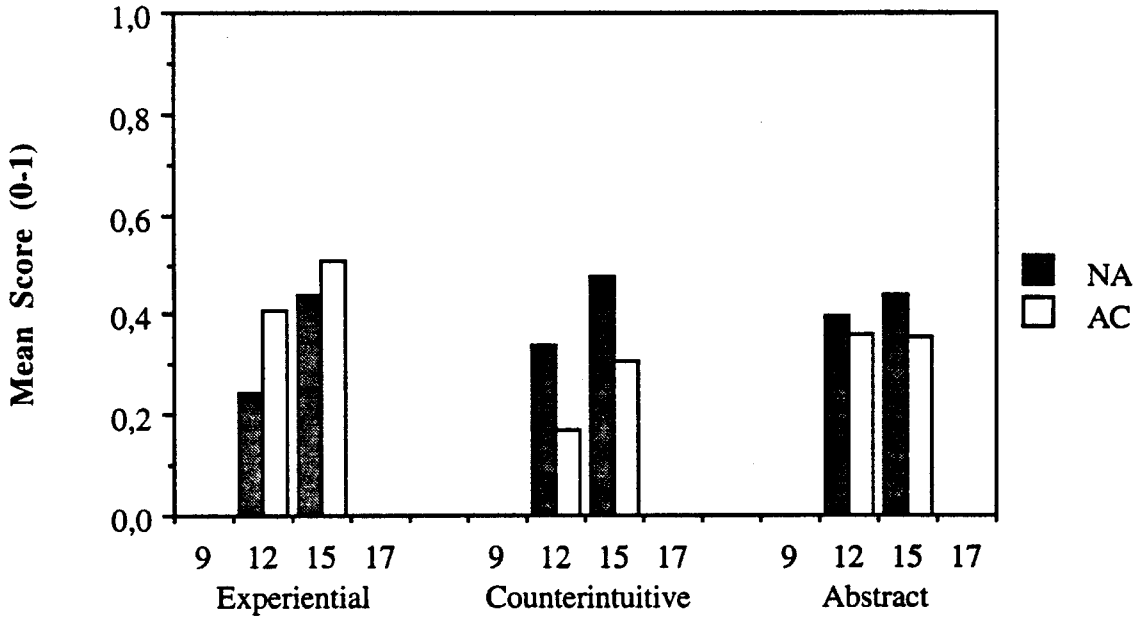


Figure 2: Intraindividual Differences between Form und context: Invariability of Form

Urban Sample



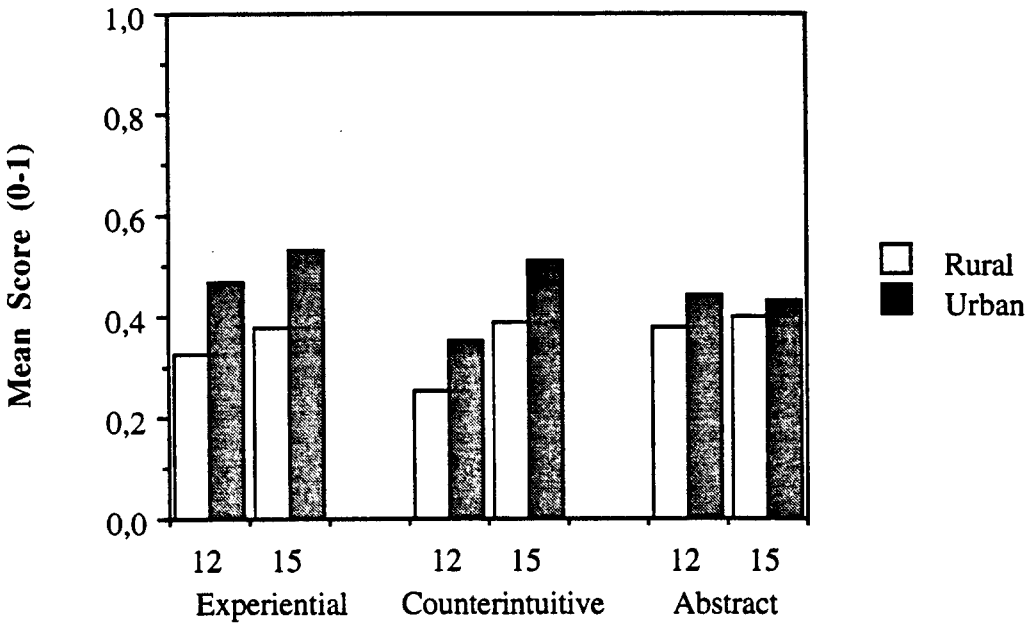
Rural Sample



Presumably subjects solve abstract syllogisms by applying a formal rule that does not differentiate between the two forms of the task. Both forms belong to the same rule. In the case of contextualized tasks the form of the syllogism interacts with the previously acquired knowledge about the context.

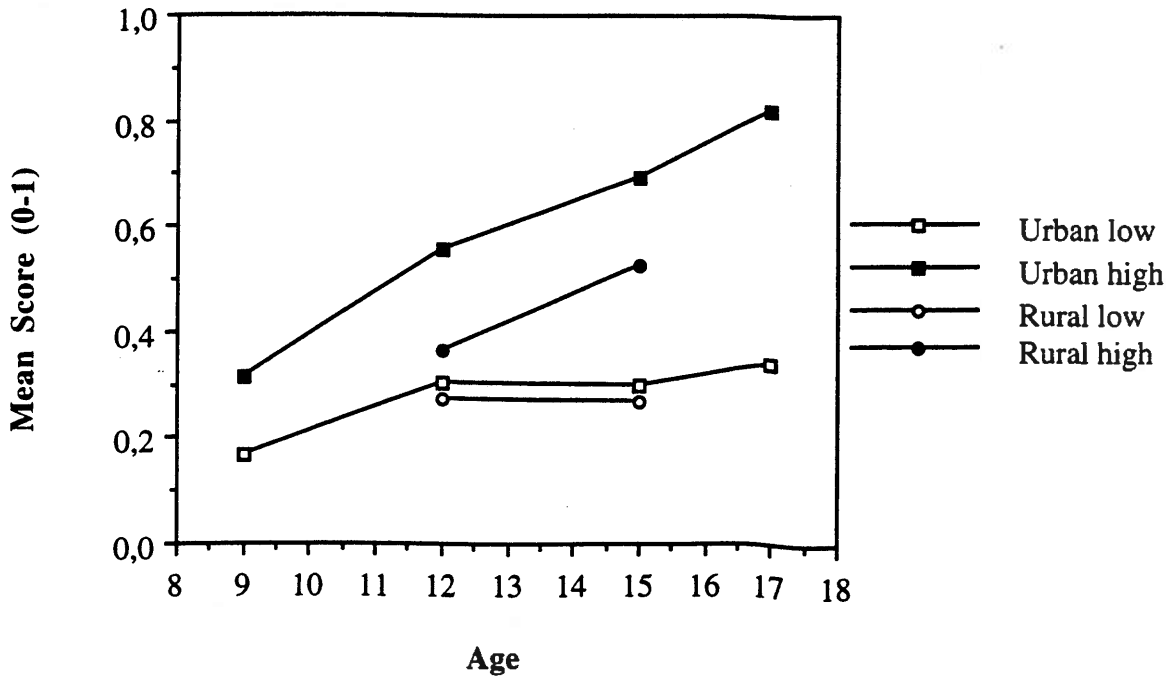
Differences between urban and rural sample: When comparing the urban and rural children it was shown that urban children, in general, were more advanced in development than their rural peers (see Fig. 3). However, the delay in development between ecologies depends on the contextuation of the task. While large differences between the urban and rural sample were found in both contextualized tasks with an increasing differentiation between them from age 12 to age 15, rural adolescents reach about the same level as their urban peers in the abstract task at ages 12 and 15.

Figure 3: Individual Differences between Children from Urban and Rural Areas: Ecological Lifeworld and Contextuation of Task



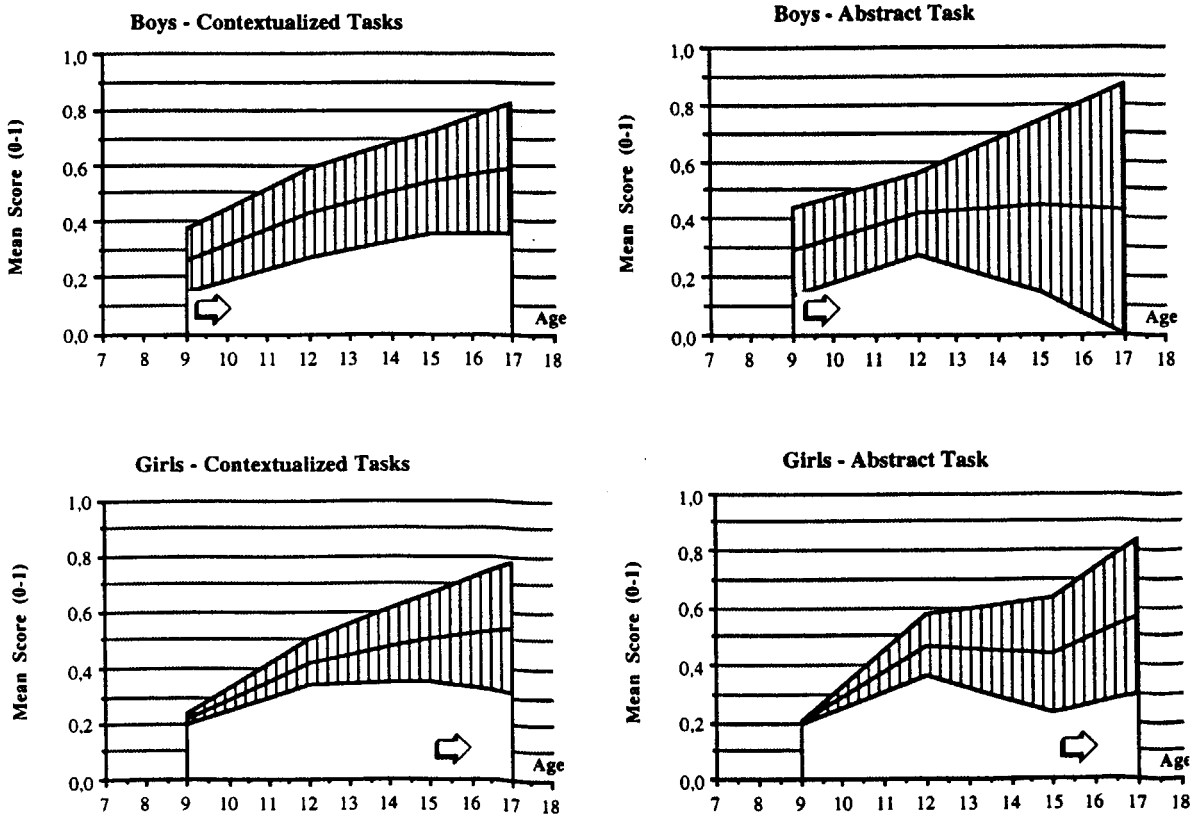
Change in individual differences: The developmental status at the onset of schooling explains the biggest part of the individual differences found in the development of syllogistic reasoning. The influence of these developmental prerequisites for performance is threefold (see Fig. 4): (a) there are large differences between advanced and delayed children at age 9; (b) Differences between the two groups increase over time. Advanced subjects apply three times more correct syllogistic deductions in adolescence than do slow developers. (3) The degree of change and the rate of progression differ greatly between slow and advanced subjects. This result may appear to be tautological, but it confirms the assumption that differences in cognitive development can be traced back to antecedent constructions in the ontogenesis of the subject.

Figure 4: Individual Differences in Developmental Prerequisites: Comparison between Urban versus Rural Sample



External conditions and gender sozialisation: While developmental prerequisites at the onset of schooling affect development directly, gender and social lifeworld do not directly influence the development of syllogistic reasoning. However, individual differences due to gender were found in conjunction with developmental status and depending on the contextuation of the tasks and developmental age (see Fig. 5).

Figure 5: The Emergence of Individual Differences in Gender and Contextuation of Task: Gender-Socialization as a Moderator of Development:



Large individual differences between the developmental courses of slow and advanced boys were found in both contextualized and abstract tasks from age 9 through 17. In contradistinction, individual differences between slow and advanced girls do not emerge before age 15. Thus, individual differences in developmental prerequisites have impact only on the cognitive development of boys. The developmental trajectories of girls are not affected by these differences even more than five years later. While in the case of the trajectories of the boys a constant influence of family and preschool socialization is reinforced by the impact of schooling and the emergence of formal operations in adolescence, the developmental courses of girls merely evidence show gradually increasing impact of schooling and developmental change in adolescence.

INDIVIDUAL DIFFERENCES IN THE DEVELOPMENT OF CORRELATIONAL REASONING

Thomas Teo, & Eberhard Schröder

Abstract

This study investigates the relationship between judgment, justification, and evidence strategy concerning the correlation of two attributes. It further investigates the emergence of individual differences in the development of this concept. The correlation task was presented in three experimental settings and administered to the urban sample in Iceland longitudinally at ages 15 (N=107) and 17 (N=59). The results show that only few adolescents developed an elaborated concept of correlation, that the relationship between judgment, justification, and evidence strategy differs remarkably between the various settings, and that gender, social class, and general ability do not produce differences at age 15, while they do produce sizable differences at age 17.

Introduction

This study is designed to investigate the internal and external constraints on the development of correlational thought in adolescence. To analyze the construction of this formal operational concept Piaget used an arrangement of cards that are varied in view of two attributes. It can be represented by a two-way cross tabulation: cell a = p.q; cell b = p.¬ q; cell c = ¬ p.q; cell d = ¬ p.¬ q. A sophisticated concept of correlation is developed as confirming (a + d) and disconfirming cases are related to the set of all cases (a + b + c + d). Such a sophisticated concept characterizes the final achievement of formal operational thought. Empirical studies show, however, that such an elaborated concept will only be acquired under specific learning conditions. Therefore it is not constructed in the cognition of most adults (Shweder, 1984). According to Schröder & Edelstein's (1991) strategy of analysis of cognitive development we distinguish internal and external constraints. Internal constraints on development refer to the relationship between the subject and the object of knowledge. External constraints refer to the effects sociocultural conditions have on the differentiation of cognition.

Research questions

(A) Intraindividual differences (internal analysis): How are judgment, justification, and strategy of evidence related to each other with regard to different types of correlation? How many adolescents are able to construct an elaborated concept of correlation? Further, is there development of this concept in adolescence ?
(B) Interindividual differences (external analysis): How do individual differences due to gender, social class, and ability emerge in the development of this concept?

Method

Subjects. The correlation task was administered longitudinally to the urban sample in Reykjavik at ages 15 (N=103) and 17 (N=58).

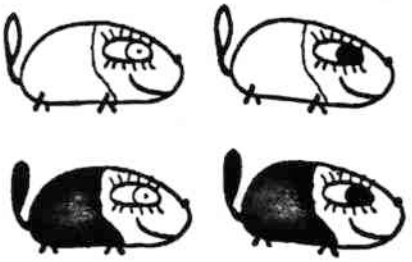
Table 1: Distribution of the sample for the concept of correlation at the age of 15 years

	Lower Class ™	Lower Class ¢	Middle Class ™	Middle Class ¢	
Ability low	12	17	11	11	51
Ability high	13	13	13	13	52
	25	30	24	24	N=103

Table 2: Distribution of the reduced sample for the concept of correlation at the age of 17 years

	Lower Class ™	Lower Class ¢	Middle Class ™	Middle Class ¢	
Ability low	7	2	8	3	20
Ability high	9	7	10	12	38
	16	9	18	15	N=58

Apparatus: Cards with pictures of mice were presented. The animals have the same shape and same expression. The color of fur and eye varies dichotomously: dark versus light.



Four combinations of color of fur and eye obtain:

(a) light fur / light eye
(b) light fur / dark eye
(c) dark fur / light eye
(d) dark fur / dark eye

Procedure: The subjects were confronted with an introductory set and three experimental settings:
(1) Complete correlation between the color of fur and eye.
(2) Probabilistic correlation.
(3) No correlation.

Table 3: Number of cards in the three experimental settings

Set:sorting	light fur light eye	light fur dark eye	dark fur light eye	dark fur dark eye	
Set 1	6	0	0	6	Com. corr.
Set 2	4	1	2	5	Prob. corr.
Set 3	3	3	3	3	No corr.

Judgment: The subject produced a correct or incorrect answer to the question *if* there is a relationship between the color of fur and color of eye (for each set).
Justification: The subject produced a correct or incorrect answer to the question *why* there is a relationship.
Strategy of evidence: The subject had to demonstrate which particular cards in each set account for, or contradict an assumed relationship (correct or incorrect answer).

Table 4: Structural Coding System

Stage I	No concept of correlation
Stage II concrete operational	Subjects realize a correlation between the two attributes. However, they focus only on one combination (either "a" or "d"). They argue similarly in set 2 and set 3. No adequate construction of the correlation of the attributes.
Stage IIIA formal operational	Subjects focus on both combinations to support their hypothesis ("a" as well as "d"). They argue that in set 2 there is no correlation between the attributes as falsifying cases exist. Arguments are derived from a deterministic point of view.
Stage IIIAB formal operational	Subjects argue as described in Stage IIIA. However, the deterministic argumentation is abandoned. The concept of probability emerges. Subjects argue that there is a correlation between the attributes in set 2.
Stage IIIB formal operational	In all sets the correlations are argued correctly: confirming and disconfirming cases are evaluated in view of the number of all cases.

Results

(A) Intraindividual differences

Figure 1: Judgment, justification, and evidence at the age of 15 years (n=103)

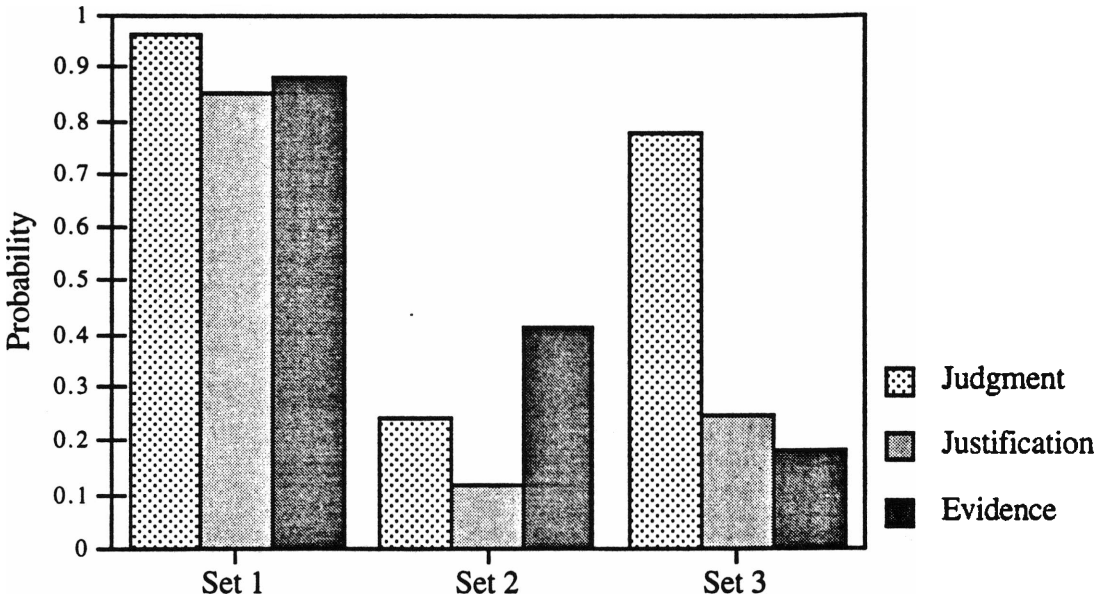
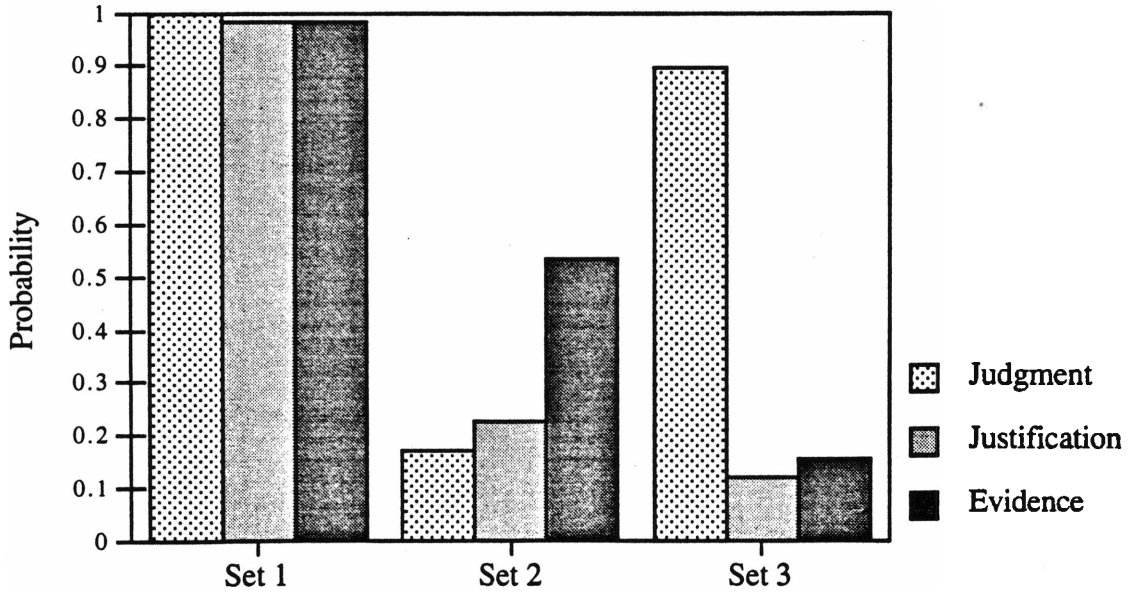
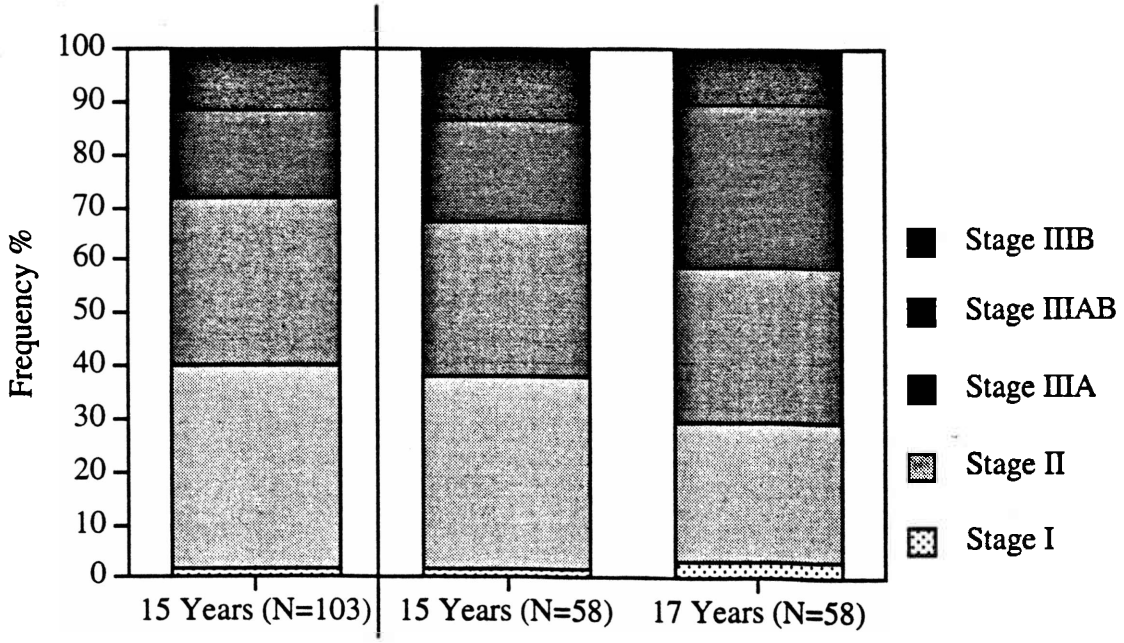


Figure 2: Judgment, justification and evidence at the age of 17 years (n=58)



The adolescents of the sample had no difficulties in judging the correlation between the color of eye and the color of fur in set 1. Further, no noticeable differences between judgment, justification and evidence strategy obtained. However, in set 2 (probabilistic correlation) and in set 3 (no correlation) the relationship between judgment, justification and evidence strategies varied considerably. In set 2 a gap existed between judgment and strategy of evidence (as well as between justification and evidence strategy): only 24% of the 15 year old subjects achieved correct judgment in spite of the fact that 41% showed the correct strategy of evidence (22% of the 17 year old subjects produced the correct judgment, 53 % the correct strategy of evidence). Similarly, great differences between judgment, justification and evidence strategy obtained in set 3. The majority (78% of the 15 year old; 90% of the 17 year old) provided correct judgments about the absence of correlation, yet correct justification and correct strategy of evidence remained below 25%.

Figure 3: Distribution of stages at the ages of 15 and 17 years



Only few adolescents developed a fully elaborated concept of correlation (in the sense of scientific reasoning). Although two thirds of the subjects used formal operational strategies (IIIA and IIIB) the highest stage of the concept of correlation, in which confirming and disconfirming cases are related to the set of all cases (IIIB), was achieved only by a minority of these subjects. Analysis of single stages yields evidence that stage II decreased from age 15 to 17 whereas stage IIIAB increased. Using the mean, the level of reasoning did not generally increase from age 15 to age 17.

(B) Interindividual differences:

Figure 4: Development of the concept of correlation by gender

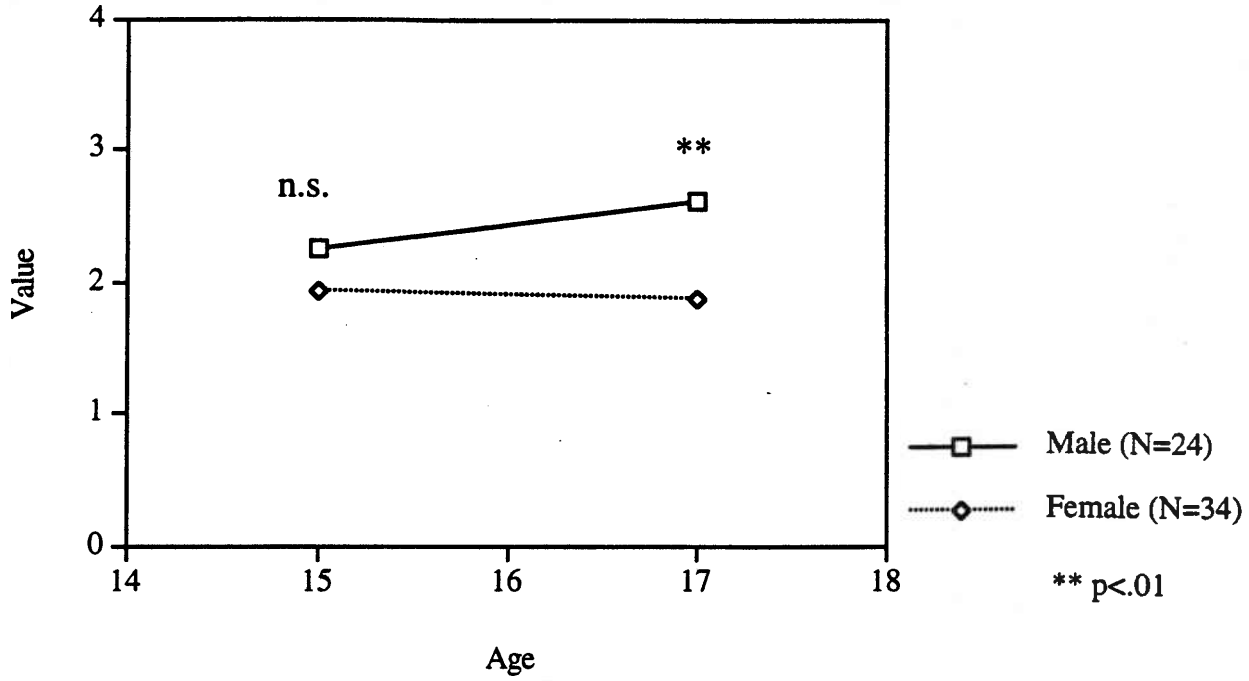


Figure 5: Development of the concept of correlation by class

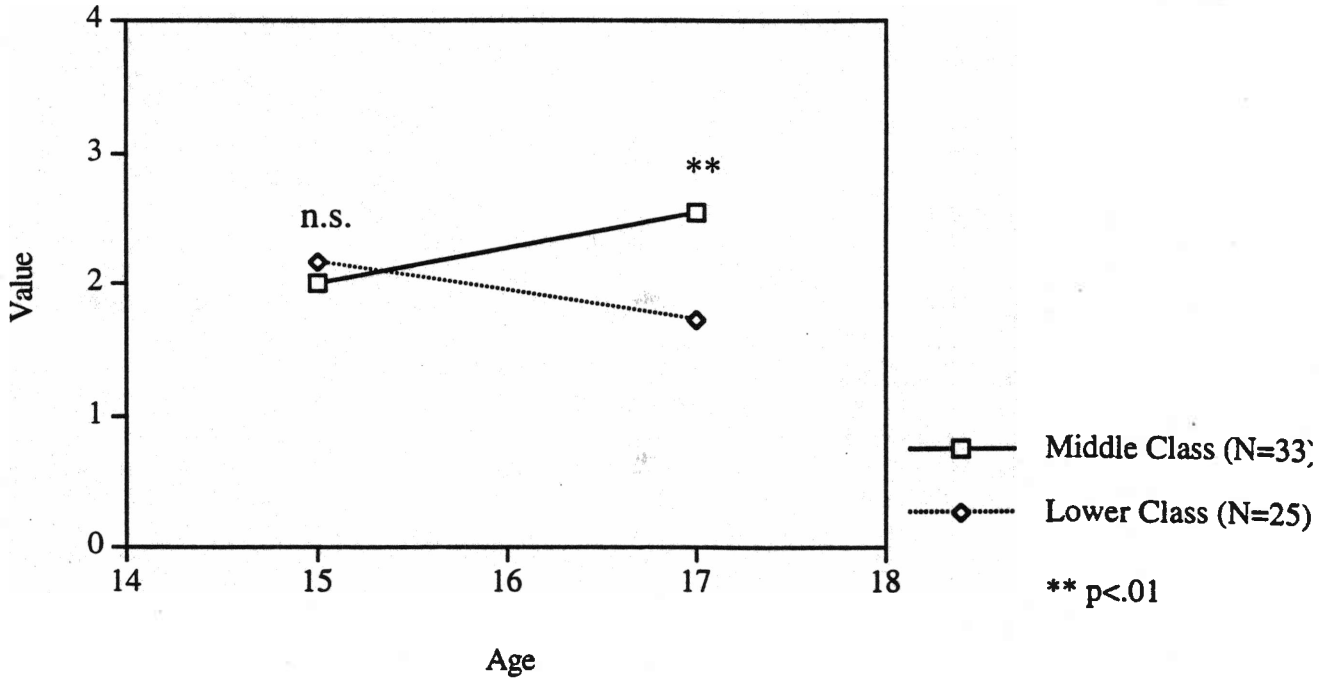
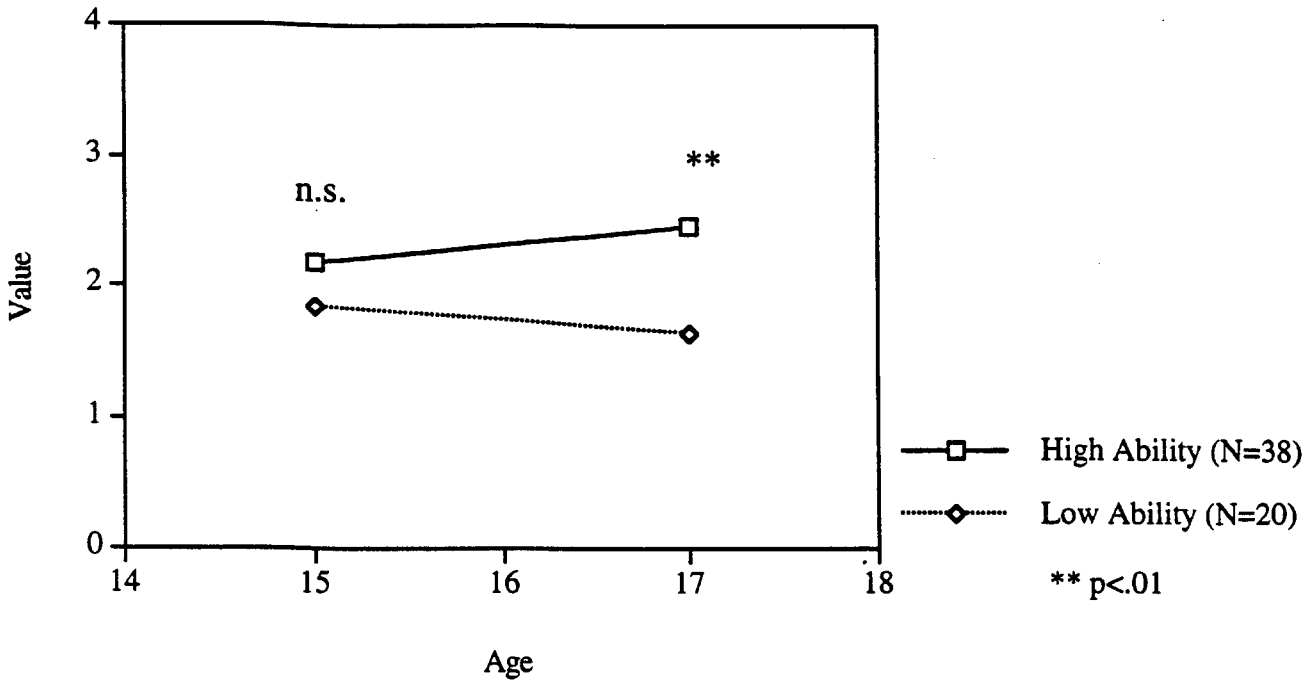


Figure 6: Development of the concept of correlation by general ability



Analyses of individual differences show that gender, social class, and general ability did not produce interindividual differences at the age of 15, whereas these factors produced significant differences at the age of 17. Gender, $F(1, 57) = 8.53$, $p < .01$; Social class, $F(1, 57) = 10.82$, $p<.01$; General ability, $F(1, 57) = 9.73$, $p<.01$.

Discussion

(A) Intraindividual differences: The results in set 2 indicate that nearly half of the subjects can give correct answers about evidence but is not able to produce correct judgments and justifications. In set 3 subjects are competent to give a correct judgment but lack justifications and strategies of evidence. In summary, the results show that the adolescents of the study lack a sophisticated concept of probabilistic correlation. This result emphasizes the fact that a sophisticated concept of correlation is highly demanding and not available to the mind immediately. From an educational point of view it seems necessary for the promotion of correlational thought to enhance a transfer of strategies of evidence into judgment and justification (probabilistic correlation). And seemingly obvious situations (set 3) demand an enhancement of judgments and justifications.
(B) Interindividual differences: The seemingly paradox results can be interpreted in terms of a performance theory of cognitive development, arguing that cognitive performance may stagnate or even decrease when contents of knowledge have limited meaning or relevance to the subject (cf. Case & Edelstein, 1993; Edelstein & Hoppe-Graff, 1993). These results have to be understood in the context of local socialization conditions. In this case the relevance of the knowledge domain depends on the educational system: At age 15, adolescents leave the compulsory unitary school. At this age differences due to class, gender, and general ability have not yet emerged. The diversification of educational decisions afterwards appears to produce differences due to external constraints that represent the availability of cultural and social resources to individuals. Adolescents who are not able to use such resources stagnate or

decrease with regard to their cognitive performance. This holds specifically for individuals from the lower class and for females. The ability to solve correlational problems increases for those adolescents who are able to use the resources in question. Cognitive challenges linked to the educational pathways chosen seem to make external constraints on development effectual, either per se or in conjunction with previous developmental experience.

GROWING UP IN LAND'S END, ICELAND: IMPLICATIONS FOR COGNITIVE DEVELOPMENT

Thomas Teo, Eberhard Schröder, & Wolfgang Edelstein

Abstract

The present study focuses on the impact of disadvantaged lifeworld experience on cognition. The sample consisted of 121 children from the urban area of Reykjavik, of 19 children from a rural stray settlement, of 25 children from a rural service village, and of 20 children from a fishing village here called Land's End. It is assumed that these four regions represent different contexts of socialization, knowledge and modernization. The fishing village stands out sociologically as ridden by frequent economic crises due to dependency on fishing, social conflicts, and high levels of migration. The subjects of the four samples were tested successively at age 7, 9, 12, and 15 years with a variety of cognitive tasks in the Piagetian tradition. The results show that compared to the other samples the children from the fishing village were generally delayed in concrete and formal reasoning. The more abstract tasks lead to greater interindividual differences than the experiential tasks. The developmental differences remained stable or increased over time. Despite these interindividual performance differences intraindividual dynamics and processes of cognitive development are not affected by lifeworld conditions.

Introduction

Problem: A typical critique of Piaget's theory targets the neglect of the social, cultural or ecological environment to account for cognitive ability and development (e.g. Hollos, 1974). But Piaget's endeavors were oriented toward epistemology not psychology. His disregard of external factors is due to his specific interests, not to theory (cf. Case & Edelstein, 1993; Chapman, 1988; Edelstein, 1993). Nevertheless, in the context of Piagetian developmental psychology the impact of the socio-cultural environment on cognitive development has been undervalued. A progressive problem shift in the context of Piagetian genetic psychology needs a systematic investigation of external constraints on the development of cognitive competence.

Background: Schröder & Edelstein (1991) specified a systematic model of sources of variations of individual differences, which permits a detailed study of milieu effects and their interrelationships with other intrinsic and external components. Intrinsic constraints on performance are located in the interface between the subject and the object of knowledge. External constraints are conceptualized as "socio-cultural" modifiers of the epistemic interactions (e.g. social lifeworlds, gender, social class).

Aim: The objective of the poster is to show the significance of different lifeworlds as potentially important factors of variation in cognition.

Research Questions: Is the sociocultural environment relevant for cognitive ability and development? Are there differences in cognition (concrete and formal operations) between lifeworlds in Iceland? How does cognition develop in the fishing village of Land's End, the most disadvantaged lifeworld of the study? Do differences increase or decrease over time? Do abstract tasks produce greater differences than experiential tasks?

Method

Subjects: For the design of the study the reader is referred to the introductory poster. The rural sample derives from three different communities in Iceland, assumed to represent different contexts of socialization, knowledge, modernization: a farming stray settlement in the Northern part of Iceland (N=19), a fishing village in the Western part of Iceland (N=20), and a service village in the South of the country (N=25). In each of the three rural communities the *complete* age class of the 7 year old were tested and interviewed (first measurement occasion).

Instruments: The Piagetian tasks administered in childhood to measure concrete operations, and in adolescence to measure formal operations are listed in the introductory poster.

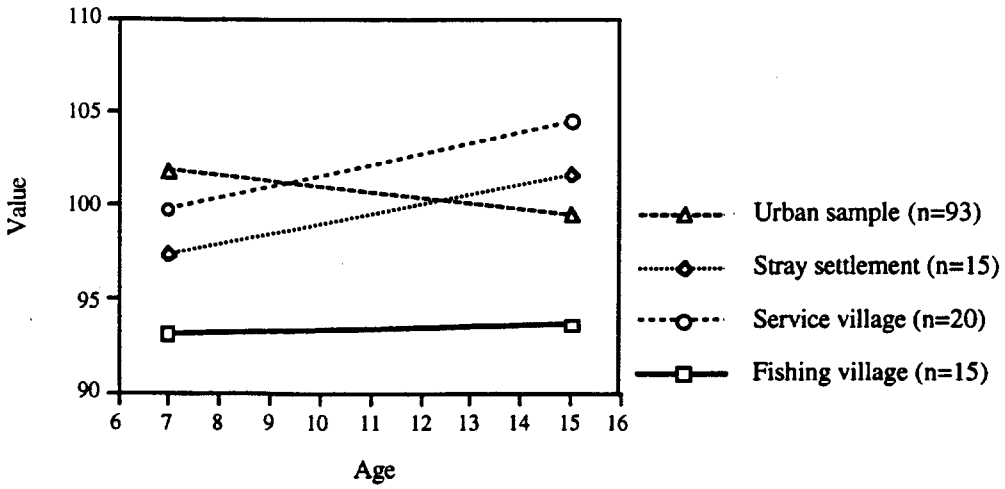
Procedure: The subjects constructed judgments and justifications for the cognitive concepts of conservation, experimental class inclusion, class inclusion with verbal categories, logical multiplication, and multiple compensation. The answers were coded dichotomously (correct versus incorrect). Explanations towards the concepts of syllogism, isolation of variables, and the pendulum problem were accepted as correct if the subjects practiced the formal operational solution (other solutions were coded as incorrect). The mean of the justifications was used for the comparison between the samples. Raven's intelligence test was standardized at both measurement points for the whole sample (M=100; SD=10) .

Method: Analysis of variance (conservation task) and repeated measures analysis of variance (using the GLM procedure of the SAS system; SAS Institute, 1989).

Results

Figures: Developmental courses of cognitive concepts by lifeworld

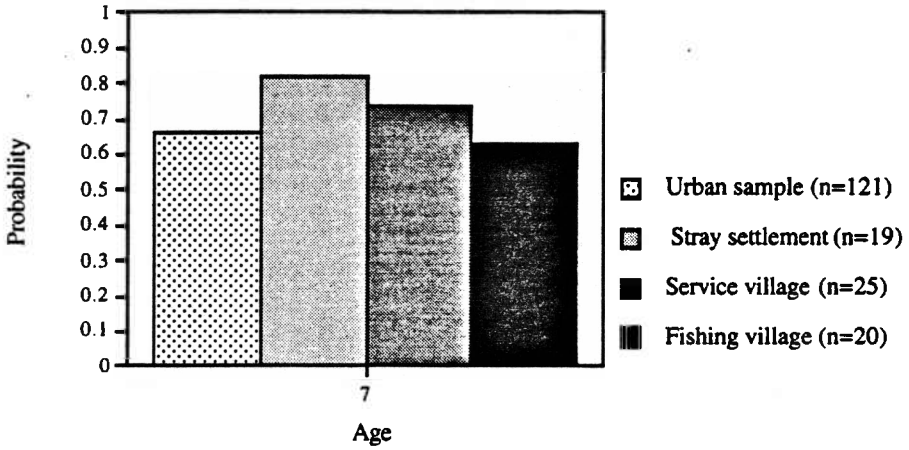
Intelligence (Raven)



Duncan (5%) - Age 7 years: Reykjavik, service village > fishing village
Duncan (5%) - Age 15 years: Service village, stray settlement > fishing village

Repeated measures analysis of variance attests that the factor "lifeworld" produces a significant difference: $F(3,139) = 3.48$, $p<.05$. Further, a significant interaction between "time" and "lifeworld" obtained ($p<.01$). The children from Reykjavik who performed ahead of the other samples at the age of 7 years fell behind the two rural lifeworlds, the service village and the stray settlement, at the age of 15 years. The children from Land's End take the lowest position in the distribution at both measurement points.

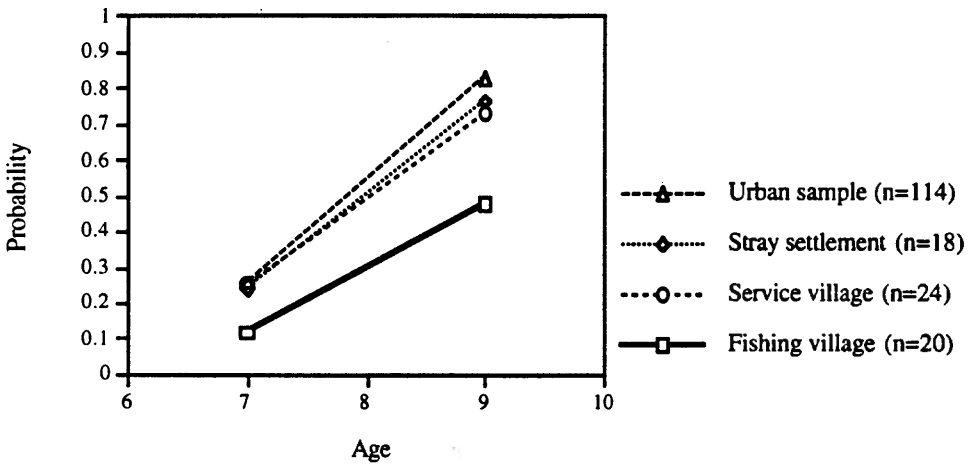
Conservation



Duncan (10%) - Age 7 years: Stray settlement > fishing village

No significant differences obtained. Duncan's multiple range test on the main effect showed only a tendency (10%) with children from the stray settlement doing better than children from the fishing village.

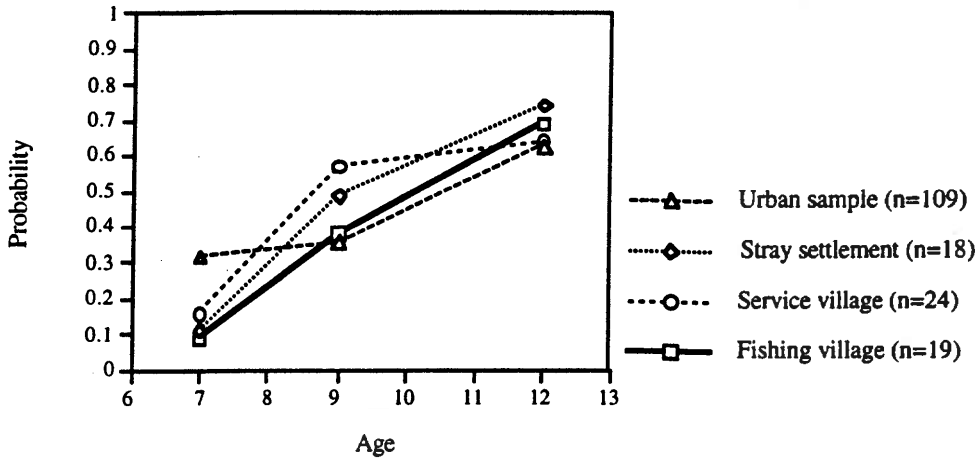
Experimental class inclusion



Duncan - Age 7 years: No significant differences
Duncan (5%) - Age 9 years: Reykjavik, stray settlement, service village > fishing village

The factor "lifeworld" produces a significant difference: $F(3,172) = 3.80$, $p<.05$. This effect can be attributed to the children of the fishing village which show great delay in this task compared to the other communities.

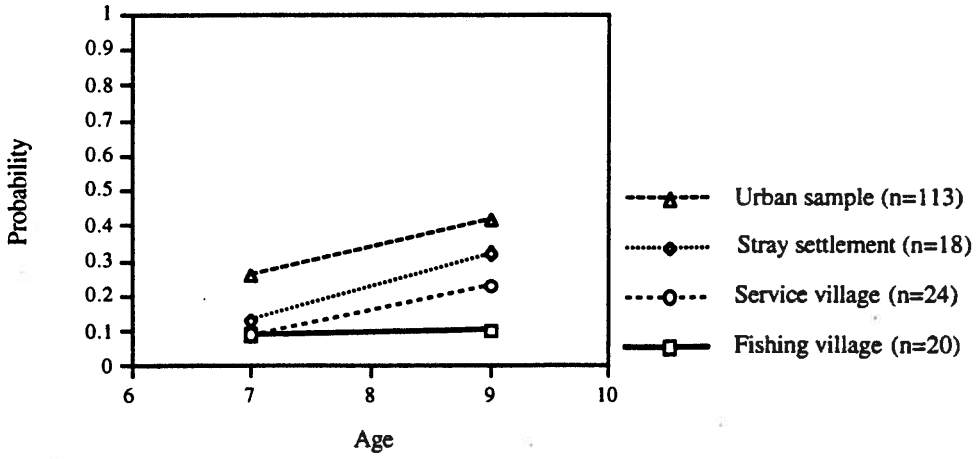
Verbal class inclusion



Duncan (5%) - Age 7 years: Reykjavik > fishing village
Duncan - Age 9 years: No significant differences
Duncan - Age 12 years: No significant differences

The analysis reveals a significant "lifeworld" and "time" interaction effect ($p<.001$). The urban children show an advantage compared to the three rural lifeworlds (especially the fishing village) in the probability of adequate justifications of the tasks at the onset of schooling. This lead fades away at the ages of 9 and 12 years, when no significant difference between the lifeworlds obtained anymore.

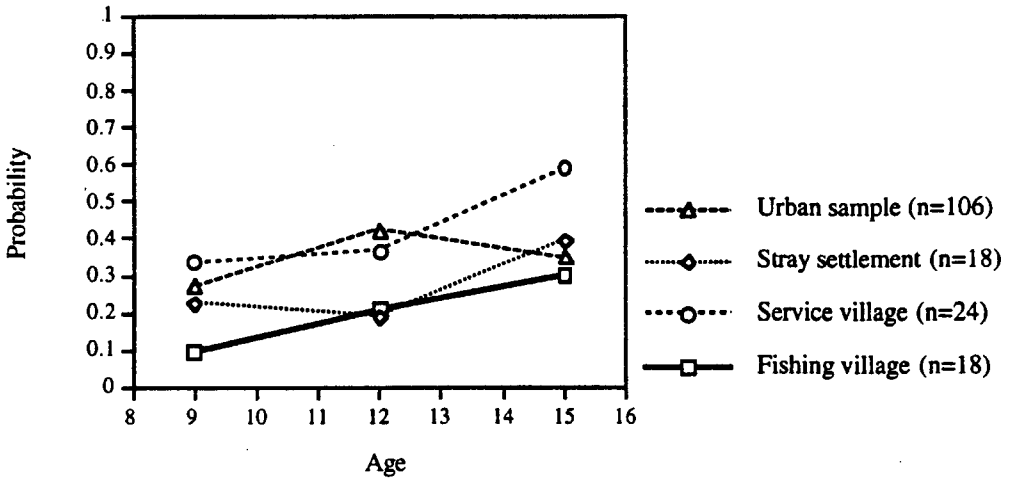
Logical multiplication



Duncan (5%) - Age 7 years: Reykjavik > fishing village, service village
Duncan (5%) - Age 9 years: Reykjavik > service village, fishing village; stray settlement > fishing village

The "lifeworld" effect is striking: $F(3,171) = 9.51$, $p<.001$. The urban sample showed a clear advantage in this task at age 7 as well as at age 9. The fishing village evidenced no development of this concept over two years.

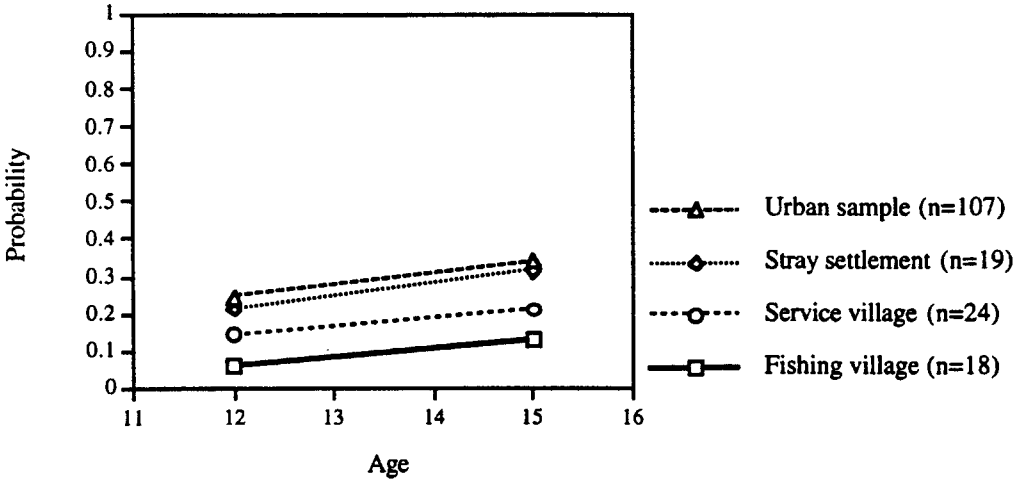
Multiple compensation



Duncan (5%) - Age 9 years: Service village > fishing village
Duncan (5%) - Age 12 years: Reykjavik > stray settlement
Duncan (5%) - Age 15 years: Service village > fishing village

Repeated measures of analysis indicates a significant "lifeworld" and "time" interaction effect ($p<.01$). Reykjavik children had difficulties with the tasks at the age of 15 years. The fishing village remained behind the other lifeworlds.

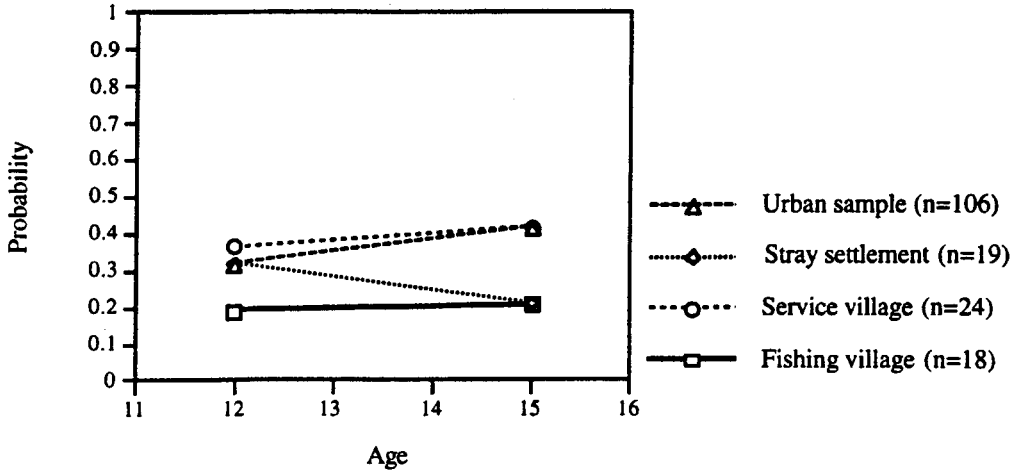
Syllogistic reasoning



Duncan (5%) - Age 12 years: Reykjavik > fishing village
Duncan (10%) - Age 15 years: Reykjavik > fishing village

The factor "lifeworld" produces a significant difference: $F(3,164) = 3.06$, $p<.05$ with urban children producing the greatest number of formal operational solutions, and the fishing village the least advanced ones.

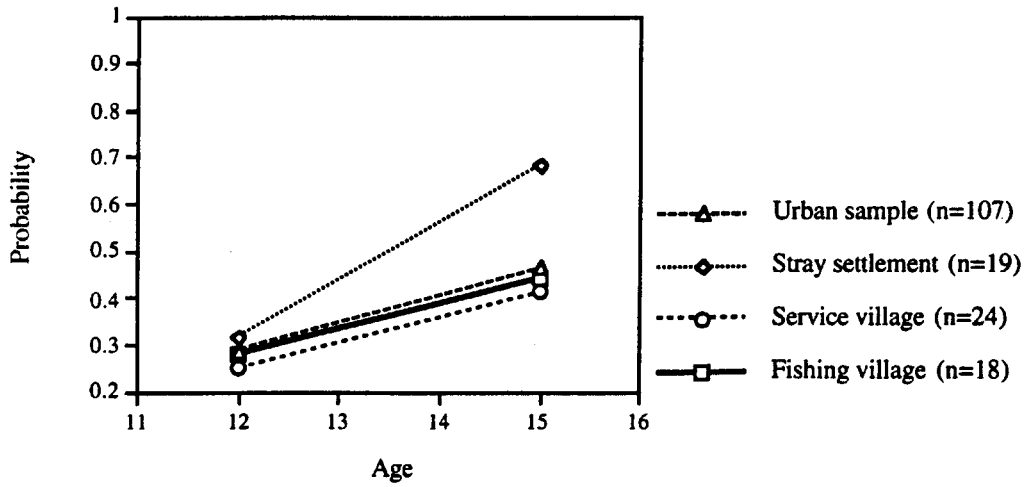
Isolation of variables



Duncan - Age 12 years: No significant differences
Duncan (10%) - Age 15 years: Service village, Reykjavik > stray settlement, fishing village

Repeated measures of analysis show that the factor "lifeworld" produces a tendency: $F(3,164) = 2.16$, $p<.10$. Interestingly, there is not much development in the formal operational solution from age 12 to age 15.

Pendulum problem



Duncan - Age 12 years: No significant differences
Duncan (10%) - Age 15 years: stray settlement > service village

No significant differences obtained. Duncan's multiple range test on the main effect shows only a tendency (10%) with adolescents from the stray settlement doing better than children from the service village.

Discussion

External constraints on development: The three rural communities differ remarkably. The children from Land's End remain delayed in nearly all tasks. The urban children generally had an advantage at the onset of schooling in comparison to the children of the service village and the stray settlement who, in the course of time, developed largely the same cognitive competence as the urban children. Lifeworlds produce differences both in concrete operational tasks and in formal operational tasks.

Internal dynamics of development: Although the four lifeworlds represent sociologically distinct contexts, the development of cognitive competence seems to progress in similar ways. Further analyses showed that the relationship between judgment and justification develops similarly in all four lifeworlds.

Internal and external analyses combined: To do justice to the concept of intrinsic and external constraints on the development of cognitive competence a comparison between types of tasks is required. The comparison between the experimental class inclusion task and the class inclusion task with semantic categories can be seen as paradigmatic for such a study. There is a highly significant interaction between "time" and "task" ($p<.001$). At age 7 both tasks are equally difficult for the children. But at the age of 9 years the explanation of the class inclusion task with semantic categories is considerably more difficult than the justification of the experimental class inclusion task. Even at the age of 12 years children do not, in the verbal class inclusion task, reach the level they achieved in the experimental class inclusion task at the age of 9 years. Further, a "task" and "time" and "lifeworld" interaction obtained ($p<.001$). The verbal class inclusion tasks show that urban children are advanced over the rural children at the age of 7 years. This difference disappears at 9 and 12 years. A different picture emerges for the experimental class inclusion tasks (see above).

Interpretation: The urban children start school with a lead in several tasks. The urban lifeworld provides supportive communicative settings (e.g. kindergarten), uncommon in the rural areas, which may lead to higher achievement than the rural children's in various, but not all tasks. Some years of schooling generally compensate this disadvantage of the rural children in two of the three communities. However, the children of the socially most conflicted area (the fishing village) cannot recover lost ground. Differences are smaller in those tasks which depend more on direct experience, specific content and concrete manipulation and refer less to previously acquired knowledge. According to Piaget (1983) interaction between the epistemic subject and the object of knowledge represents the motor of development. Land's End as the socially most conflicted and crisis ridden community seems to affect negatively basic requirements in cognition and to distort stable cognitive constructions in an enduring way. Lack of opportunities for expertise represents a risk factor for cognitive development. The results show that blanket statements about variations based on the rural-urban comparison are misleading. Comparisons must take the social characteristics of the community, the nature and abstractness of the task, the modality of presentation, and age, as well as the interactions of these variables into account. A theory of cognitive socialization is required to account for these interactions and effects on cognitive development.

DEVELOPMENTAL TRANSFORMATION OF SOCIO-MORAL REASONING

Monika Keller, & Christine Schmid

Abstract

The object of the present study is the internal logic of stage transformation. As recent research has shown, the distribution of reasoning above or below the individual modal stage is an important predictor of developmental progress between successive measurement points in longitudinal studies. It remains unclear whether individual development follows a cyclical model with alternating phases of consolidation and transition rather than a model of gradual transformation. The present longitudinal study analyzes the transformation of socio-moral reasoning between ages 7, 9, 12 and 15 years. The results show that the distributions of reasoning issues above and below the modal stage are different for the age-groups and that, depending on these distributions, the frequency of modal stage advance between measurement points varies for the age-groups. Individual patterns of change are analyzed for the occurrence of cyclical patterns of consolidation and elaboration. If progression between two measurement points proceeds faster than assumed by the cyclical model, or respectively, if measurement time intervals are too long, it cannot be decided by the individual patterns of change if the data fit the cyclical model. Nevertheless various indications lead to the conclusion that socio-moral reasoning goes through phases of consolidation and transition.

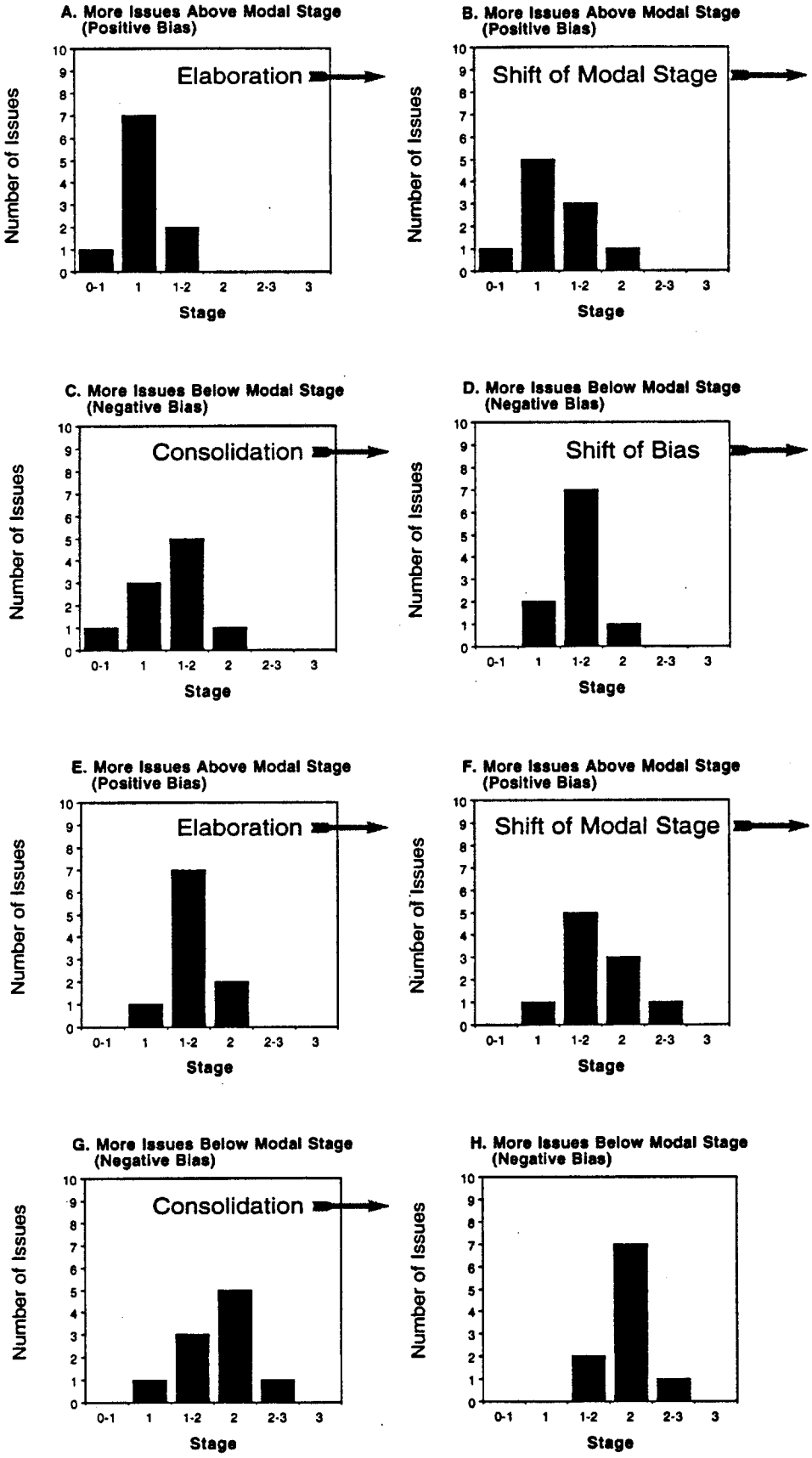
Introduction

According to Snyder and Feldman (1984) intraindividual development proceeds through cyclical phases of internal equilibrium and stability (consolidation) and disequilibrium and instability (transition) (see Figure 1). Consolidation is characterized by a relatively high number of reasoning issues at a modal stage (A, D, E, H in Figure 1). Phases of transition are characterized by a lesser number of reasoning issues at the modal stage (B, C, F, G in Figure 1) and a predominance of reasoning issues above (positive bias) or below the modal stage (negative bias). According to the model (1) modal stage advance should occur only for subjects with a positive bias and (2) an inverse relationship of number of reasoning issues at the modal stage between two successive measurement points should obtain. Snyder and Feldman (1984) supported this model based on data from a training study in spatial reasoning.

In contradistinction, Hart and Damon (1984) did not find support for the cyclical model in longitudinal data on self-understanding: (1) Modal stage advance occurred for both positive and negative bias subjects and (2) number of issues at the modal stage was not inversely related between two successive measurement points. Therefore they postulated a gradual-transformation model which does not require consolidation at the modal stage. Berkowitz and Keller (1994) and Walker and Taylor (1991) rejected Hart and Damon's conclusion because it does not take into account the length of the measurement time interval and individuals' varying rates of development. They interpreted their own longitudinal data of socio-moral development as evidence for the cyclical transformation model.

The present study tries to disentangle the interdependence of developmental state of subject (bias type), individual progression rate and the time intervals given across four successive measurement points from childhood to adolescence. Further, we propose additional criteria to decide between the two developmental models.

Figure 1: Cyclical Phases of Internal Consolidation and Transition


A. More Issues Above Modal Stage (Positive Bias)
Elaboration
B. More Issues Above Modal Stage (Positive Bias)
Shift of Modal Stage
C. More Issues Below Modal Stage (Negative Bias)
Consolidation
D. More Issues Below Modal Stage (Negative Bias)
Shift of Bias
E. More Issues Above Modal Stage (Positive Bias)
Elaboration
F. More Issues Above Modal Stage (Positive Bias)
Shift of Modal Stage
G. More Issues Below Modal Stage (Negative Bias)
Consolidation
H. More Issues Below Modal Stage (Negative Bias)
Number of Issues
0 1 2 3 4 5 6 7 8 9 10
0-1 1 1-2 2 2-3 3
Stage

Method

Subjects: 44 females and 50 males from an urban sample in Iceland were tested longitudinally at ages 7, 9, 12, and 15 years.

Task: Subjects were administered an interview about a socio-moral conflict in a friendship dilemma in which a protagonist has to make a choice between keeping a promise to a best friend or going to a movie with a third child (Selman, 1980). The interview assessed various components of the understanding of persons, relations, and the moral norm of promise-keeping. Ten content aspects (issues) of descriptive and prescriptive social reasoning were defined and scored for developmental levels (Keller, 1984; Keller & Reuss, 1984).

Scoring: Each issue was scored in half and full stages (0-1, 1, 1-2, 2 etc.; Keller, v. Essen, & Reuss, 1984). Interrater reliability for the issues varied between 80% and 90% exact agreement between two raters for all age groups.

Results

Figure 2

Frequency of Subjects with Different Bias Types by Age Group

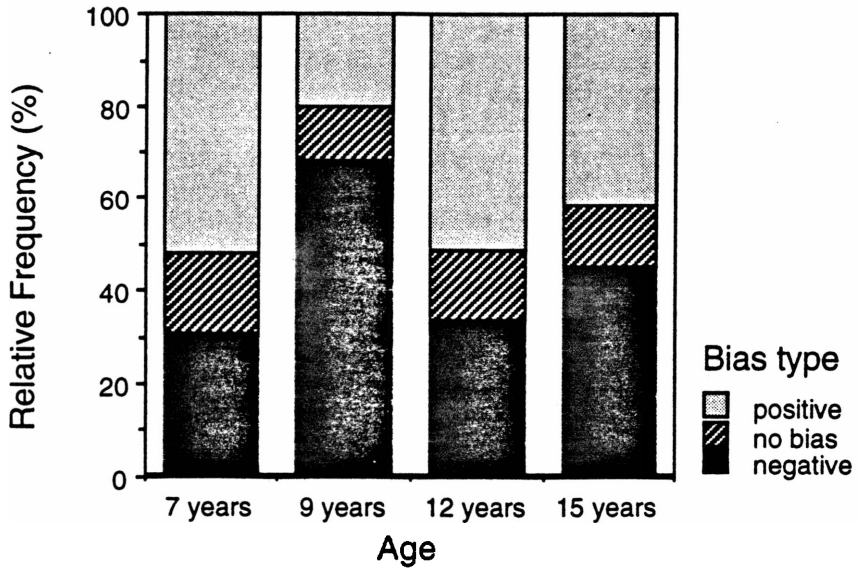


Figure 2 shows the distribution of subjects with negative bias, no bias and positive bias within the age groups. The 7-year-olds are characterized by the predominance of subjects with positive bias. Among the 9-year-olds subjects with negative bias predominate. Among the 12-year-olds again there are more subjects with positive bias, while the 15-year-olds show a more equal distribution of positive and negative bias.

Table 1: Relative Frequency of Subjects (in %) with Modal Stage Advance Between Measurement Points by Bias Type and for Total Age Group

Age	Bias type			Total Age Group
	negative	no bias	positive	
7 -> 9 yrs	62	94	90	82
9 -> 12 yrs	30	18	79	38
12 -> 15 yrs	53	57	81	68

Note: Chi^2 of bias type by modal stage advance from 7 to 9 yrs: 10,59 (df=2) $p < .01$; 9 to 12 yrs: 17,28 (df=2) $p < .001$; 12 to 15 yrs: 8,05 (df=2) $p < .02$.

Table 1 shows the frequency of subjects with modal stage advance (1) for bias types and (2) for total age groups.

(1) The results evidence modal stage advance for subjects with all three bias types, but the frequency of stage change is significantly higher for the positive than for the negative bias type subjects across all measurement points.

(2) Consistent with the distribution of bias types age groups are characterized by different frequencies of subjects with modal stage advance: The highest frequency of modal stage advance is observed in the earliest transition between 7 and 9 years (in spite of the shortest time interval). The lowest frequency is observed in the next transition between 9 and 12 years, while again more subjects are changing between 12 and 15 years.

Table 2 shows the intraindividual patterns of development between measurement points as presented by Walker and Taylor (1991). The letters in the table refer to the letters in Figure 1. The patterns in the upper part are consistent with the sequences of progression predicted by the consolidation/transition model, but only the first and third pattern necessarily involve a cyclical pattern of change. The middle part represents patterns of development which are faster than predicted by the model. The patterns in the lower part represent stagnation and regression.

Table 2: Intraindividual Patterns of Developmental Change Between Measurement Points in Terms of the Consolidation/Transition Model (Snyder & Feldman 1980, 1984)

Pattern of developmental change	**Age in years**		
	7 -> 9	**9 -> 12**	**12 -> 15**
Change predicted by model:			
Elaboration: **e.g. A -> B** from no or positive bias to greater positive bias	5	9	12
e.g. A, B -> C, D *Shift in modal stage (one half stage):* from positive bias to negative bias	17	7	24
Consolidation: **e.g. C -> D** from negative bias to smaller negative or no bias	6	10	7
Shift in direction of bias: **e.g. C, D -> E, F** from negative bias to positive bias	5	27	8
Total:	**33**	**53**	**51**
Change faster than predicted by model:			
e.g. C, D -> G ... *Shift in modal stage (one half stage):* from negative bias to negative or positive bias	19	24	30
Shift in modal stage (two half stages): regardless of bias change	37	5	10
Shift in modal stage (three and four half stages): regardless of bias change	4	-	-
Total:	**60**	**29**	**40**
Change violating developmental change assumptions:			
Stagnation: no change of modal stage or bias	-	7	1
Regression: from positive to negative bias or regression of modal stage	1	5	2
Total:	**1**	**12**	**3**
Total number of subjects:	94	94	94

In Walker and Taylor's (1991) study most subjects fit the consistent patterns. Our results show that only about one third of the subjects fits the model at the earliest transition, and about one half of the subjects fits the model at the two later transitions. In spite of the shorter time interval between the first two measurement points more subjects are characterized by patterns of faster development in comparison with the later time intervals. Only very few subjects violate general developmental assumptions (e.g. regression). Because only few subjects fit the two cyclical patterns within the given measurement points we need further evidence to support the cyclical model. This evidence is provided below.

Table 3: Average Number of Issues At Modal Stage by Bias Type and Age Group

Age	**Bias type**		
	negative	**no bias**	**positive**
7 yrs	6,93	7,00	6,57
9 yrs	6,63	8,18	5,47
12 yrs	7,03	8,29	6,77
15 yrs	6,07	7,00	5,46

Note: Total number of issues is 10.

Table 3 shows the average number of issues at the modal stage for subjects with negative bias, no bias or positive bias within the age groups. Subjects with no bias have the highest average number of issues at the modal stage.

Table 4: Number of Subjects with Equal or Changing Numbers of Issues At Modal Stage Between Measurement Points

Change of numbers of issues at modal stage	**Age**		
	7 -> 9 yrs	**9 - 12 yrs**	**12 - 15 yrs**
low-low	19	20	24
low-high	**21**	**31**	**12**
high-low	**32**	**16**	**42**
high-high	22	27	16

Note: low = 4 - 6 issues at modal stage, high = 7 - 10 issues at modal stage. Subjects with bold patterns are inconsistent with the gradual-transformation model.

Table 4 shows a substantive number of subjects who change the number of issues at the modal stage between two successive measurement points. Additional analysis of intraindividual patterns across all four measurement points showed that only 8 subjects evidenced no change in the number of issues at the modal stage, at least at the given measurement points.

Summary

The results of this study evidence that the empirical patterns of change depend on three factors: developmental state of subjects (bias type), speed of development, and the time interval of testing.

When development proceeds relatively fast as is the case in this study and in earlier periods of development in general (Bloom, 1964) empirical patterns are found that do not permit to decide the adequacy of the cyclical model. In this study and in the previous studies by Hart and Damon (1984) and Berkowitz and Keller (1994) developmental change occurs also for negative bias subjects because within the time-interval more developmental change occurs than assumed by the model. Developmental change according to the sequences predicted by the cyclical model can only be found under conditions of shorter testing intervals or slower development as given in the training studies by Snyder and Feldman (1984), and in the study by Walker and Taylor (1991) where data from adults and children were collapsed.

Nevertheless we take the results of our study to support the cyclical model for the following reasons:

First, although a great number of subjects was developing faster than expected in terms of the model, some were found which fitted the two patterns of consolidation and elaboration that represent the cyclical change between more and less issues at the modal stage.
Second, in each age group a number of subjects without bias was found. This group of subjects is the one with the highest number of issues at the modal stage. In terms of the consolidation/transition model these subjects can be interpreted as representing the state of consolidation.
Third, nearly all subjects showed varying numbers of issues at the modal stage across the four measurement points. Although this result cannot serve as a direct proof of developmental change in terms of the consolidation/transition model, it represents a clear disconfirmation of the gradual-transformation model where the number of issues at the modal stage should not vary much between measurement points.

STABILITY AND CHANGE IN MORAL REASONING OF ADOLESCENTS

Tobias Krettenauer, & Monika Keller

Abstract

The study explores interindividual differences in intra-individual change of moral reasoning from early to late adolescence. The influence of individual and social constraints (cognitive ability, socio-economic status, and gender) on developmental change is analyzed. As research on development has shown, developmental growth is greater in earlier as compared to later years. Based on this finding, we expected differential impact of developmental constraints at different periods in moral development: During periods of rapid developmental transformation this influence would be of lesser importance than during periods of slower developmental growth (e.g. adulthood). Thus, in periods of major developmental growth the internal constraints of structural developmental processes themselves are hypothesized to represent the main motor of intraindividual change, whereas in periods of slower developmental progress the importance of "external", i.e. individual and social constraints for moral development is expected to increase.

To test this hypothesis, a Standard Dilemma (the "Judy"-Dilemma) developed by Kohlberg (Colby & Kohlberg, 1987) was presented longitudinally to 68 subjects at ages 12, 15 and 19 years. The results confirm the above expectations: from early to middle adolescence we find strong overall developmental growth, but no impact of cognitive ability, socio-economic status and gender on intraindividual change. In contradistinction, from middle to late adolescence there is less developmental progress, but stronger influence on intraindividual change is exerted by individual and social constraints for moral development.

Introduction

In the cognitive structural tradition the study of the influence of external constraints generating individual differences in development has been neglected in favor of the exploration of internal constraints as evidenced in universal developmental sequences (see Edelstein, 1993; in press). One exception is the study of gender effects, which in the field of moral development has produced both strong theoretical claims and controversial results (Baumrind, 1986; Gilligan, 1982). The claim that Kohlberg's measure shows developmental stage growth of females to be delayed compared to males has not been validated (Walker, 1991). Effects were inconsistent and seem to depend on the nature of the task. With regard to social experiences in different lifeworlds Hollos (1974; Hollos and Cowan, 1973) has shown the interaction of external and internal constraints in social reasoning. Social experiences had differential effects on development at different ages. These results were confirmed by Keller's (1990) findings for socio-moral reasoning, which showed a complex interaction between the social lifeworld, the nature of the task and time of measurement. These studies show that both external and internal constraints must be taken into account to explain the development of individual differences over time. Thus, a more comprehensive design is needed in research on individual differences in intraindividual development, including the specification of both internal-developmental and external-environmental constraints.

The study explores individual differences in the development of moral reasoning in a comprehensive framework, including both internal and external constraints. Internal constraints are represented by the nature of the intraindividual cognitive transformation or equilibration process in development (see Keller and Schmid, this volume). Gender, social lifeworld conditions and general cognitive abilities represent social and individual factors constituting external constraints which may exert differential influence in the course of development. Given

the acceleration of development at younger ages (Keller, 1994) external constraint factors may exert less influence during these periods than internal structural forces, while they may prove more salient in periods of slower growth. More specifically it is assumed that in periods of major developmental growth the structural-developmental process itself represents the major force in intraindividual change, whereas in periods of slower developmental progress the importance of external constraints on development is expected to increase.

Method

Task: Socio-moral reasoning was assessed by a slightly modified version of the "Judy-Dilemma", one of Kohlberg's standard Dilemmas, (Colby and Kohlberg, 1987; Keller, Eckensberger and v. Rosen, 1989). In the original version a mother has promised her daughter permission to go to a concert with money the daughter has earned herself. In the last minute, mother claims the money for a purchase of clothes. The daughter decides to lie about the money earned and go to the concert anyhow. Her sister has to decide whether she should inform mother. The modification consisted in changing the dilemma for the sister by having mother ask the remaining sister where the protagonist is, thus producing a stronger pull for action for the sister.

Scoring: Arguments were matched to the Standard Scoring Manual (Colby et al., 1987), defining full and transitional stages. Due to the empirical and theoretical restrictions of the preconventional stages, scoring criteria were developed to broaden the framework by including different content aspects of reasoning (Keller, Eckensberger and v. Rosen, 1989). Inter-rater reliability ranged from 80% to 86% full agreement in scoring half-stages.

Subjects: Subjects were 68 adolescents from Reykjavik, Iceland. In a longitudinal measurement design they were interviewed at ages 12, 15 and 19 years successively. Table 1 shows the sample of the present study. (The complete sampling design and its stratification variables is described in the introduction poster).

Table 1: Sample of present study

	SES/low		**SES/high**		
	female	male	female	male	
TRA/low	7	7	6	8	28
TRA/high	10	9	10	11	40
	17	16	16	19	N = 68

Results

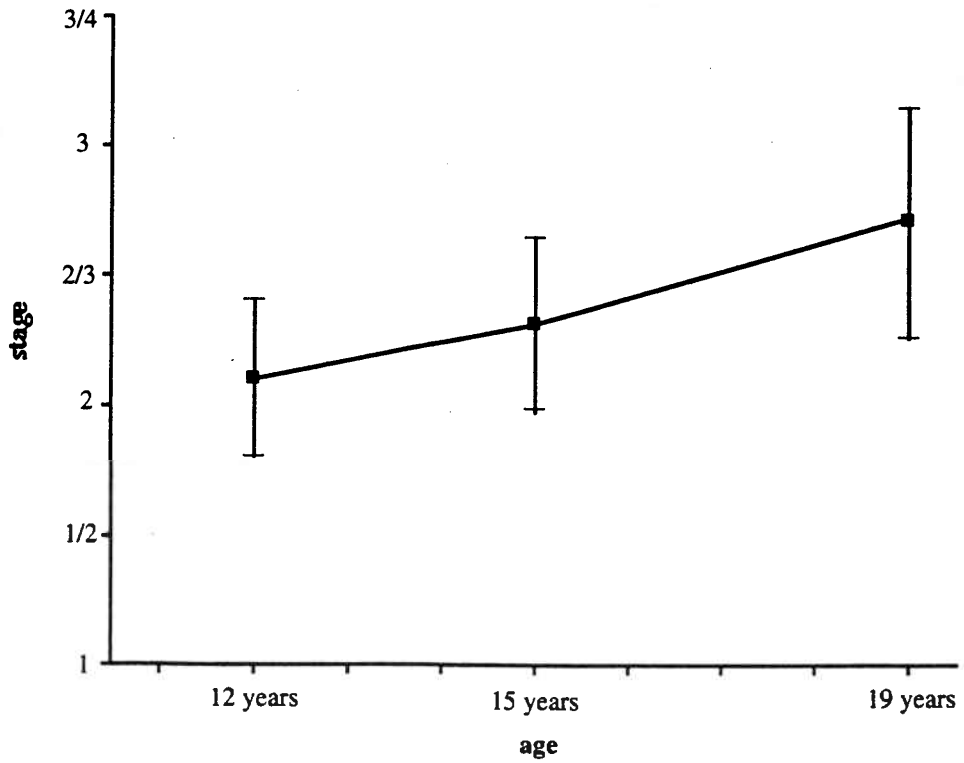
In an analysis of variance with repeated measures, including the within-subject effects of time of measurement (12, 15 and 19 years) and the between-group effects (gender, social class (high, low) and ability (high, low)), neither gender nor social class produced a significant main effect, while general ability was an important predictor of level of moral reasoning over time ($F = 10.14$; $df = 1, 60$; $p = .002$).

The time effect and significant interactions with time are presented in Table 2. A highly significant effect obtained for the within-subject factor time. In spite of the seemingly linear progression over time as evidenced in Figure 1, the developmental effect is different for the two transition periods. Between 12 and 15 years the developmental effect is highly significant while between 15 and 19 years this effect barely reaches significance. Moreover, variance in moral reasoning at age 19 years is increased compared to the two younger ages (see Figure 1).

Table 2: Significant effects in the analysis of variance with repeated measurement and variables representing external constraints of development

factor		*SS*	*df*	*MS*	*F*	*p*
Time (overall)		49.40	2,59	24.7	62.4	.000
	12-15 years	48.20	1,60	48.2	102.6	.000
	15-19 years	1.21	1,60	1.21	3.36	.057
Abil. x Sex x SES x Time (overall)		1.97	2,59	.99	2.49	.087
	12-15 years	.61	1,60	.61	1.31	.257
	15-19 years	1.36	1,60	1.36	4.21	.044

Figure 1: Mean change and variability in moral judgment across ages



There are no significant two-way interactions of measurement time and the external constraint factors. The three-way interaction of ability by gender by time is marginally significant at 19 years, while the four-way interaction of time by gender by class by cognitive ability is marginally significant in the overall model and statistically significant between 15 and 19 years.

Figure 2 and Table 3 document the four-way interaction by showing the differential progression rates in terms of substages between measurement occasions for the eight subgroups of males and females of high and low social class origin with high and low cognitive ability. The progression rates for the subgroups differ between 15 and 19 years. Four subgroups evidence faster progression rates compared to four subgroups showing lesser progression rates: The two subgroups with the greatest progression and the highest developmental level at age 19 years include males and females of high ability originating from both low and high socio-economic background. The two other subgroups are males with low ability from both high and low socio-economic origins. Subjects from these two groups were at the lowest developmental levels at age 15 years and thus appear to have experienced a developmental spurt between 15 and 19 years.

Figure 2: Mean change in moral judgment across ages by variables representing external constraints of development

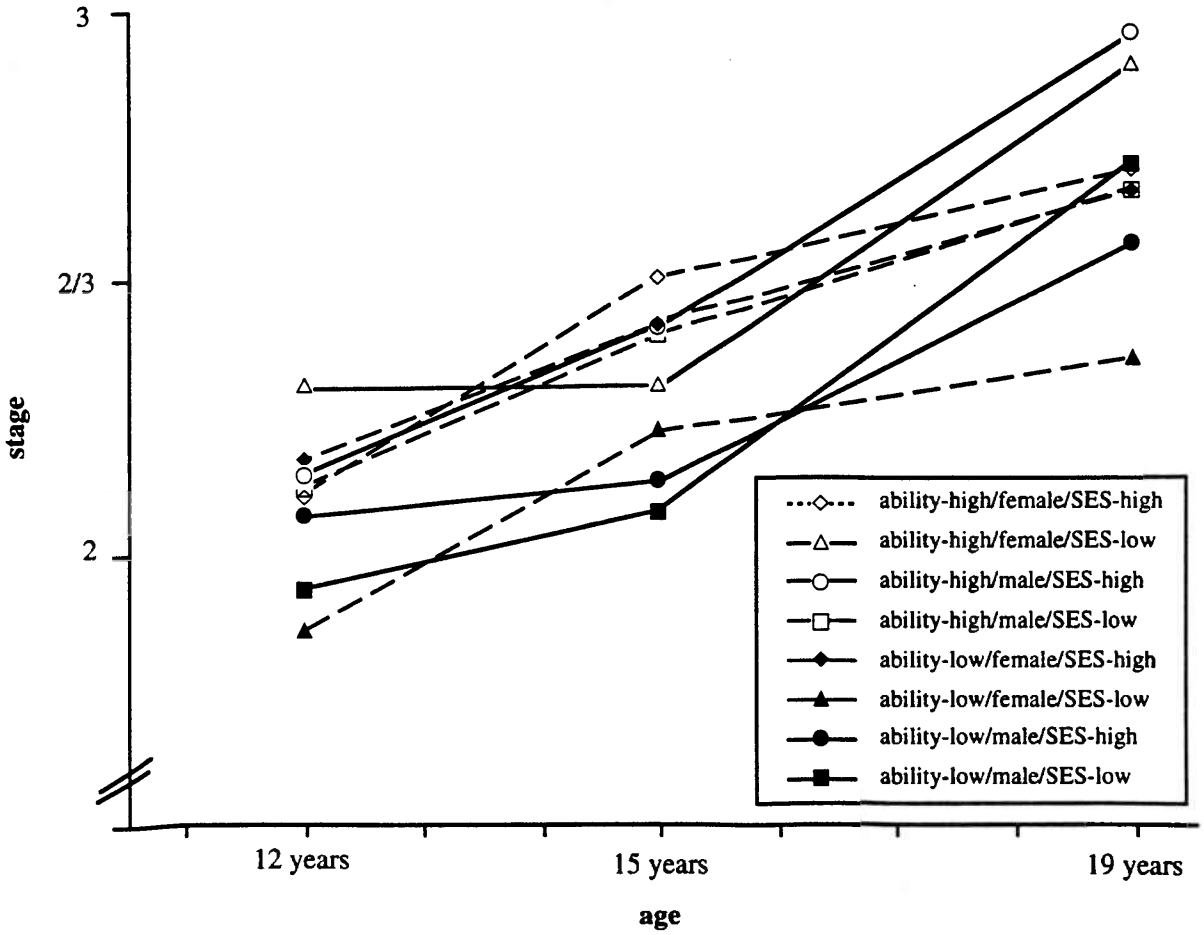


Table 3: Individual and mean change in moral judgment between 15 and 19 years by variables representing external constraints of development

Ability:	*low*	*low*	low	low	high	*high*	*high*	high	
Sex:	*male*	*male*	femal e	femal e	male	*male*	*femal e*	femal e	
SES:	*low*	*high*	low	high	low	*high*	*low*	high	all
stagnation/regression	-	*3*	4	3	5	*3*	*2*	6	26
progression (1/2 stage)	*5*	*3*	3	2	2	*3*	*4*	4	26
progression (≥ 1 stage)	*2*	*2*	-	1	2	*5*	*4*	-	16
mean change	*0.65*	*0.45*	0.25	0.25	0.28	*0.55*	*0.60*	0.20	.40

Further Explorations

In order to explain differential developmental growth in middle to late adolescence we took two further variables into account: (1) type of educational experience after age 15 and (2) important life experiences between 15 and 19 years.

(1) *Type of education*: At age 15, before finishing comprehensive compulsory school, subjects were asked to indicate their options for further schooling. Four types of schools were available: "Preacademic Secondary", "Comprehensive Secondary " and "Commercial" are equal in representing a more or less specialized prerequisite for higher studies. "Vocational training" is offered in schools specializing in training for various skilled jobs.

(2) *Important life experiences*: At age 19 subjects were asked to indicate retrospectively their most salient life experience since the last measurement occasion. Events were classified according to the following categories: "spending time abroad", "experiences in relationships" (including parents, friends or others) and "education/occupation related experiences". The category "various" contains non-normative life events, e.g. drugs, accidents or illness. Subjects who mentioned no experience (N=20) were excluded from the analyses.

Table 4 shows the patterns of growth between 15 and 19 years depending on the type of school selected at age 15. The results show the strongest growth for subjects who had opted for the vocational school type and the smallest growth for subjects who had opted for the commercial school type. Thus, developmental change seems to be strongest for those subjects who had embarked on an educational course involving a vocational decision and the corresponding skills.

Table 4: Individual and mean change in moral judgment between 15 and 19 years by educational career

	pre-academic	secondary applied	commercial school	vocational training	all
stagnation/regression	11	8	4	2	25
progression (1/2 stage)	11	5	2	4	22
progression (≥ 1 stage)	7	3	4	2	16
mean change	0.42	0.32	0.40	0.50	.40

Table 5 shows that subjects who refer to important experiences in relationships or in education/occupation evidence the strongest progression rate between 15 to 19 years.

Table 5: Individual and mean change in moral judgment between 15 and 19 years by self-reported most important life-experience

	staying abroad	relation-ships	education/ occupation	various	all
stagnation/regression	5	5	3	8	21
progression (1/2 stage)	2	8	1	4	15
progression (≥ 1 stage)	3	5	4	-	12
mean change	0.35	0.50	0.50	0.25	.40

The cross-classification of the design variables (gender, class, ability) with the two additional experiential constraint variables (type of school selected after age 15, important life experience) produced no effects. Thus, it was not possible to relate the differences in developmental growth-rates in the different subgroups to differences in education or life-experiences.

Conclusion

The results of this study show the complex interaction of internal and external constraints in development. First, the differential growth rates show that the effects of external constraint variables on structural development are different at different periods in time. As assumed they have increased importance at later periods in development when the rate of growth slows down. Thus, internal developmental constraints must be taken into account when assessing the effects of externally induced differences in development. Second, the results show that neither gender nor social class per se predict developmental growth in cognitive strutural competence. Only ability level – an indicator of cognitive functioning – predicts developmental growth in a one-factorial way: High ability subjects score at a higher developmental level of socio-moral reasoning across all measurement occasions. However, the results demonstrate that complex interactions of external and internal constraints have to be taken into account to explain differential developmental growth rates in late adolescence.

Exploratory analyses show that growth is influenced not only by longterm external constraints such as represented by gender, social class and ability level, but also by more shortterm factors such as type of education and social experience. Thus, the influence of enduring social and individual constraints, which foster different developmental growth rates in late adolescence, is further modified by differential opportunity structures not attributable to social class or gender. At later periods in persons' biographies this differentiation of opportunity structures may interact with external constraints and yield stable individual differences in adults' moral reasoning.

THE EFFECT OF NON-NORMATIVE CHILDHOOD EXPERIENCES ON THE EMERGENCE OF RISK FACTORS IN THE DEVELOPMENT OF THE CHILD

Matthias Grundmann, Wolfgang Edelstein, Volker Hofmann, & Bernd Schellhas

Introduction

This poster is the first in a series of four that deal with personality related risk factors in cognitive development. In this present poster, patterns of non-normative rearing practices and their experiential correlates within social milieus are identified as socialization conditions for the emergence of anxiety and depressive symptoms as risk factors for development.

Ecological socialization models assume that parental life styles correspond with social structures. Life style patterns represent class specific social and cultural orientations encompassing different social perspectives, role models and cognitive styles permitting to describe the child's experience of class or milieu specific normative parent-child transactions that influence the child's development. Parents' socio-cultural orientations, their cognitive styles and rearing practices promote or impede children's explorations of their lifeworlds. To understand how socialization conditions constrain exploratory activity and generate risks for the child's development, we first describe milieu-specific socialization conditions as a normative baseline for the child's development. We then describe the particular configuration of socialization variables within social class conducive to chronic anxiety or to depression symptoms in the children.

A major assumption of this study is that normative rearing practices within given settings, while differentiating opportunity structures that enhance development differentially do not produce risk factors for development, whereas non-normative practices generate such risks. Children are vulnerable to non-normative rearing practices and tend to respond with defensive reactions such as depressive symptoms or anxiety. These defensive reactions interfere with exploratory activity and delay cognitive growth (see posters by Jacobsen et al., Hofmann et al., and Schellhas et al.).

Method

Sample

As shown in the introductory poster the longitudinal sample is composed of 121 urban children aged 7 through 15, about equally divided between (middle and lower) social classes and gender. The socialization data of the study is based on 112 urban children, the depression part on the 88 children, the anxiety part on the 102 children of the sample with no missing data on relevant variables. This attrition did not affect the social class and sex balance of the sample. The reader is referred to the poster by Jacobsen et al. for a description of the sample for the attachment study.

Table 1: Distribution of socialisation variables; number of cases

valid N = 112;	categories								
variables	1	2	3	4	5	6	7	8	9
1. education and work									
educational level of parents (primary, lower, upper,	11	17	34	25	11	14			
post secondary, and academic)									
workload (from low to high)	8	5	42	34	20	3			
working mother (no-yes)	47	65							
2. parents' network orientation									
(no contact, sometimes, often contact with)									
- relatives (given)	50	20	42						
- colleagues	47	39	26						
- friends (self chosen)	63	27	22						
3. parents' leisure activities (no - yes)									
- activities in nature, travel	82	30							
- home and garden	65	47							
- social activities (clubs, play, groups)	94	18							
- intellectual (theater visits, reading, studying)	72	40							
- visual consumption (vcr, tv, video)	83	29							
4. parents' attention to child's activities	9	39	64						
- supervision of schoolwork (none, sometimes, often)									
- number of activities with child	2	7	14	22	20	21	12	8	6
- time with child (hours a day)	25	14	26	22	15	10			
5. parenting style (from low to high)									
- punitive-restrictive	20	12	16	14	20	11	19		
- verbal-overcontrolling	7	14	31	11	21	10	8		
- passive	62	21	21	8					

Sozialization conditions

The socialization variables were measured when the children were seven years old using a standardized parent questionnaire for mothers and fathers separately. The variables were constituted on the basis of theoretical considerations or summarized on the basis of factor analytic procedures (the parenting style scale). These variables define the milieu-specific socialization conditions within the middle and the lower social class as shown in Table 1.

Personality variables

The measurement of the personality variables "security of attachment", "chronic anxiety" and "chronic depression" is described in the respective posters by Jacobsen et al., Hofmann et al., and Schellhas et al..

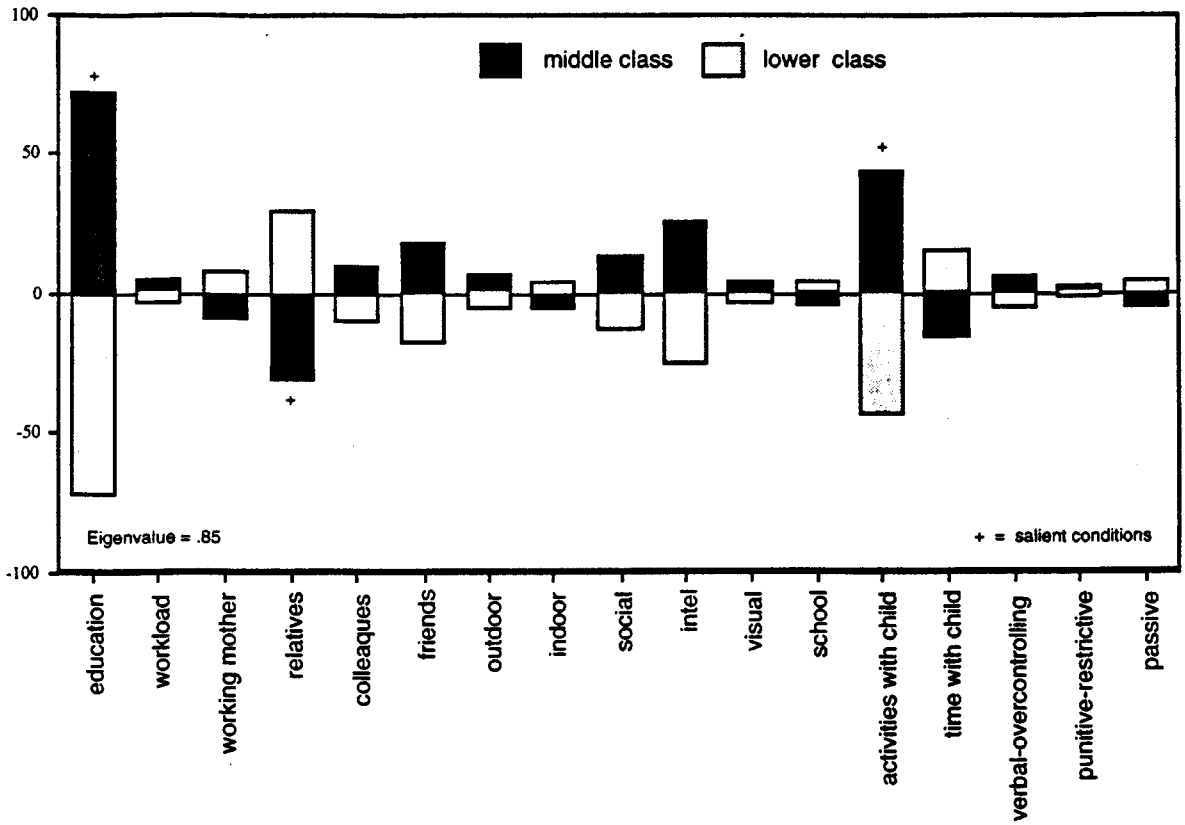
Analysis

This study is designed to explore milieu-specific patterns of socialization in families with chronic-anxious and chronic-depressive children compared to no-symptom families within the same social milieus. The results are based on canonical correlation analysis (Optimal Scaling Technique (OST) for two sets of variables). A sequential strategy is used. First, in order to explore the meaning of social class in view of the socialisation practices a class typically represents, the OST is used for a set of socialization variables and the criterion variable "social class". This heuristic is designed to discover baseline differences between middle and lower class socialization milieus. Second, in order to explore how milieu effects create risks for development, a similar strategy is used to determine the particular configuration of socialization similar to a multivariate multiple regression analysis (Gifi, 1991). The component loadings are equal to standardized regression coefficients; because the OST refers to binary criterion variables, the eigenvalues equal r^2.

The normative baseline: socialization conditions within the lower and the middle class

Ideally, it is assumed that middle class parents have a high level of education and autonomous working conditions that lead to higher levels of autonomously determined social orientations and to greater amounts of attention to the child's activities, and correlate with less restrictive parenting styles. In contrast, lower class parents are likely to spend less time with the child, provide less attention, and exhibit a more authoritarian parenting style corresponding to restricted living arrangements, authority dependent working conditions and a lower educational level (Kohn & Schooler, 1983).

Figure 1: Configurations of characteristic rearing practices in the middle and the lower social class (component loadings)



Note: The eigenvalue represents the explained variance of all variables on the social class dimension

The social class related differences between the socialization conditions found in the sample show that the assumption of more autonomous and less restrictive orientations in the middle class and more restrictive living conditions and more passive orientations in the lower class is borne out by the data. Specifically, parents in the lower and middle classes differ with regard to educational level, network orientations, intellectual and cultural leisure orientations, and the amount of activities with the children. No other socialization variables show important differences between the two classes. The direction of the coefficients is congruent with the assumption formulated above: Middle class parents are better educated, less oriented to relatives (given partners) and more to friends (chosen partners); they are more interested in intellectual activities, and spend more activities with their children than parents from the lower class. The patterns represented by Figure 1 will be used for comparative purposes in subsequent figures to represent the baseline conditions for a given social class.

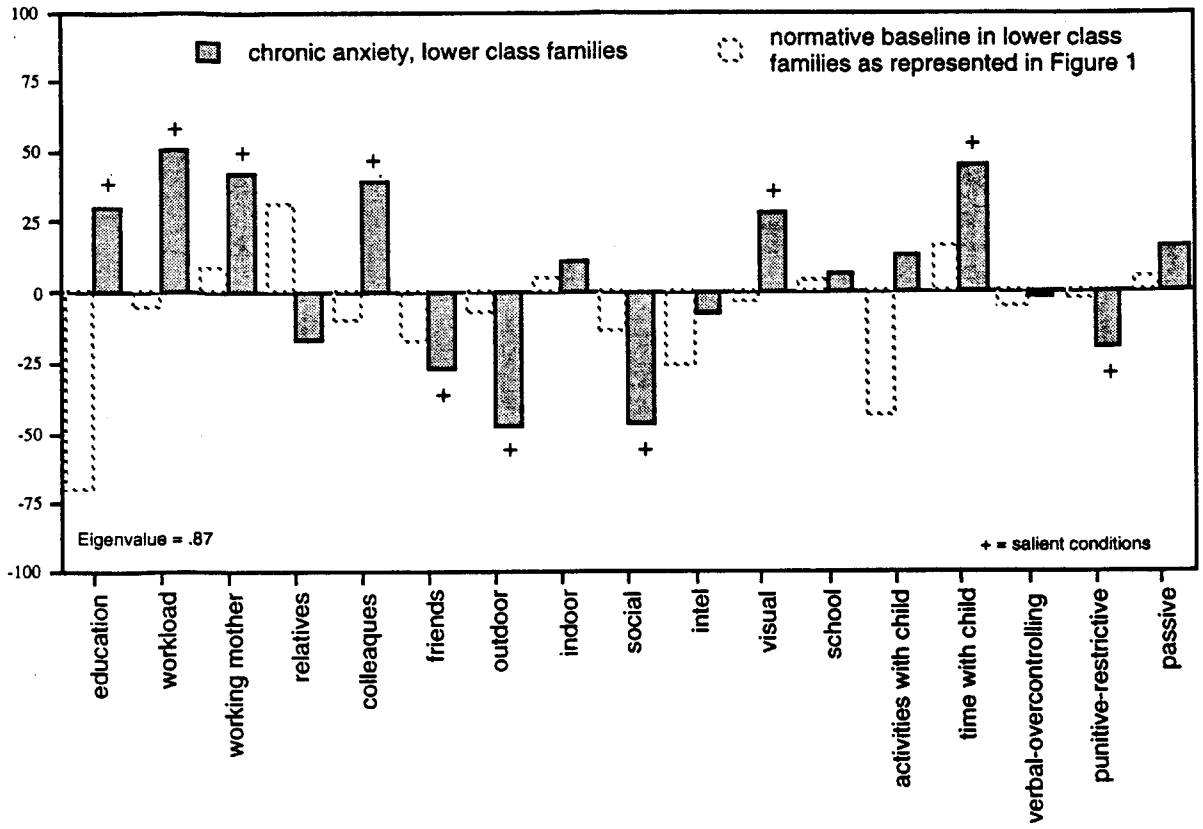
Hypothesized effecs of non-normative parenting practices in middle and lower social class milieus

Normative conditions are expected to provide regular, if differentially productive conditions of cognitive development, with opportunities for exploratory activity for the child depending on social class. In contrast, non-normative conditions within each class are hypothesized to interfere with opportunities of growth, in particular by creating risk factors that interfere with free exploration by the child of the physical and social lifeworld. Typical responses that produce impediments to exploration are anxiety and depression. Referring to Piagetian theory (Inhelder, 1968; de Ribaupierre, Rieben & Lautrey, 1991) children suffering from these symptoms shy away from novelty and tend to be delayed in their rate of cognitive growth. In the following sections of this poster we analyse rearing environments that typically elicit these responses. Because the most salient case of anxiety and depression are the chronic versions of these conditions, the present analysis will focus on this class of symptoms.

The case of anxiety

In our sample chronic anxiety is typically a lower class symptom; 80% of children with chronic anxiety were identified in lower class families (see poster by Schellhas et al.). Within the lower class, chronic anxiety emerged in families characterized by:
- a higher educational level than typical for lower class parents;
- highly restricted working conditions of parents, including higher numbers of working mothers;
- a network orientation to work colleagues combined with very restricted contacts with friends;
- little interest in outdoor and social activities but high tv-consumption;
- more time for children than normative in this group.

Figure 2: Rearing conditions conducive to risk for chronic anxiety within lower class (component loadings)



Note: The eigenvalue represents the explained variance of all variables on the anxiety dimension

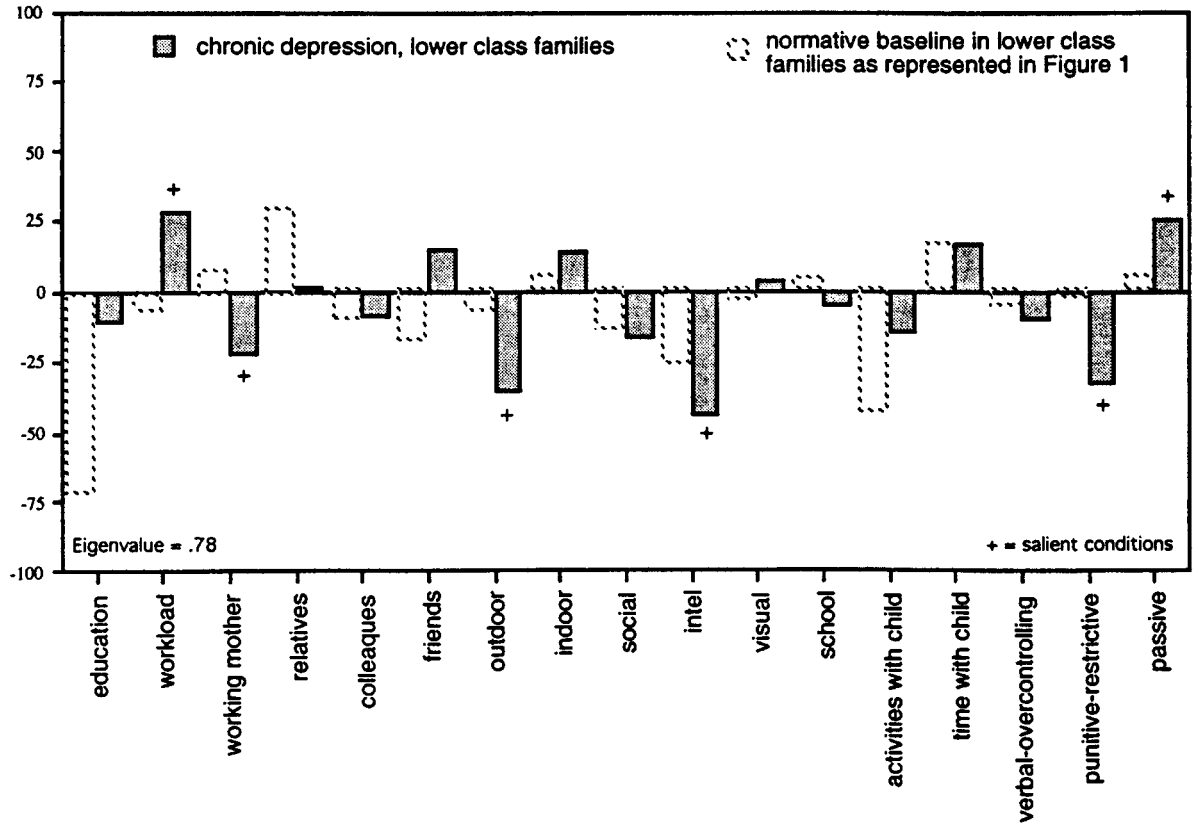
Contrary to Figure 1 the present figure does not represent a social class specific child rearing configuration but superimposes the typical configuration of child rearing variables conducive to chronic anxiety within the lower class on the normative baseline pattern for that class (see Figure 1).

The pattern disclosed is inconsistent with the normative pattern for the lower class. Neither the very high workload nor the prominent network orientation to colleagues (given partners) were found in the lower class baseline pattern. The work orientation of parents combined with reactive social orientations, relatively high education, a higher amount of time for the child and low punitive rearing strategies represent untypical experiences for lower class children. It is speculated that a combination of higher than usual educational aspirations for child with more than usual time spent with child in conjunction with the example of intensive work functions to exert achievement-related pressure on the child and simultaneously to restrict his or her opportunity to explore the world. This pattern is therefore understood as conducive to defensive personal characteristics that produce anxiety as a risk factor for cognitive development.

The case of depression

Chronic-depressive children were found in both the middle and the lower class. According to our assumptions, therefore, non-normative child rearing conditions must be determined in each class in order to specify etiological risk factors for the development of depressive reactions specific to each class. Again, as in Figure 2, the configuration of child rearing conditions conducive to chronic depression within the lower class is superimposed on the baseline representation of the socialization variables for that class (see dotted columns in Figure 1).

Figure 3: Rearing conditions conducive to risk for chronic depression within lower class (component loadings)



Note: The eigenvalue represents the explained variance of all variables on the depression dimension

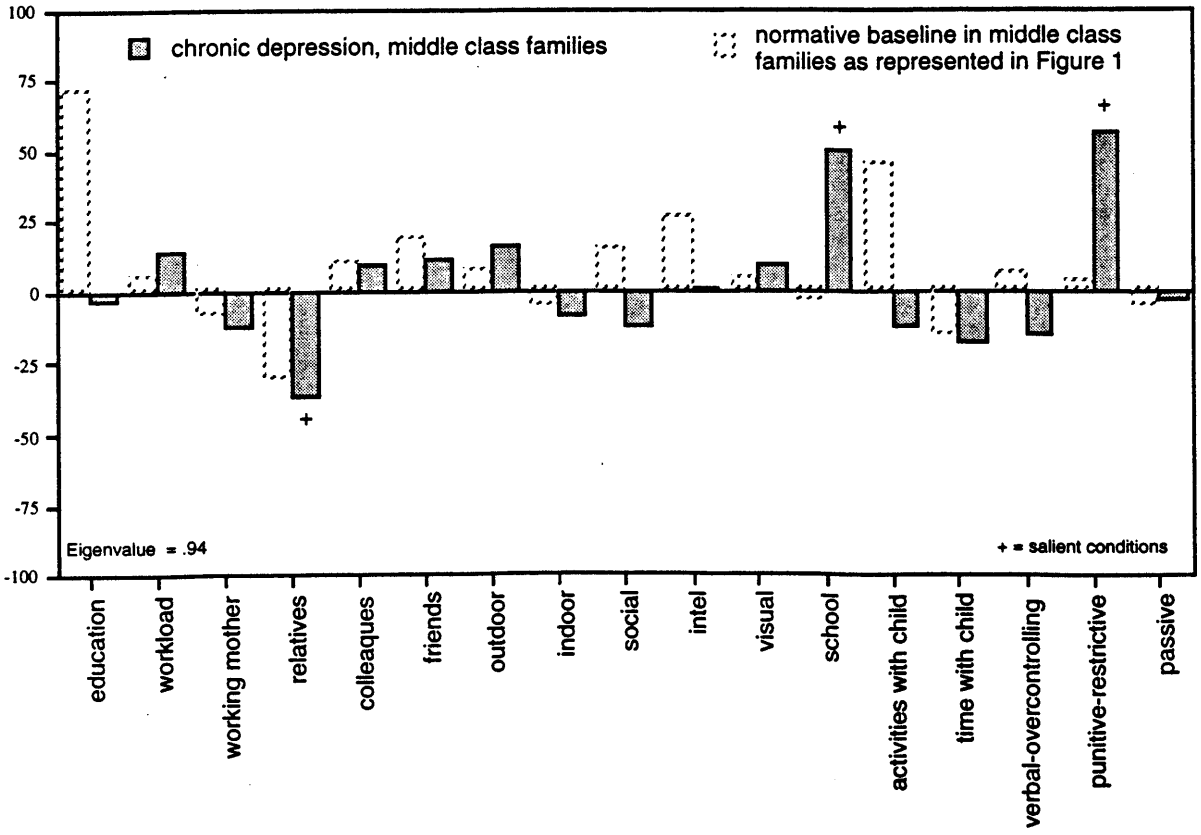
In *lower class* families the most salient socialization conditions conducive to depressive reactions are:

- distinctively low intellectual and outdoor orientations;
- low restrictive and high passive parenting style;
- non-working mothers and fathers with a high workload.

These conditions contrast importantly with the typical patterns in lower class families. In particular, non-working mothers and passive parenting styles are non-normative in lower class families. The high workload of the fathers represents a constraint on child rearing, and the low interest in outdoor and intellectual activities represents a restrictive and passive social orientation of the parents.

In conjunction with a passive parenting style these patterns are taken to create a child rearing climate that tends to impede the child's opportunities for exploration. The major difference distinguishing depression-prone from anxiety-prone family patterns in the lower class concerns the increased presence of the mother and the diminished workload of the father. Yet, time of the father with child is restricted. Presence thus appears to be paired with aloofness, pressure with distance. The child may receive a mystifying double message leading to helplessness and withdrawal from autonomous activity and exploration.

Figure 4: Rearing conditions conducive to risk for chronic depression within middle class (component loadings)



Note: The eigenvalue represents the explained variance of all variables on the depression dimension

In *middle class* families chronic depression is predominantly found in families with
- a low educational level compared to other parents within the middle class;
- intensive supervision of the child's schoolwork;
- few activities with the child;
- a highly restrictive parenting style.

The construction of Figure 4 derives from the same heuristic strategy as the previous figures; this time the configuration of rearing variables is superimposed on the baseline conditions typical for the middle class (see black columns in Figure 1).

Again, within middle class families with chronic depressive children the socialization conditions differ from those of other middle class families. The salient characteristic is a punitive-restrictive and intensely supervisory parenting style – very untypical for the middle class and thus a most untypical rearing experience for children in this class. The same is true for the relatively low educational level and the paucity of parents'activities with their children. By comparison with the normative pattern of opportunities provided in middle class families these conditions are taken to restrict a child's typical range of opportunities for emotional, social and physical experiences and, thus, to adversely influence cognitive development by curbing curiosity and exploratory activity.

Summary

The aim of this analysis was to explore how socialization conditions in families with chronic-anxious and chronic-depressive children differ from those in families with symptom free children. While social class per se had little effect on the development of depression (see poster by Hofmann et al), chronic anxiety emerged importantly in the lower class. Thus, it was assumed that milieu-specific conditions *within* social class influence the emergence of these characteristics.

The analysis showed that the most important risk factors for the child's personality development are untypical socialization conditions in a given social milieu. The underlying assumption is that various and often restrictive childhood experiences do not normally generate risks for children's personal development. However, conditions that contrast with normal milieu-specific experiences carry the risk of producing defensive reactions in the child. While there is a wide range of normative conditions fostering a variety of differentially successful developmental trajectories (e.g. different rates of developmental progress), non-normative, or intensively untypical socialization conditions within given milieus generate risks for developmental pathologies. Milieus producing chronic anxiety and chronic depression were analyzed in terms of risks imposed on development, objectively and subjectively, through scarce allocation of resources and constraining rearing practices, restricting opportunities for curiosity and exploration.

Two of the three remaining posters of this series describe the structure of anxiety and depression as risk factors for development and trace their effects on cognitive development in adolescence (see posters by Hofmann et al., and Schellhas et al.).

THE EFFECTS OF CHILDREN'S REPRESENTATIONS OF ATTACHMENT ON THE COURSE OF DEVELOPMENT

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Volker Hofmann, & Wolfgang Edelstein

Abstract

Security of attachment to one's caretakers is thought to play a key role in influencing children's later psychological health and their ability to adapt and function in new situations (Bowlby, 1982). Although recent studies support this hypothesis for the years of infancy and early childhood, little is known about the link between attachment and a child's long-term psychological functioning and development.

The current poster presents findings from a longitudinal study of the relationship between children's attachment representations and cognitive functioning in middle childhood and adolescence. Children were classified as to security vs. insecurity of attachment at age seven based on their discussion of a story of parental separation. Three major attachment groups were distinguished: secure, insecure-avoidant and insecure-disorganized. The groups were compared to each other at ages 7, 9, 12, 15 and 17 based on a battery of Piagetian tasks assessing concrete and formal reasoning, including tasks that assess deductive reasoning ability. The analyses controlled for children's level of IQ at age 7 and for attention problems.

The study shows that children with a secure attachment representation have a clear advantage over children with insecure attachment representations with regard to their cognitive functioning in the years of middle childhood and adolescence. Children with an insecure-disorganized attachment were found to be particularly disadvantaged on tasks assessing their deductive reasoning ability.

Theory

Four major patterns of attachment are identified in attachment research, as well as the family conditions which promote them. A secure pattern of attachment is consistent with healthy development, whereas insecure patterns have been linked to disturbed development.

Children with a secure attachment pattern are confident that their parents will be available and responsive when needed. They are thus able to explore the world without fear and are competent in dealing with it. Children with an insecure-avoidant pattern have no confidence that when they seek care they will be responded to helpfully. They are largely unable to seek their caretaker under stress and turn to objects instead. Children with an *insecure-ambivalent* attachment are uncertain regarding the availability of their attachment figures. Because of this, they are prone to separation anxiety and have difficulties in exploring the world freely. Children with an *insecure-disorganized* attachment are fearful regarding their caretakers. These children are unable to use their caretaker as a secure base and are often inhibited in their explorations.

Method

Subjects

This substudy included 85 urban children (41 girls, 44 boys; 38 lower and 47 middle class children) who were extensively interviewed and tested with regard to their cognitive and emotional development at ages 7, 9, 12, and 15. A subsample of 51 children was available up to age 17.

Measures

1. Attachment representations:

Children's representations of attachment were assessed based on their responses to a story depicting an imagined parent-child separation at age 7. Four major attachment groups were distinguished: *secure, insecure-avoidant, insecure-ambivalent* and *insecure-disorganized.* This method has been shown in several studies to be a valid measure of children's attachment representations (see for example Main, Kaplan & Cassidy, 1985). As only a small number of children received an *insecure-ambivalent* attachment classification, they were excluded from the present analyses.

2. Cognitive development:

• *Overall cognitive functioning:* The measure of overall cognitive functioning was based on children's responses to a battery of standardized Piagetian tasks administered at ages 7, 9, 12, and 15 (see introductory poster).

• *Deductive reasoning abilities:* Children's performance on three syllogistic reasoning tasks presented longitudinally to the children at ages 9, 12, 15, and 17 were assessed. These tasks require children to deduce logical conclusions based on abstract, verbal propositions presented to them by an experimenter.

3. Control Variables:

• *IQ:* At age 7, the subjects were administered Raven's Progressive Matrices, a non-verbal and well-known test of intelligence.

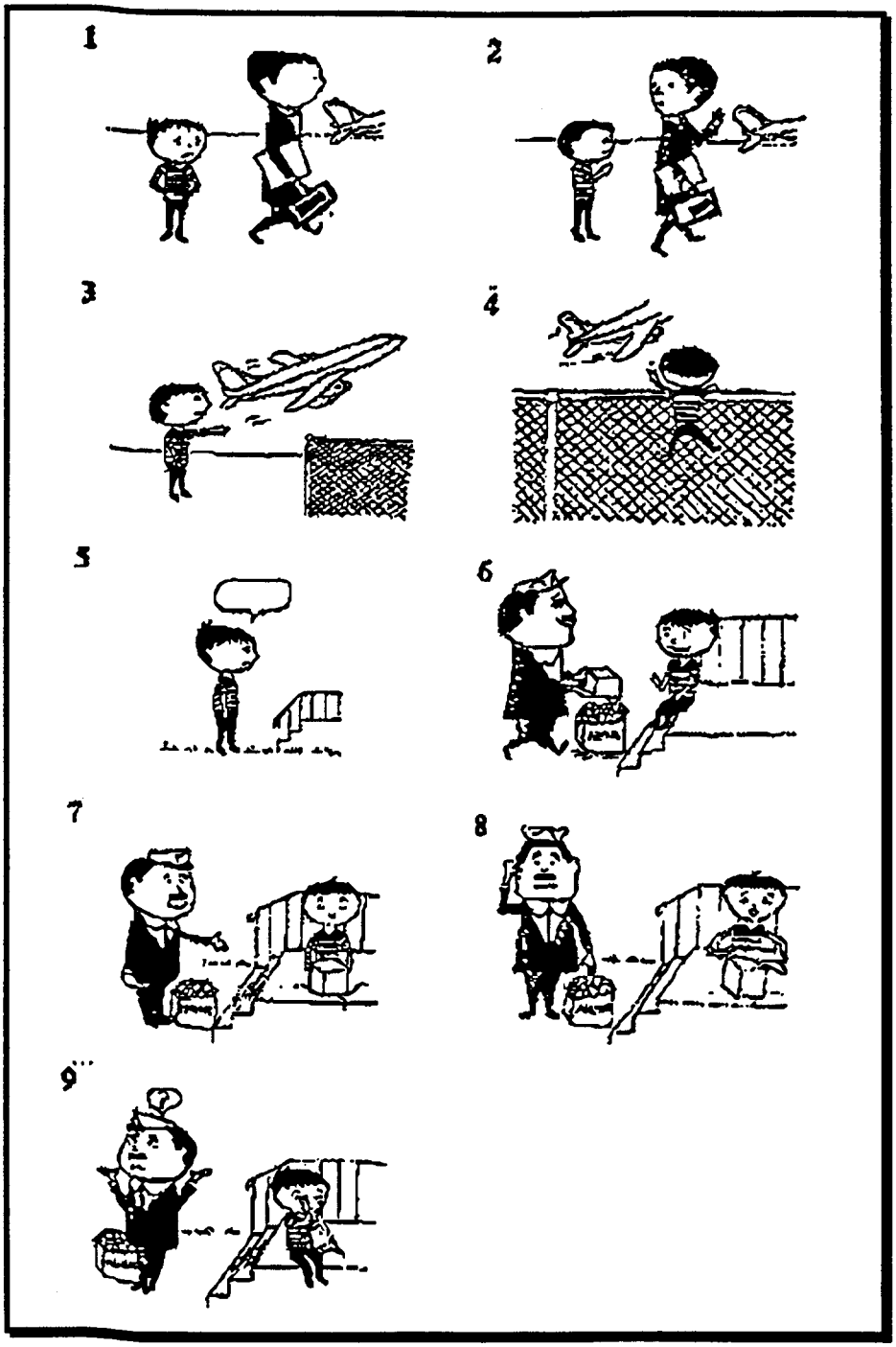
• *Attention problems:* School teachers rated each child at age 9 on items taken from three standardized questionnaires: the Kohn Competence Scale, the Schaefer Classroom Behavior Inventory, and the Quay and Peterson Behavior Problem Checklist. A sum score of teachers' reports to items that specifically tapped attention difficulties were computed for each child.

Separation Story

Criteria for attachment classifications:

Secure	Child objectively and openly talks about feelings in a balanced manner and connects feelings to parental separation.
Insecure-avoidant	Child does not connect feelings to parental separation and may deny that a separation is taking place.
Insecure-ambivalent [1]	Child is extremely angry about separation and gives ambivalent responses about how the pictured child would cope.
Insecure-disorganized	Child expresses strong fears that parent will die or will be inaccessible. He may also be very disturbed by pictures and refuse to talk about them.

[1] this pattern was excluded from the analyses due to low frequency

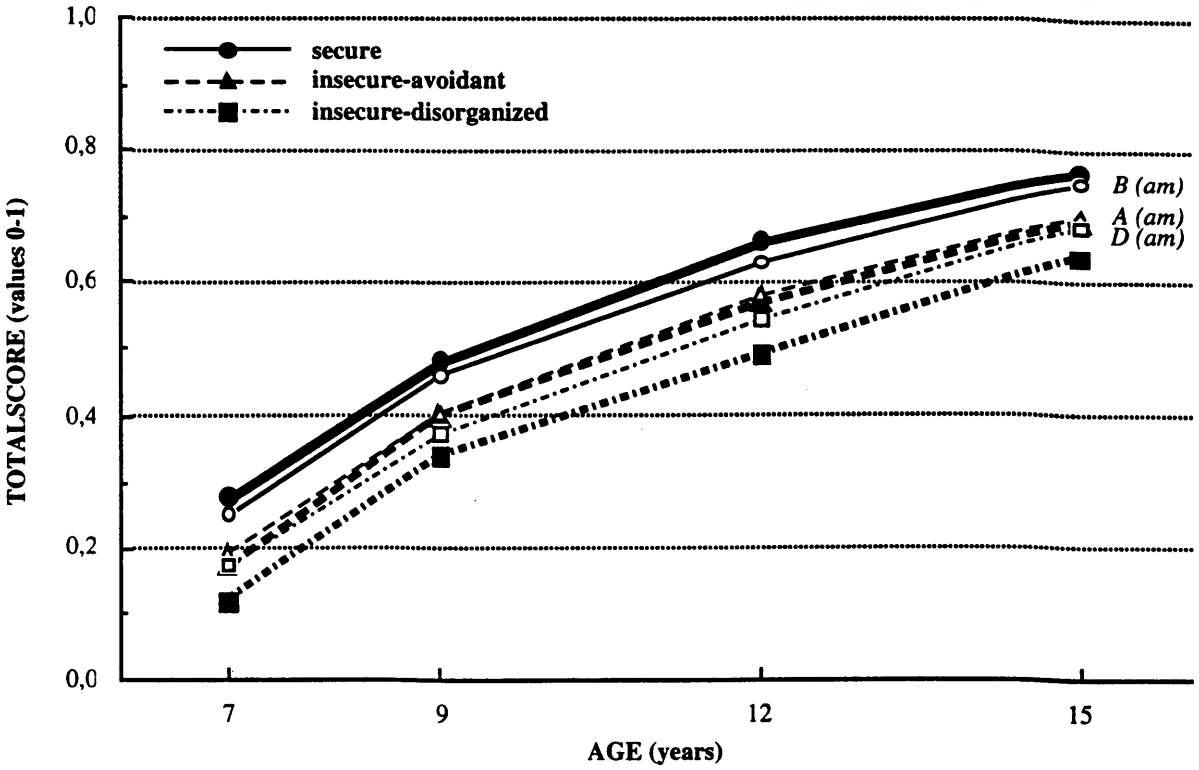


Analysis

One-way analyses of covariance with repeated measures were computed to determine whether the three attachment groups differed with regard to their mean scores on the two cognitive measures (overall, deductive reasoning). The analyses of cognitive development controlled for IQ and attention problems by way of analysis of covariance.

Results

Relation between attachment representations and overall cognitive functioning in later childhood and adolescence



Results of univariate analyses of variance with repeated measures on a standardized summary score of 33 Piagetian tasks:

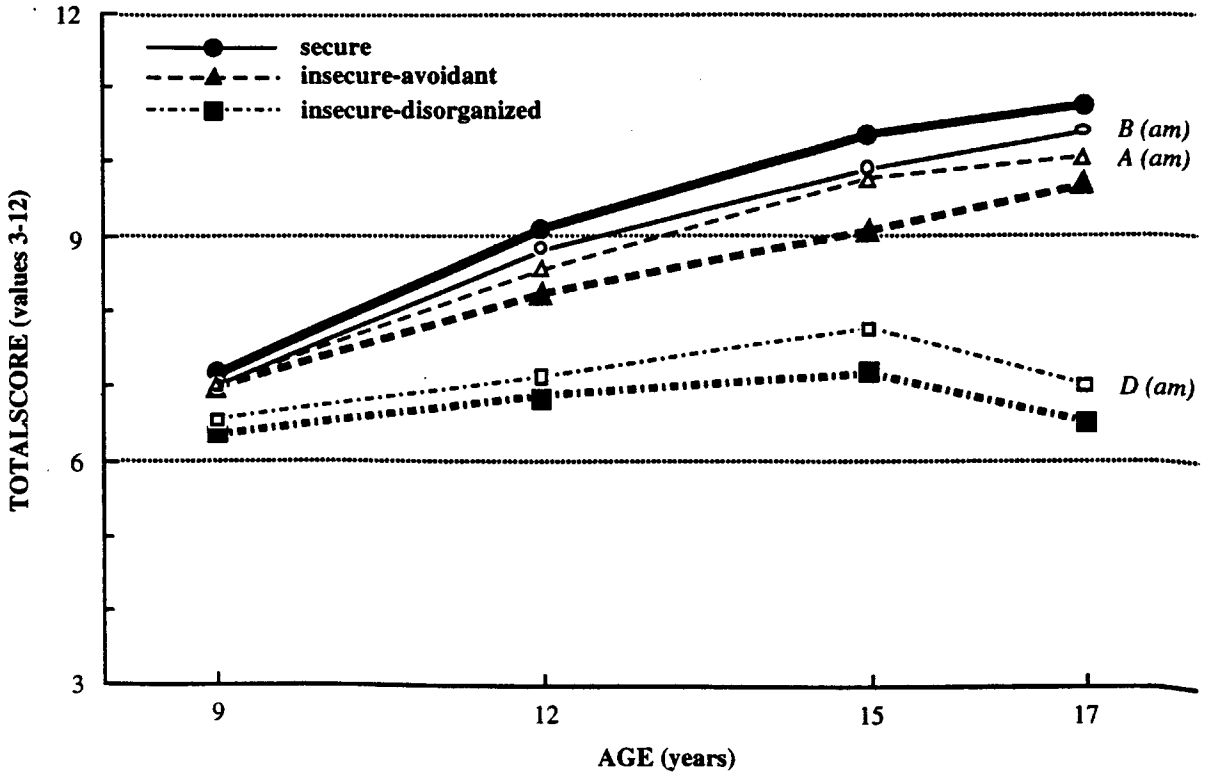
SOURCEDF	*TYPE III SS*		*MEAN SQUARE*		*F VALUEPR > F*
Attachment 2	1.17	0.58	13.46	0.000	
B - A	1	0.54	0.54	12.36	0.001
B - D	1	1.01	1.01	23.28	0.000
A - D	1	0.13	0.13	3.13	0.081

Analysis of covariance (controlling for IQ and attention problems):

Attachment 2	*0.30*	*0.15*	*4.21*	*0.018*	
B - A	*1*	*0.15*	*0.15*	*4.14*	*0.045*
B - D	*1*	*0.27*	*0.27*	*7.57*	*0.007*
A - D	*1*	*0.04*	*0.04*	*1.14*	*0.289*
IQ	*1*	*0.29*	*0.29*	*8.09*	*0.006*
Attention problems	*1*	*0.18*	*0.18*	*5.16*	*0.026*

Note. In the figure scores represent the average proportion of adequately solved tasks. **Bold type = main analysis;** *plain italics represent results of analysis of covariance controlling for IQ at age 7 and for attention problems at age 9 (am = adjusted means).* **B** = secure (n=39) · **A** = insecure-avoidant (n=29) · **D** = insecure-disorganized (n=17).

Relation between attachment representations and deductive reasoning in later childhood and adolescence



Results of univariate analyses of variance with repeated measures on a summary score of 3 deductive reasoning tasks:

SOURCE	*DF*	*TYPE III SS*	*MEAN SQUARE*	*F VALUE*	*PR > F*
Attachment2	**2**	**42.17**	**71.08**	**11.64**	**0.000**
B - A	**1**	**32.03**	**32.03**	**5.25**	**0.026**
B - D	**1**	**35.30**	**135.30**	**22.15**	**0.000**
A - D	**1**	**56.00**	**56.00**	**9.17**	**0.004**

Analysis of covariance (controlling for IQ and attention problems):

Attachment 2	*67.89*	*33.94*	*6.24*	*0.005*	
B - A	*1*	*1.40*	*1.40*	*0.26*	*0.614*
B - D	*1*	*63.19*	*63.19*	*11.61*	*0.002*
A - D	*1*	*52.12*	*52.12*	*9.57*	*0.004*
IQ	*1*	*13.88*	*13.88*	*2.55*	*0.117*
Attention problems	*1*	*27.79*	*27.79*	*5.10*	*0.029*

Note. In the figure scores between 3 and 6 represent preoperational performance; scores between 6 and 9 represent concrete operational performance; scores above 9 represent formal operations. **Bold type = main analysis;** *plain italics represent results of analysis of covariance controlling for IQ a age 7 and for attention problems at age 9 (am = adjusted means).* **B** = secure (n=27) · **A** = insecure-avoidant (n=18) · **D** = insecure-disorganized (n=6).

Summary

Children who had *secure* representations of attachment at age 7 were favored over children with insecure attachment representations in later cognitive functioning as gauged by their scores on the battery of Piagetian tasks after the effects of IQ and attention difficulties had been controlled for statistically. They were also advantaged in deductive reasoning in middle childhood and adolescence as represented by their performance on syllogistic tasks.

Children with an *insecure-disorganized* representation received the lowest scores on the deductive reasoning tasks across the four measurement occasions. Although children in this group showed slight progress at ages 12 and 15, their mean scores at age 17 differed little from the scores they had received at age 9. This finding suggests that children with an insecure-disorganized attachment may be at particular disadvantage with regard to their later cognitive functioning. Previous research has shown that children with an insecure-disorganized attachment have a negative self concept (Cassidy, 1988), and that they may fear their caregivers (Main and Hesse, 1990). It is thus possible that their anxieties regarding others and their doubts about their own capabilities and worth may interfere with their incipient ability to reason deductively.

Taken together, the findings of the study support Bowlby's and Ainsworth's notion of a link between internal representations of attachment and a child's long-term psychological functioning and development. The results suggest that while security of attachment may be a protective factor for children's cognitive development from childhood to maturity, insecurity of attachment represents a developmental risk factor.

Note. *An article reporting results from this study has been published in Developmental Psychology, Vol. 30(1), 112-124*

DEVELOPMENTAL DYNAMICS: STABILITY, ANTECEDENTS, AND CONSEQUENCES OF DEPRESSIVE REACTIONS

Volker Hofmann, Bernd Schellhas, Matthias Grundmann, & Wolfgang Edelstein

Abstract

This longitudinal study examines typical developmental paths of depressive reactions under the influence of macro and micro family resources from childhood to adolescence from a a clinical developmental perspective. Depressive patterns are interpreted as specific risk factors in development that affect the conditions of cognitive assimilation over time. Depressive reactions were identified longitudinally by two separate measures according to DSM III-R - criteria for depressive disorders (APA, 1987): At age 7, children were classified for depressive reactions based on unstandardized descriptions of the child's behavior in three different interview situations. At ages 9, 12, and 15, depressive reactions were measured by a depression scale derived from a teacher questionnaire measuring social behavior in the school setting. The longitudinal analysis revealed that depressive reactions are highly stable across time. In subjects showing depressive reactions at an early age, depression tends to be chronic, and more dominant in boys. No social class differences were found in the incidence of depression over time. However, family conditions of depressive subjects differ according to social class: Whereas in *middle class* families restrictive child rearing strategies combined with a high level of aspiration seem to be important conditions of depression, in *lower class* families high workload of parents, a passive orientation in parental leisure activities and parenting seem to be important risk factors. Longitudinal patterns of depression are associated with a sizeable delay in cognitive growth. The delay is greatest in children suffering from chronic depression.

Introduction

In the last two decades depression in childhood has become a major focus of interest in developmental and clinical child psychology. However, many quite basic questions concerning this disorder are still unclear. Among these are the relationship between childhood and adolescent (and adult) states of depression (developmental stability), the specific socialization conditions that may faciliate the emergence of depressive reactions in children as well as in adolescents, and the possible developmental outcomes that are triggered by a depression-prone personality structure. In this study, depressive reactions are seen from a longitudinal developmental perspective. The main goals were to identify typical longitudinal patterns of depression from childhood to adolescence and their location in the social matrix, their familial antecedent conditions, and their developmental outcomes. Longterm depressive reaction patterns are interpreted as a specific affective risk factor for social-interactive maladjustment, affecting the conditions of cognitive assimilation. Applying the theory of learned helplessness (Seligman, 1975) to family conditions, the development of depressive reactions is triggered by an exposure to enduring restrictive and aversive situations in the family. These are in particular:

- high workload of the parents constraining parental care,
- restrictive and aversive parental methods of conflict regulation constraining the child's exploratory behavior and opportunities for experience,
- high aspiration level of parents, which limits the child's freedom to explore,
- passive and impersonal parental leisure orientations, which restrict attention to the individual.

Objective and subjective conditions of the development of depressive reactions are not equally distributed across social classes. It is hypothesized that similar strategies of conflict resolution, parental leisure activities, network orientations, and working conditions have different meanings in different contexts, and thus produce different outcomes.

Method

Sample

The longitudinal study is based on 88 children from the larger sample with no missing data on relevant variables (for the composition of the main sample see introductory poster).

Measures

Depression

Depressive behavior as an non-clinical indicator of a depression-prone personality structure was measured longitudinally by two separate measures, (a) according to DSM III-R - criteria for Major Depressive Disorder (APA, 1987), (b) according to DSM III-R - criteria for Dysthymic Disorder (APA, 1987), as illustrated in Table 1.

Table 1: Longitudinal model for the analysis of the development of depressive behavioral patterns

(a) at the age of 7	***(b) at ages 9, 12 and 15***	
Qualitative evaluation of **unstandardized descriptions** of the child's behavior in **three interview situations**	**Depression scale of 20 items**, derived from **teacher questionnaire** containing 77 items measuring social and maladjusted behavior of child in school setting	
criteria for classification:	*subscales of the depression scale:*	*N of items:*
- depressive mood	- sadness	2
- negative self-image	- negative self-image	6
- passive behavior	- passive behavior	4
- concentration problems	- lack of concentration	4
- low, monotonous and slow voice	- social withdrawal	4
- lack of energy		
- inhibited or hyperactive motor behavior		

Depressive reactions were assessed at each measurement point separately. Four dichotomous classifications were derived, which were used in the analysis of longitudinal patterns of depressive behavior (see Results, 2.). Further analyses focused on milieu-specific socialization conditions for depression in childhood (see Results, 1.), specifically for chronic depression (see poster by Grundmann et al.), and on developmental outcome (see Results, 3.).

Family measures

The family variables were measured when the children were seven years old using a standardized parent questionnaire. Antecedent family variables were constructed at different social levels:
- education and work: education, workload, working mother;
- parents' network orientation: activities with friends, colleagues, or relatives;
- parents' leisure activities: social, visual (tv, video), intellectual (reading, theater), home and garden, nature (travel);
- parents' attention to child's activities: parental supervision of schoolwork, number of activities with child, time with child;
- parenting style: punitive-restrictive, verbal-overcontrolling, passive.

For a more elaborate description of socialization variables see poster by Grundmann et al.

Cognition

Cognitive development was measured through a sum score derived from an age adequate battery of Piagetian tasks at ages 7, 9, 12, and 15 (Schröder, 1989; see introductory poster).

Results

1. Depression and family antecedents

The following analysis is designed to examine family antecedents of the development of depressive behavior in middle childhood. The result is based on regression analysis taking social class interaction effects into account. Separate computations for the different social classes confirm these effects. Antecedent (socialization) variables were used as independent variables to predict depressive behavior at the age of nine. Table 2 shows that socialization variables explain about 47% of the variance of the criterion within a significant regression function.

Table 2: Prediction of depressive reactions in lower and middle class nine-year-old children by socialization variables (ß-weights)

Status	Variable	main effect (ß-weights)	social class interaction effect (ß-weights)	estimated ß for lower class	estimated ß for middle class
education and work	educational level	-.06	.22	-.06	.16
	workload	.15	-.15	.15	.00
	working mother	-.91	.70	-.91	-.21
parents' network orientation	relatives	.65	-.78	.65	-.13
	friends	.28	-.03	.28	.25
	colleagues	.20	-.15	.20	.05
parents' leisure activities	outdoor (nature, travel)	.06	-.06	.06	.00
	indoor (home, garden)	.26	-.24	.26	.02
	social (clubs, play)	-.16	.12	-.16	-.04
	intellectual (theater, reading)	-.55	.41	-.55	-.14
	visual (tv, video)	.74	-.83	.74	-.09
parents' attention to child activities	number of activites with child	-.53	.55	-.53	.02
	time with child (hours/day)	.25	-.12	.25	.13
	supervision of schoolwork	.06	.23	.06	.29
parenting style	punitive-restrictive	.04	.31	.04	.35
	passive	.13	-.25	.13	-.12
	verbal-overcontrolling	-1.05	.99	-1.05	-.06
N=100	*multiple R = .69*	*R^2 = .47*	*adj. R^2 = .19*	*SE = .67*	*F(35,64) = 1.7*	*p = .041*

Figure 1: Family antecedents of depressive reactions at age 9 in lower and middle class (estimated ß-weights)

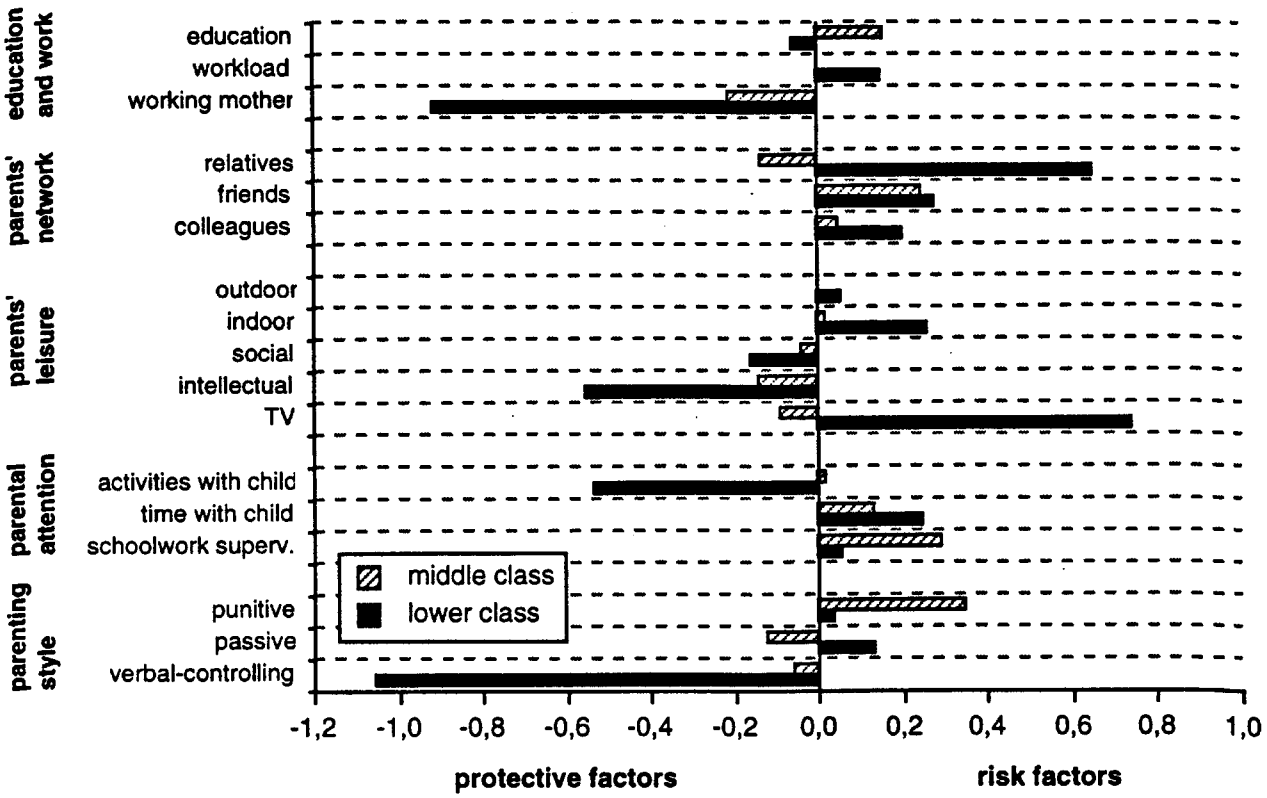


Table 2 and Figure 1 show that children of parents with high workload, many activities with relatives, friends and colleagues, indoor and passive (tv) leisure activities, and a more passive rearing style are at risk for the development of depressive behavior in the *lower class*. On the other hand, children of lower class parents who spend much of their leisure time in intellectual activities, are involved in more activities with their children, and show a more verbal-controlling parenting style are protected from depression.

The parental risk factors for the development of depression in the *middle class* are high level of education paired with intensive supervision of schoolwork, punitive-restrictive parenting, and a social network orientation twoards friends and colleagues. We speculate that this finding may represent a potentially excessive amount of aspiration in certain middle class families that may limit the freedom of the child (see poster by Schellhas et al., for risk factors of anxiety).

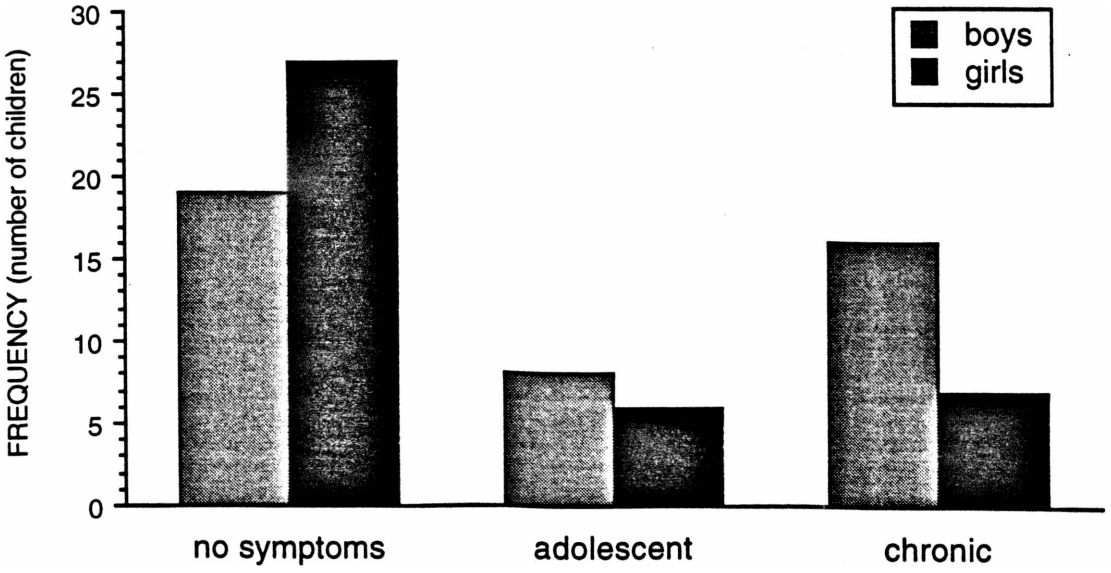
A rather unexpected finding from this analysis is that working mothers in both social classes represent a protective factor against the development of depression. Working mothers are traditionally seen as a risk factor for the development of the child. We speculate that sometimes an unmitigated presence of mothers, especially in families with a high aspiration level, may produce negative effects on the child (see poster by Schellhas et al.).

2. Longitudinal patterns of depression by social class and gender

Four basic developmental patterns of depression between childhood and adolescence were identified:
- *no depression* at any measurement occasion (52,3%)
- depressed both in childhood and in adolescence ("*chronic depression*", 26,1%)
- depressed in adolescence, no symptoms in childhood ("*adolescent depression*", 15,9%)
- *remission* after childhood (5,7%).

The longitudinal results indicate that chronic and adolescent depression represent identifiable and stable developmental patterns which were related to cognitive outcome. In spite of the social class differences that obtained in the family antecedents of depression, no social class differences were found in the incidence of depression patterns per se: Both chronic and adolescent depressives are nearly equally distributed across the lower and middle social classes. Longitudinal patterns are different for boys and girls: While chronic depression is more frequent in boys than girls ($\chi^2=4.9;df=1;p<.03$), adolescent depression is nearly equally distributed across sexes (see Figure 2). This holds true even when each social class is analyzed separately.

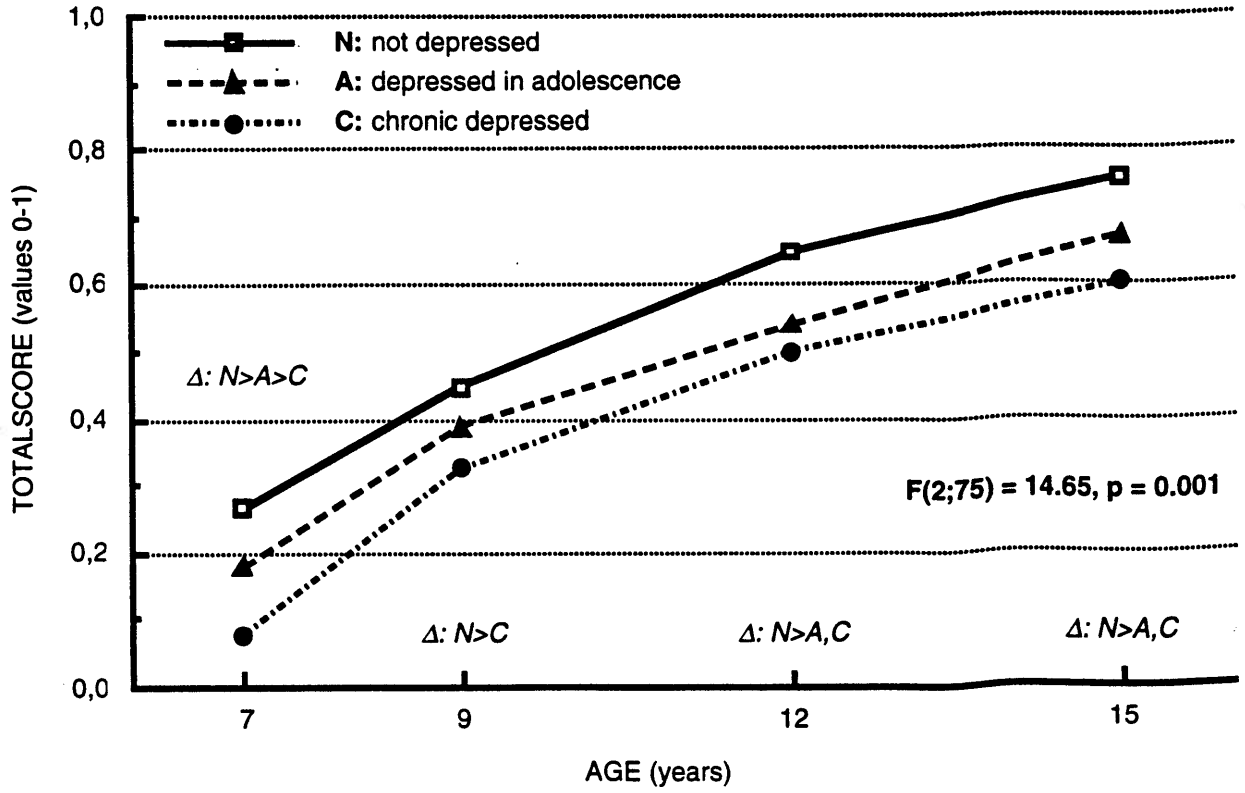
Figure 2: Longitudinal patterns of depression by gender



3. Depression and cognitive development

Depressive reactions were hypothesized to represent a risk factor for cognitive development. Figure 3 compares the course of cognitive competence among non-depressed, chronic depressed, and adolescent depressed children. The results of the univariate analysis of variance with repeated measures indicate that the two major longitudinal patterns of depression are linked to delay in cognitive growth. At age 15, those afflicted with adolescent depression evidence roughly three years of delay in cognitive development compared to non-depressed children. The delay is even greater in the chronic depressed.

Figure 3: Developmental course of cognitive competence at ages 7, 9, 12, and 15 by longitudinal patterns of depression



Legend: Δ = Results of post-hoc Duncan tests at each age level ($p < .05$):
N = not depressed · **A** = depressed in adolescence · **C** = chronic depressed

Summary and Conclusion

The findings show that depressive reactions, together with their family correlates, represent basic tendencies towards social-interactive maladjustment that affect developmental outcomes. An early onset of depressive states was found to be an important risk factor for depressive reactions at subsequent ages. Chronic patterns of depression are more frequent in boys, and nearly equally distributed across social classes. However, antecedent conditions of childhood depression are shown to be milieu-specific: Whereas in lower class families high workload and a more intrafamilial social orientation of parents combined with more passive leisure activities and interaction styles seem to play a role in the development of depression, the socialization pattern in middle class families of depressed children can be characterized by restrictive parenting styles and a high level of parental aspiration and control. Interestingly, a working mother appears to represent a protective factor rather than a risk for depression. Longitudinal patterns of depression represent a specific affective risk factor in development. They are linked to developmental delays in cognitive development over time: Chronic depressed children show an average developmental time lag corresponding to more than three years compared to non-depressed children. This raises important questions about the internal relation between cognitive and affective development, in particular about the role of early affective experience in later cognitive growth.

DEVELOPMENTAL DYNAMICS: A LONGITUDINAL STUDY OF ANXIETY

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Volker Hofmann, Matthias Grundmann, & Wolfgang Edelstein

Abstract

In this study the development of separation anxiety under the influence of macro and micro family sources from childhood to adolescence is shown. The results of regression analysis indicate important socialization predictors of separation anxiety in 7 year old children of the lower and the middle social class. Contextual analysis shows that chronic anxiety predominantly affects children in lower class families, while adolescent anxiety is more frequent in middle class families. Low levels of anxiety and anxiety in childhood are unrelated to social class. Anxiety operates as a developmental risk factor producing vulnerabilities that affect cognitive development over time. Measured by a battery of Piagetian tasks, the developmental delay of children with a chronic anxiety pattern exceeds one standard deviation (equivalent to a 3 year developmental time lag).

Introduction

Two important types of infant anxiety were examined, (1) anxiety concerning loss of personal (bodily) integrity, and (2) separation anxiety. The negative function of anxiety for other domains of personality is well kown in anxiety research. Many studies have shown that anxiety has negative effects on cognitive information processing and achievement. But mainly the specific, i.e. the situational or actual *state* of anxiety was related to negative outcomes. From a developmental perspective *trait*-anxiety with its strong dispositional character is taken to be a more reliable predictor for cognition. In this study trait-anxiety is viewed from a developmental perspective that has been neglected in most studies of the subject. The main goal of the research was to study the conditions and the developmental course of anxiety and its relation to cognition. Long-term anxiety is taken to function as a risk factor for the development of cognition. On the other hand, the development of anxiety can be interpreted as a basic tendency of social-interactive maladjustment. In this context the development of anxiety would depend on early exposure to ego-threatening situations, in particular withdrawal of love, negative parental evaluations, and conflictual rearing strategies like threatening, or inconsistency of rearing behavior (Krohne, 1985), which may depend on specific social resources (see poster by Grundmann et al.).

Research questions

1. Are there family antecedents of the development of anxiety in the context of social class?
2. If anxiety has negative effects on cognitive assimilation, does high long-term anxiety have detrimental effects on the development of cognition?

Method

Sample

For the composition of the sample see introductory poster.

Family measures

The family variables were measured at age seven using a standardized parent questionnaire. Family antecedent variables were constructed at different social levels:
- education and work: Education, workload, working mother
- parents' network orientation: Activities with friends, colleagues, or relatives
- parents' leisure activities: social, visual (tv, video), intellectual (reading, theater), home and garden, nature (travel)
- parents' attention to child's activities: parental supervision of schoolwork, number of activities with child, time with child
- parenting style: punitive-restrictive, verbal-overcontrolling, passive.

For a more elaborate description of socialization variables see poster by Grundmann et al.

Anxiety

Anxiety was measured by the General Anxiety Scale for Children (GASC, Sarason et al., 1960) containing 32 self-report items.
Using factor analysis a Personal Anxiety Scale (PASC), which contains items describing fears of personal damage, and a Family Anxiety Subscale (FASC) were derived. High reliability and excellent construct stability were obtained across the time span from middle childhood to adolescence (see table 1). The FASC is composed of items specifying fear of illness, separation, and loss of father or mother. In the present poster we use only the FASC. It appears to be closely related to the attachment concept of J. Bowlby and M. Ainsworth and to the concept of separation anxiety as defined by DSM III. Anxiety as measured by the FASC tends to decrease with age from childhood to adolescence.

Items of the *FASC* (separation anxiety)

Do you worry about whether your mother is going to get sick?
Do you worry about whether your father is going to get sick?
When your father is away from home, do you worry about whether he is going to come back?
When your mother is away from home, do you worry about whether she is going to come back?

Table 1. Construct stabilities of the FASC from childhood to adolescence

From 7 to 9 years	*From 9 to 12 years*	*From 12 to 15 years*
$\gamma = 0.84$	$\beta = 0.73$	$\beta = 0.74$

Four longitudinal patterns of separation anxiety (FASC) were found:
1. high on separation anxiety on all measurement occasions (chronic anxiety: 14.8%),
2. highly anxious in childhood (7 and 9 years: 10.7%)
3. highly anxious in adolescence (12 and 15 years: 11.5%)
4. low anxiety scores at all measurement occacions (57%).

Subjects suffering from either chronic or adolescent anxiety are hypothesized to be prone to vulnerabilities that affect cognitive development over time (anxiety as risk). Children with high anxiety in childhood seem less vulnerable.

Cognition

Cognitive development was measured using the sum score of tasks included in an age adequate battery of Piagetian tasks presented to subjects at ages 7, 9, 12, and 15 (Schröder, 1989; see introductory poster) .

Results

1. Prediction of separation anxiety at age seven by socialization variables

The following analysis is designed to examine family antecedents of the development of separation anxiety. The result is based on regression analysis taking social class interaction effects into account. Separate computations for the different social classes confirm these effects. Antecedent or socialization variables were used as independent variables to predict separation anxiety at the age of seven. Table 2 shows that socialization variables explain about 42% of the variance of the criterion within a significant regression function.

Table 2. Prediction of separation anxiety at age seven by socialization variables (beta weights)

Status	Variable	*beta-weights of main-effect*	*beta-weights of interaction*	*estimated beta for SES-low*	*estimated beta for SES-middle*
education and work	education level parents	-0.43	0.83	-0.43	0.42
	workload	0.62	-0.57	0.62	-0.05
	working mother	-0.14	-0.13	-0.14	-0.27
parents' network orientation	relatives	-0.23	-0.02	-0.23	-0.25
	friends	0.17	-0.40	0.17	-0.23
	colleagues	0.53	-0.53	0.53	-0.008
parents' leisure activities	outdoor (nature, travel)	-0.19	0.06	-0.19	-0.13
	indoor (home, garden)	0.26	-0.19	0.26	0.07
	social (clubs, play)	0.03	-0.17	0.03	-0.14
	intellectual (theater, reading)	-0.20	0.09	-0.20	-0.11
	visual (tv, video)	0.53	-0.42	0.53	0.11
parents attention to child activities	number of activities with child	-0.001	0.37	-0.001	0.37
	time with child (hours/day)	-0.19	0.01	-0.19	-0.18
	supervision of schoolwork	0.44	-0.38	0.44	0.06
parenting style	punitive-restrictive	-0.002	-0.13	-0.002	-0.13
	passive	-0.38	0.23	-0.38	-0.15
	verbal-overcontrolling	-0.03	-0.04	-0.03	-0.07
N=112	multiple R=0.65 R^2=0.42	adj.R^2=0.16	SE=0.31	F(35, 76)=1.6	p=0.04

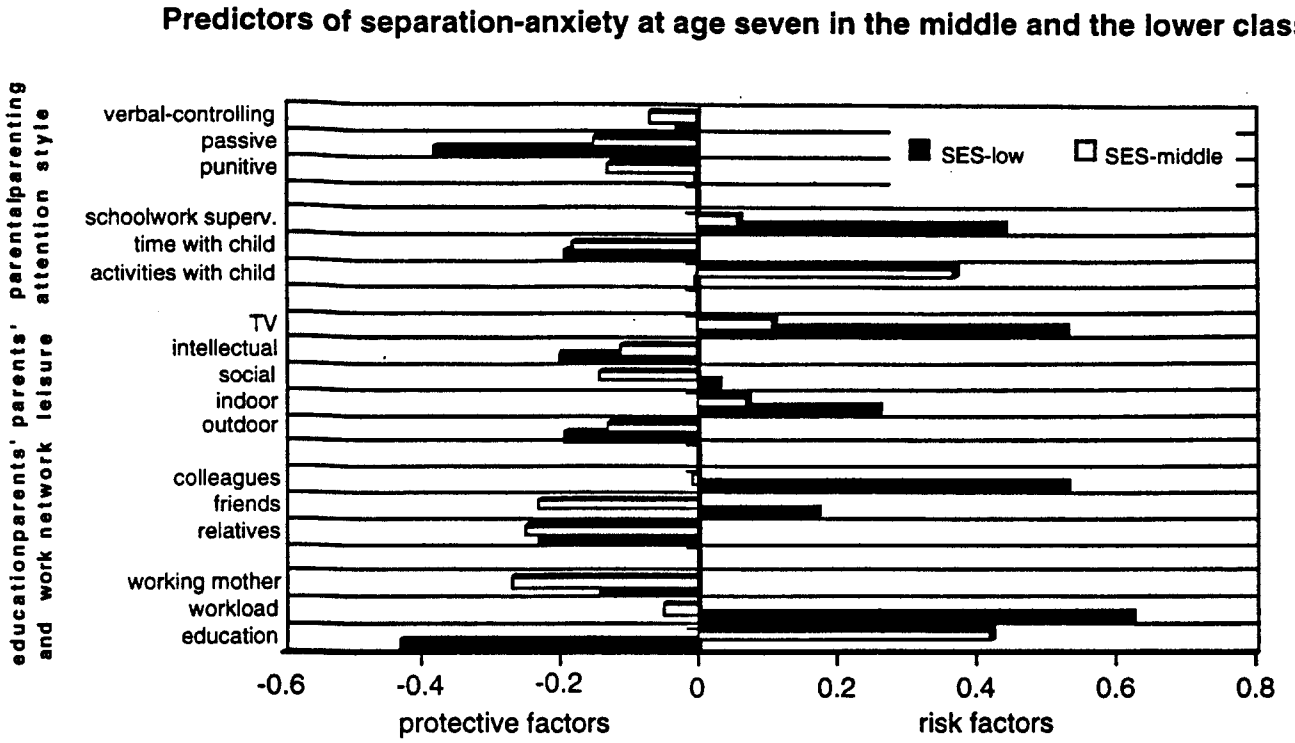


Figure 1 shows the estimated beta-weights of socialization variables for the social classes.

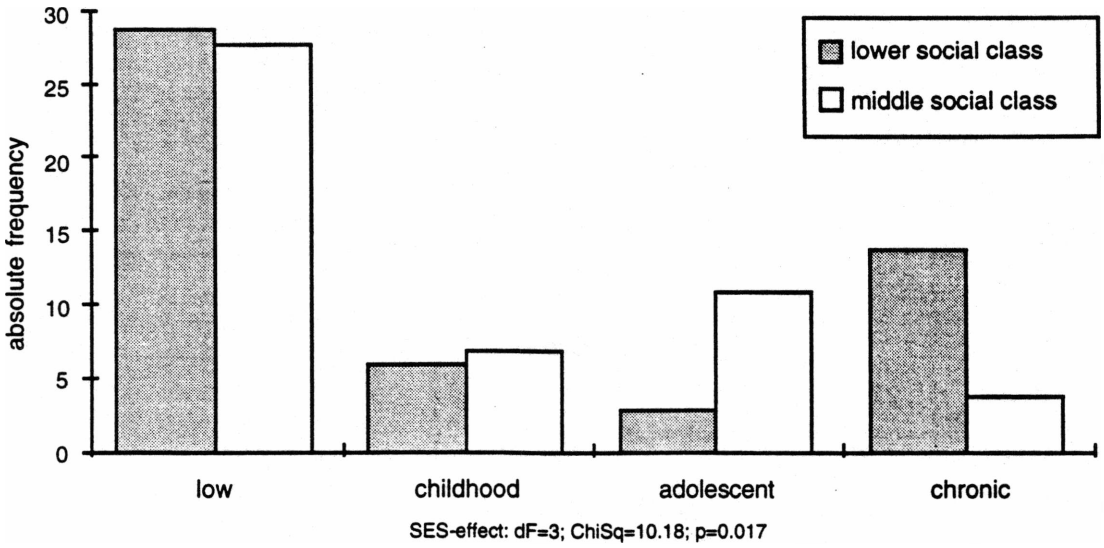
Table 2 and Figure 1 show that high workload, activities with colleagues, parental TV viewing, and intensive parental supervision of child's schoolwork represent typical risk factors for the development of separation anxiety in the lower class. On the other hand, the educational level of the parents, spending substantial amounts of time with child, activities with relatives, and passive strategies of conflict resolution typically protect children from separation anxiety in the lower class.

Unexpectedly, high educational level of parents, and a high number of activities with child appear as risk factors in the *middle class*. We speculatively interpret this counterintuitive finding as representing a potentially excessive amount of aspiration in certain middle class families that may limit the freedom of the child. Activities with relatives and friends, outdoor and social activities of parents with child, and spending substantial amounts of time with child protect children from separation anxiety in the middle class. The negative significant beta-weight of the variable working mother yields an unexpected prediction in the sense of a protective factor against separation anxiety. While working mothers sometimes present a risk for development at times the presence of mothers does produce negative effects on the child. One further example is depression in middle class children (see poster by Grundmann et al., and poster by Hofmann et al.).

2. Interaction of longitudinal patterns of separation anxiety and social class

The incidence of chronic anxiety is more frequent in lower class families, while adolescent anxiety is more frequent in middle class families. The low anxiety pattern and the pattern of childhood anxiety are unrelated to social class. Chronic anxiety is a typical lower class symptom (see figure 2).

Separation anxiety by social class (longitudinal anxiety patterns)

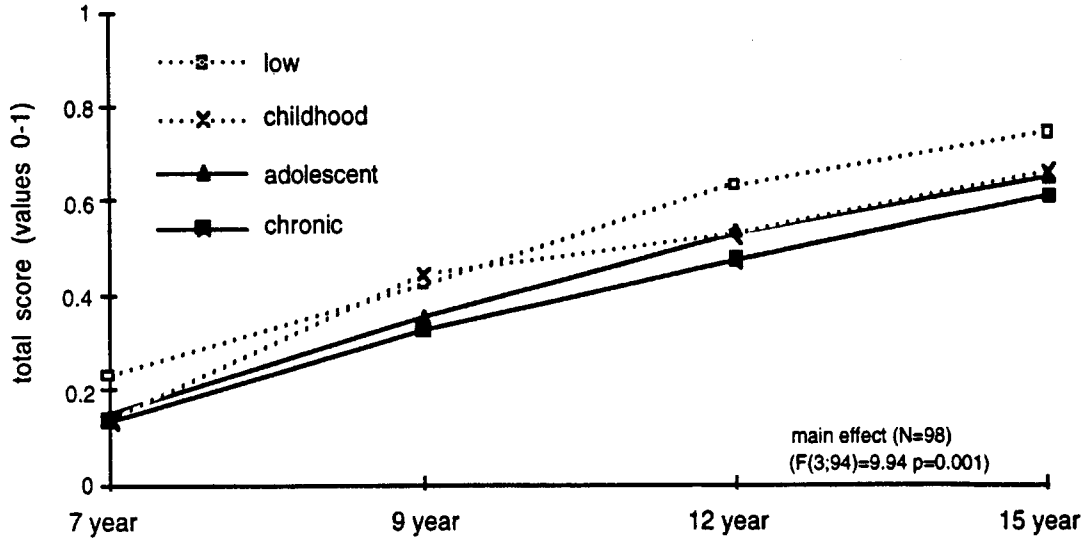


In the poster by Grundmann et al. the authors discuss the patterns of socialization conditions of normative and non-normative configurations within the lower class that permit to identify conditions conducive to the emergence of chronic anxiety. We refer the reader to this poster.

3. Anxiety and cognitive development

It was hypothesized that anxiety represents a risk for cognitive development. Figure 3 compares the course of cognitive growth of children in the low, childhood, adolescent, and chronic anxiety groups. These groups differ significantly and cumulatively, as evidenced by the cognitive growth curve. The difference between the low and the chronic anxiety groups at age 15 exceeds one standard deviation, equivalent to roughly 3 age-equivalent years of development.

Developmental course of cognitive competence at ages 7, 9, 12, and 15 by longitudinal patterns of separation anxiety



Summary and Conclusions

Our findings show that anxiety, together with its family correlates, represent basic tendencies towards social-interactive maladjustment that affect cognitive outcomes. Longterm (chronic) high anxiety patterns were related to social class. Chronic anxiety was a typical lower class symptom. Milieu-specific conditions of the development of anxiety are identified and discussed in the poster by Grundmann et al. Results indicate that various types of anxiety are linked to *developmental delays* in cognitive development over time. Between children with chronic and low anxiety patterns this delay represents the difference equivalent to an average developmental time lag corresponding to three years. This raises important questions about the internal relation between cognitive and affective development, in particular about the role of early affective (anxious) experience in later cognitive growth.

The social construction of cognitive development

Wolfgang Edelstein

Introduction

By "social construction of cognitive development" we refer to the fact that human beings must develop epistemic consciousness of their worlds, a consciousness that is triggered in social relationships and shaped by two sets of structures that affect both its course and its outcomes. On the one hand epistemic consciousness is maintained and directed by internal structures and mechanisms of the mind. On the other hand, it depends on external constraint systems that represent the specific nature of experience. Thus, the socialization of cognition consists in the interaction of internal structures of the mind with the representations of experience arising in the specific ecological setting of development.

In Piagetian terms, socialization of cognition is the result of a double process: (a) the exposure of the organism to experience of objects and relations in the environment; (b) the interaction, within the mind, of the functional invariants of the equilibration process and the specific representation of experience alimenting their action. Of these, the former is a difference-producing process, while the latter is responsible for the unity of the mind. Only the latter was of interest to Piaget.

The concept of individual differences has been a rather homeless concept in Piagetian theory. Our endeavor in the present chapter is part of the movement that recently has found the support also of Bärbel Inhelder (1989), to shift the Piagetian preoccupation with the epistemic subject further to the psychological subject than Jean Piaget himself was interested in doing (see Inhelder & Piaget, 1971, p. 210). This shift hinges on understanding the constraints imposed on development by experiential reality, in particular the reality of affectively charged relationships. In order to unfold the notion of systematic constraints on development the argument will capitalize on the theoretically underdefined concept of décalage. Within the constructivist perspective the notion of constraints on development (Edelstein, 1992; Schröder & Edelstein, 1991), provides a legitimate place for intraindividual and interindividual differences in development that derive from differences growing out of the formative experiences of children in socially and/or psychologically different lifeworlds.

The question of constraints on development that produce individual differences will be pursued by asking whether affective dispositions that are related to, or generated by, the quality of the child's close relationships represent developmental risks or vulnerabilities affecting cognitive growth. To illustrate, empirical examples of constraints placed on development by insecure attachment, anxiety, and depression will be presented. We hypothesize that these disorders, in part, relate to socialization. They may emerge, for example, in families with less than adequate access to social resources and social opportunities or in families characterized by non-normative patterns of interaction.

Internal structure and external reality

Cognitive socialization implies that there are external factors that impact on cognitive development in ways not specified by structural theory. For Piaget, development is primarily a matter of internal processes that draw for their dynamic on the increasing coordination of schemes in the course of the equilibration of cognitive structures. But once we turn our attention to the construction of the schemes, we necessarily refer to concrete realities that trigger the internal process. Thus, exposure to experiential reality is basic to the internal processing of experience, and for exposure to take place, opportunities for interaction with epistemic objects and with persons are necessary. These opportunities are socially constituted and located in a social world where they are unequally yet nonrandomly distributed. They are part of the system of social inequality, which will inevitably produce variability in development. Piaget pays little attention to this - psychological, behavioral and social - variability. The universality of the stages and the invariability of the sequences represent the empirical thrust of his psychology. Variability enters the theory from a side entrance. In the guise of décalage, variability in rate of development is supported by well-known examples, such as the extreme cases of rural children in Iran or the island of Réunion mentioned by Piaget as a kind of curiosity (see Dasen, 1977, for an account of cross-cultural research on the Piagetian program). And if we read Piaget closely, in spite of his silence, variability or individual differences in developmental performance is continually present, if unacknowledged, in his protocols. It is represented by variations in age among subjects who perform at identical levels, but also by interindividual differences in performance at identical ages; and, as every researcher in the Piagetian tradition is aware of, it is present in intraindividual differences in performance on different tasks by the same subjects.

Piaget ignored variation in cognitive development because his interest is not on the psychological characteristics of individuals, but on the structure of mind. Unexplained variation is stowed away in the residual category Piaget termed horizontal décalage. In order to elucidate the meaning of this term a specification of the role and the quality of experience in development is required. It represents the subjective side of what, from the objective side, can be construed as an account of cognitive socialization.

As long as socialization is taken to refer to the interaction, with the subject, of a reality that, at some point at least in the history of the subject's becoming a cognizing self, is external to the self, this does not differ from the traditional realist epistemology (which generally relies on an empiricist perspective on development and a black box view of internal process). However, this view is not shared by constructivist psychology. It follows from the constructivist view of the mind's operations as held by Piagetian theory that "experience" is dialectical, deriving from the internal structure of the assimilatory process no less than from the physical and social world of objects and relations that give rise to it. In experience, internal structure and external reality are linked in a relationship of mutual entailment. The development of the epistemic relationship simultaneously represents and produces change in the entailment structure that links subject and object, experience and reality, knower and known.

In spite of his preoccupation with the internal dynamic of mind, Piaget's view is explicitly grounded in a social interactionist conception of epistemic practice (e.g., Piaget, 1952, 1970; Inhelder & Piaget, 1958, chapter 18), and thus, a "co-constructive" epistemology fits both with the structure of schema theory and a more explicit role of constraints on the epistemic process to complement it. In this view, the object of experience has an active role in the epistemic process, and whether directed to physical objects or other subjects this is best defined as a process of epistemic interaction, a process here referred to as co-construction (see Youniss, 1980; Youniss & Damon, 1992).

The nature of the epistemic process itself is independent of the ultimate nature of the reality constraints imposed on it. Whether these constraints are grounded in the subject's genetic

endowment (and thus a prerequisite to cognitive action) or located in the world of objects in the ecology of a child's experience, or whether they are grounded in the energizing and motivating input from interactions in relationships that serve as supports or holding environments for epistemic interaction, the process characteristics will remain the same. Nevertheless various constraints imposed on the process will affect development differentially, and in order to explain these differences, these constraint modalities will contribute different explanatory heuristics. Thus, if experience is grounded in interaction, the socio-cultural patterns of interaction will produce variations in the quality of experience which in turn will impact on the development of cognition. Patterns of experience modulating cognition may be specific to either the participating individuals, e.g. in the family, or to time and place and culture, or to settings within the social structure. Opportunities for experience, cognitive conflict, and decentration may be culturally divergent, historically specific or socially deprived. Risks and vulnerabilities may prove to be regular characteristics of regimes of experience specific to class or culture, producing, as the case may be, interindividual differences in development.

Varieties of experience

Interindividual differences in development refer to either systemic or idiosyncratic differences in individuals' exposure to experience. Selective experience may refer to either (a) the object of knowledge, (b) the mechanisms by which experience is processed, or (c) the outcome of development as a prerequisite of future construction.

(a) The object of knowledge: The socializing power of object experience is constituted by the context of action in which the object is embedded. The context of action confers meaning on the object and invests it with epistemic significance. Take the example of the physical object endowed with the contours of a "house": Depending on the social function or action context, the object grounds different social experiences (see Schütz, 1982, e.g., p. 178 ss). This could be, for example, the representation of "home" tainted by the experience of poverty. If even the meaning of physical objects can be socially constituted, this certainly is the case regarding intrinsically social objects of cognition, specifically persons, relations, and interactions. While cognitive and social-cognitive development have been shown to vary depending on the nature of experience with "natural" and "social" objects (Hollos & Cowan, 1973; Keller, 1992; Schröder & Edelstein, 1991) it has remained a moot question how these experiences constrain construction, and how the constraints are brought to bear on cognitive development. For Hollos (1974) who studied the thinly populated and communicatively impoverished area of rural Norway, it is the density of interaction and communication opportunities that differentially affects epistemic encounters even with physical objects. And, ever since R. Spitz (1945, 1946) presented his findings on maternal deprivation, a wealth of studies have established the detrimental effects on cognitive development of withholding either emotional attention or stimulation through objects.

However, it is a major step from there to understanding just how the experience of interaction with a significant other induces in the mind of the subject the particular "working model" of object interpretation, that, through positive or negative cathexis either of the epistemic encounter itself, or of the object operated on in the encounter constrains the course of cognitive development. To the present, clinical reconstruction of the subject's history appears to have shed more light on the process than mainstream developmental psychology.

(b) Mechanisms. In Piaget's constructivist theory, the transactions of the subject of cognition with the internal experience of the object ground cognition.These transactions are effected through assimilation and accommodation which may indeed be constrained by the social selection of effects inherent in the way schemata of objects and schemata of interactions are constructed and put to use. Thus, under the constraints of previous experience, schemata may be disfigured or fixated as a consequence of disequilibrated over-assimilation or over-

accommodation. Cellérier (1987), in line with recent advances in neuroscience, has analyzed the economy of schema operations using the metaphor of success or failure of schema construction and schema survival. The reinforcement a schema receives through successful operation destines it for survival in development. It seems plausible that the constraining effects of experience at work in the assimilation dynamics of the developing mind may generate differences in the quality, the differentiation, and the rate of growth of the cognitive system.

(c) Outcome. Elicited by the object and mediated by the mechanism of assimilation, a scheme selected for success under the constraints of previous experience will reach an enduring quality as an outcome of the construction process. Depending on the role and quality of experience, outcomes will therefore differ between individuals. But as every outcome is an antecedent condition of further development, differences in developmental status represent conditions of epigenetic differentiation that reinforce interindividual differences. Whenever there is order or regularity in the constraints imposed by the objects of experience, by the mechanism of functional adaptation processing the impact of the object in schema construction, and finally by the outcomes devolving from these processes, we are headed for experience-related intraindividual and interindividual differences in development.

We have dealt here with objects of experience, mechanism and outcomes as if they were separate entities. But they are, of course, interlocking aspects of scheme construction and operation, separated only in the analytical approach. We have dealt with the process as a psychological one, with experience treated more or less as a private occurrence. But the prevailing orders of opportunity provide differential exposure to experience, and thus differential constraints on development. And while we may fruitfully use a clinical window to search developmental contexts for the incidence of risk or for signs of individual vulnerability, the more encompassing theoretical perspective is to map the evolving societal structures of the distribution of developmental opportunity, such as the incidence of economic hardship (Elder, 1984) or the renaissance of poverty (Garbarino, 1992). Beyond clinical variations in the trajectories of individual constructions, these patterns generate collective variations in the structures, rates and outcomes of cognitive growth.

Developmental variation: a social construction account

Just as developmental research in the structural tradition has not frequently related individual differences in development to variations in exposure to experience, socialization research, typically, has ignored intraindividual change along dimensions of interest to developmentalists, and thus failed to relate development to socialization. In his analyses of the Children of the Great Depression (Elder, 1974) and the various follow-up analyses of that seminal study (e.g. Elder & Liker, 1982; Elder, Van Nguyen & Caspi, 1985), Elder studied the effects of the deprivation of material and psychological resources that, during the Great Depression, affected the lives of families that participated in the Oakland Growth Study (Eichorn, 1981) and in the Berkeley Guidance Study (Macfarlane, 1938). He found that these conditions affected the children differentially depending, in particular, on age, gender and social class. It turned out, for example, that lower class boys were hit harder, and in different ways, by economic hardship experienced by the family than were girls. In terms of macro-micro relationships, father's loss of job proved to be a "developmental risk", that conjointly with the effects of restrictive conflict regulation strategies produced differential vulnerabilities for adolescent sons and adolescent daughters at a given age. Girls were found to be more resilient throughout the life span than were boys; the boys, for example, had more medical trouble in later life than had girls (Elder, 1984;). Perhaps, we might hypothesize, girls had a better role-model in their mothers, who were coerced into a position of familial leadership by the predicament of the fathers.

Elder's studies bear on the unfolding and patterning of the life course rather than intraindividual development. If we critique developmental theory for ignoring the effects of social structures on the pattern of individual experience, we may critique socialization theory for ignoring developmental processes. Thus, Elder did not follow upon the risks generated by macro events to investigate developmental effects on the person's competence. Rather, he traced the vicissitudes of the person's biography. But the deep structure of cognitive competence belongs to a different order of phenomena than does frequency of medical trouble, and the ability to cope differs from marital adjustment or incidence of divorce, or from depressive episodes, although, of course, the developmental dimensions are phenomenally or causally related to the life course events. Elder's data permitted him to trace the effects of the Great Depression, via the family, to individual characteristics of the children, and hence to their consequences for the life course (Elder & Caspi, 1988). We can draw on these studies for a variety of relevant inferences: The social construction of the life span respresents the outcome of the interaction of a number of co-occurring factors. This represents the objective opportunity structure available to the individual in his particular group. In the case under study this is deprivation due to the Great Depression as it hit lower class families. Second, there is the specific context of development and its implications. Hypothetically,the relation might be structured as follows: sons are in a phase sensitive to the predicament of fathers; daughters are affected by the rise of mothers compensating the demise of fathers. The incidence of risk is defined by this encounter of objective and subjective factors. The vulnerabilities and strengths generated by the encounter extend over the life span. The missing link, at present, is the developmental factor. What we must explain is how the level of identity or ego resilience achieved or interfered with can explain the incidence of marital disturbance or medical risk in the men or the adjustment to life in the women who once were children of the Great Depression.

Through a sociological window, Elder observed the conditions of economic hardship, tracing their effects first on families, then on children across lives. Developmental psychologists have traditionally looked at things from a different perspective. Their object has been the course of development in the context of individual biographies. As a rule, they rely on normative rather than non-normative events (Baltes & Schaie, 1973). Relevance is constituted by the theoretical relationship that is established between the risk condition and the process of development itself.

For a constructivist theory there are relatively few meaningful choices of external conditions that potentially provide variability in developmental process and outcome. A true linkage must obtain between these conditions and the inner structure of the developmental process, to be described, for example, in terms of assimilation. Patterns of parent-child interaction, or patterns of peer interaction, or exposure to educational experience are among possible candidates, inasmuch as these conditions specify variations in the provision of relevant opportunities to participate in cooperation, confront novelty, seek exploration, differentiate perspectives, take the role of the other, engage in cognitive conflict, and so on. All of these represent activities that, in Piagetian and other constructivist theories, are linked to the dynamics of cognitive processes. But surprisingly few researchers have studied social ecologies, family- and class-related conditions of cognitive socialization from the vantage point of cognitive developmental theory. Hollos (1974; Hollos & Cowan, 1973), mentioned earlier, is a case in point. Lautrey and his coworkers (1980) studied the developmental impact of class-related socialization patterns. Doise and Mugny (1984), Mugny (1985), and Perret-Clermont (1980) have observed the influence of peer co-construction on the quality of the achievement in cognitive and social cognitive tasks - the basic paradigm underlying the peer teaching strategy that Damon (1984) in a much quoted review has described from a cognitive-developmental point of view. Krappmann (1991; Oswald & Krappmann, 1991) and his colleagues have observed the naturally occurring patterns of peer interaction in groups and their impact on the development of social cognitive abilities and dispositions such as helping and cooperation. Of course, cross-cultural research in the Piagetian tradition (Dasen, 1977) has mostly been designed to study interindividual differences in performance on basic Piagetian tasks that can be traced to culture-specific

functional requirements specifically operating in a given culture (see Cole et al., 1971; Cole & Scribner, 1974) or historical setting (Damerow, 1994; Radding, 1985).

Social settings represent patterns of interaction that vary depending on the material and affective resources allocated, influencing the meaning of the interaction and thus the participating subjects' cognitive intent, the way they come to cognitively relate to the world. Patterns of early interaction with significant others, through the social, structural and individual resources allocated to them - such as time for child, stimulus display, intensity of care, and quality of affect - orient the child towards enduring modes of epistemic interchange, and thus generate persistent patterns of psychological and social experience imposed, as it were, on the subject's very ability to construct meaning from social and epistemic encounters, and shape these encounters prior to any given act of cognition.

Intrinsic constraints and external conditions

At the close of this account of the social construction of epistemic variability, the sources of variation must be related to developmental performance. These sources may be classified as producing either "intrinsic" or "external" constraints on development, depending on the more proximal or more distal relationship they entertain with the act of cognition. Intrinsic constraints refer to the conditions represented in the cognitive act by the task and the modalities of processing the task. External constraints represent the cultural, social and personal conditions imposed on cognition prior to the cognitive act (see fig. 1)

Let us pursue this differentiation a little further. The major determinant of any given performance within a constructivist account of cognitive development is the competence achieved prior to the spell of performance elicited in a given situation: Other things equal, previous outcomes are the best predictors of actual performance. The performance, however, is modified by the intrinsic constraints placed on competence by a given task and by organismic conditions relative to the process characteristics and modalities of the task situation (Schröder, 1989; Schröder & Edelstein, 1991). For example, two different classification tasks that measure the same operational competence in the same logical structure may place different constraints on memory, or appeal to perception in different sensory modalities. Idiosyncratic experience may, of course, interfere with these constraints. A specific learning history may arouse anxiety and inhibit performance on a task. In such cases, external constraints are superimposed on internal ones. Intrinsic constraints are imposed by task characteristics and the process modalities involved in solving the task. They represent variations of task achievement that Piaget, rather unspecifically, subsumed under the notion of décalage. These phenomena are part and parcel of cognitive psychology and much progress has been made in deciphering their effects.

External constraints, in contradistinction, are imposed by experience. They relate to the socialization of the person, his history and biography. Within the task, they bring to life the contexts of exploration and achievement that are characteristic of the person, and represent, beyond the person, the characteristics of the group that shares the experience with her. In summary, exposure to differential experience provides an antecedent condition of cognitive development. With regard to a task, systematic differences may obtain between the experience of rural and urban children, or between lower and middle class subjects. Required performance may arouse negative affect or stress in a vulnerable group in a test situation; underprivileged subjects may experience anxiety and defense when confronted with a challenge. The meaning of the situation, the cathected context of achievement modifies the act of cognition, imposing what Bowlby has called a working model of reality processing on the construction of objects, persons and relations.

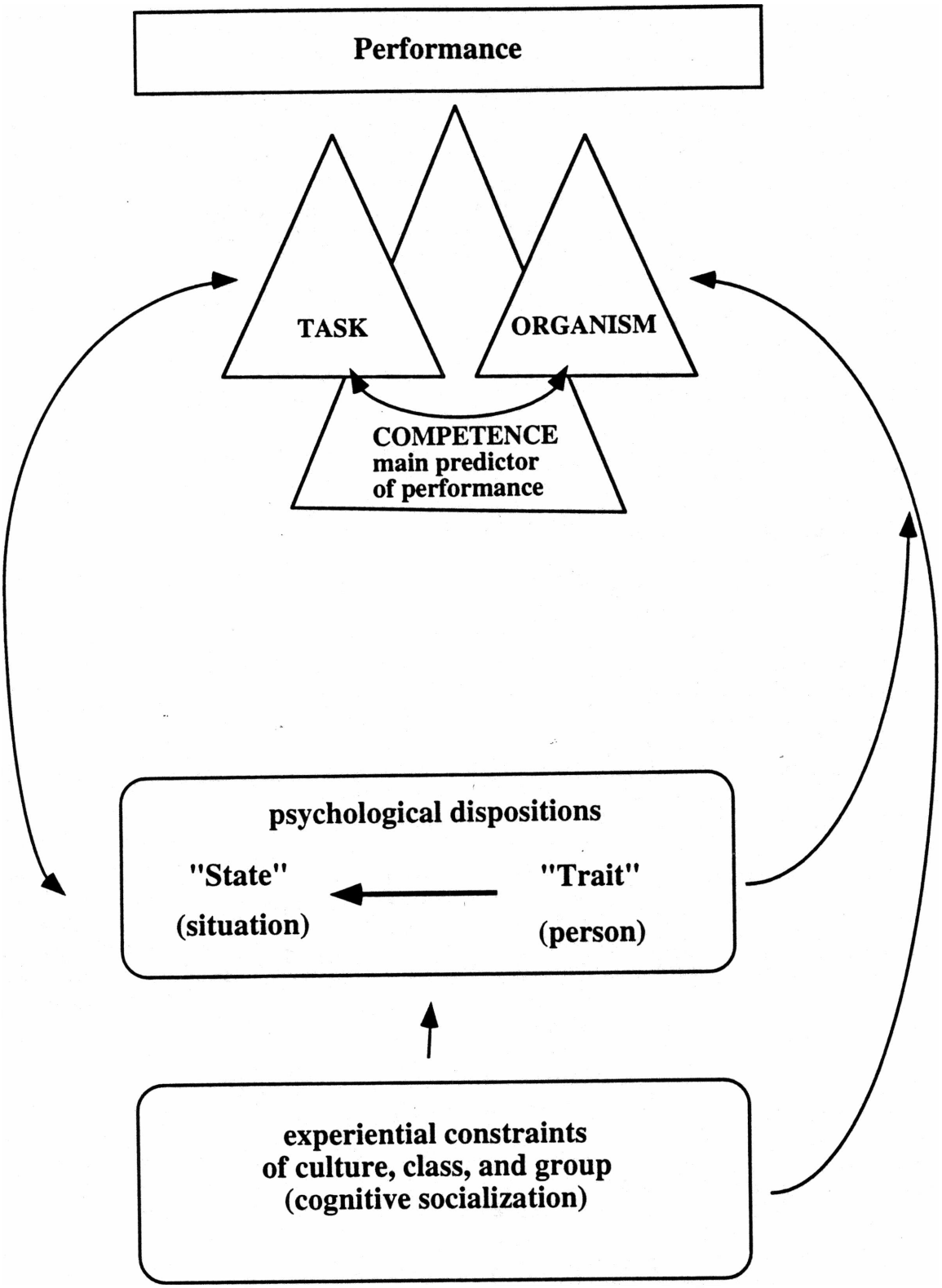


FIG. 1. Factors determining performance. Intrinsic constraints internal to the cognitive act in the upper part of the figure; external constraints preceding cognitive act in the lower part of the figure.

From a sociological viewpoint, this process has been identified as leading to difference, deficit, or deprivation. The non-random distribution of opportunity provides the exploring mind with specific yet regular exposure to experience that is basic to assimilation and construction. Such opportunity structures are ubiquitously provided by the cultural contexts and social ecologies in which children are socialized: the mother-child dyad, the family system, the children's field of interaction with experience in their specific social settings. From a clinical viewpoint, the process is focused on the individual's negative cathexis of the object of experience, neurotic deformation, or the operation of defenses such as repression, regression, or fragmentation (Haan, 1977). What Noam calls the encapsulated biography of painful experience or thwarted construction arises to revenant life in the deformed structures of the schemes of assimilation, grinding out, at worst, an impoverished, disequilibrated, or biased representation of reality. This will depend on the maturity of the subject, the history of the disorder, and the context and content of the experience at issue. For Noam these processes are part and parcel of any present organization of cognition and self. In the micro-processes that determine performance, the subjective history of experience, idiosyncratic or collective, connects the affectional dynamic inherent in the construction activity that, according to Piaget (1981) energizes schema operations, with the act of cognition, the prise de conscience. These processes build dispositions affecting later explorations, centrations that fixate the economy of schema activities in assimilation to earlier investments.

Lest this account appear too onesided, let us point out that differences in cognitive development as generated by varieties of experience in varieties of epistemic encounters generally represent regimes of difference, not deficit. The normative structure of cognitive achievement imposed on cognitive development historically transforms constraints on development into mechanisms of deficit or failure relative to the success of others who perform to criterion in a world designed to benefit the highly selective optimization of abstract cognitive achievements. This remark has a double edge. On the one hand, it points to the historical process of change imposing a collectively validated norm of achievement on the development of cognition. Conversely, this very process has generated a system of constraints on development that produces risks, vulnerabilities and failures both consecutive to cognitive pressure and stress, and consecutive to deprivation and deficit (Edelstein, 1983).

The historical emergence of such constraint systems provides a starting point for an ecological theory of socialized development accounting for patterns of socializing experience, classes of developmental differences and/or deprivations, and types of developmental outcomes over time that are generated by these differences. Using Bronfenbrenner's theoretical account (Bronfenbrenner & Crouter, 1983), we may identify developmentally effective experience tied to the micro-system of parental bonding and rearing climates as well as sibling interactions that are basic to the intrapsychic system of affective constraints on development. We may identify the opportunity structure of childhood ecologies in the mesosystem, with their privileged classes of physical, social and cultural objects. Finally, there is the macrosystem of history, culture and language, of the division of labor and social inequality that determine the meaning of action and the symbolic system that makes up the conscious pattern of a person's life and of the social relationships in which he finds himself rooted. None of these systems functions in an isolated way. It is their synergy that across individuals and cohorts generates the developmentally effective patterns of experience that, on the basis of the specific interplay of developmental universals and developmental variations, simultaneously produce individual biographies and collective mentalities.

Empirical illustrations

To illustrate the operations of the constraint system on development, we choose the example of external constraints located in the primary socialization matrix and the pattern of relationships with significant others – the attachment pattern between caretaker and child, anxiety arousing and depressogenic stressors – and their influence on cognitive development over time. The examples are taken from our longitudinal study of individual development from childhood to adolescence (Edelstein, Keller & Schröder, 1990).
Children's attachment to their caretakers has been shown to exert a strong influence on their motivation and ability to explore their environment (Ainsworth, 1990; Bowlby, 1969). The relationship can be construed as follows: Various traditions – both philosophical and psychological – concur that self respect and feelings of self worth depend on the recognition of the self by significant others. Conversely, children lacking in a sense of self worth have been found to experience difficulties constructing adequate models of the world (Bowlby, 1969; Kohut, 1978). In a secure relationship with a caretaker children experience the recognition of their needs. They feel taken seriously as the persons they are. This provides them with the resilience needed to engage in exploration and brave the unknown. In contradistinction, insecurely attached children will not experience the trust of a caretaker enabling them to sufficiently cathect their selves. They will feel threatened more easily and be less willing to engage in cognitive exchanges with the world. Alternatively, they will be forced into cognitive encounters beyond their capacity and therefore contract an avoidant attitude towards affectivity which again limits their freedom of exploration. Frequently depression and anxiety will affect their strategies of exploration: depression by limiting the will to explore – a resignation leading to passivity and inaction; anxiety by arousing defenses that interfere with the subject's response to discrepant experience. Thus, insecurity of attachment appears as a risk factor emerging in the system of early relationships that places specific constraints on the cognitive development of the child. We take these constraints to operate on the child's assimilatory activity (Bowlby, 1969; Jacobsen, Edelstein & Hofmann, 1994). While insecurity itself represents a risk with which individuals attempt to cope by generating a working model that protects them against confronting novelty, or pushes them towards more confrontations than they can deal with, the anxiety and depression frequently implicated in the insecure child's engagement with the world appear to be elements of such working models. In sum, certain contexts of socialization in the family generate risks including personality dispositions, to which development appears to be vulnerable in highly specific ways. As we shall see, the vulnerability is cumulative, and its effect tends to increase over time rather than decreasing with age or through compensatory experiences.

Attachment

In the present study the intraindividual effects of attachment on cognition were observed longitudinally from seven to 17 years. Attachment was measured at age seven based on the children's responses to a picture story containing nine pictures that represent a parent-child separation. The subject was asked what the protagonist child in the story was thinking and feeling during the separation experience, why he felt that way, and what he would do. The child's answers were assessed using a modified version of Kaplan's (1987) method which is directed at the overall mode of regulating thoughts and feelings about separation (Jacobsen, Edelstein & Hofmann, 1994) .

As this report focuses on the longitudinal effects of attachment on cognitive development, the cognitive measures need to be described briefly. At age seven, these were a set of Piagetian tasks, assessing conservation of number, substance, weight, area, length, continuous and discontinuous quantity, two-dimensional space and logical multiplication. With increasing age,

age adequate tasks were added to the battery, and such tasks eliminated that were no longer adequate. Formal operations were assessed by three syllogistic reasoning tasks, as well as by tasks of combinatorial reasoning, multiple compensation, correlation and the pendulum task. The dependent measures were (a) a composite score based on all concrete and formal reasoning tasks, (b) a composite score based on the three syllogistic reasoning tasks.

The sample for the study numbers 89 children, about equally divided as to gender and social class. The children were classified into the four main attachment groups: secure, insecure-avoidant, insecure-ambivalent, and insecure-disorganized. Due to their small number, the insecure-ambivalent children were dropped from the analysis. Data were available for 85 children.

Groups	Boys	Girls	Total
B Secure	17	21	38
A Insecure-avoidant	22	10	32
C Insecure-ambivalent	3	1	4
D Insecure-disorganized	7	14	21
Total	49	46	95

Table 1. Distribution of attachment groups

Note: No main effects were found for gender or social class. A week interaction effect obtained for attachment and gender. This effect concerned only the cognitive performance of secure children, where boys were more advanced than girls.

Figure 2 shows that the three remaining attachment groups differ significantly and consistently from each other in cognitive performance. The secure group outperformed the two insecure groups throughout. Formal operations emerged at about age 12 in the secure group, consolidating over the next three years and beyond. The avoidant subjects among the insecure children were considerably less advanced throughout the age span under study, barely entering full formal operations at age 15, after a long spell of time in the transitional stage. The disorganized group is the most problematic of all. In effect, in some of the tasks, they scarcely advance beyond concrete operations (see fig. 3). The age-equivalent developmental discrepancy tends to increase between groups. The differentiation process generally appears to increase with age, gaining momentum at the moment of transition into formal thought (most clearly evidenced in the developmental pattern of syllogistic reasoning – see fig. 3).

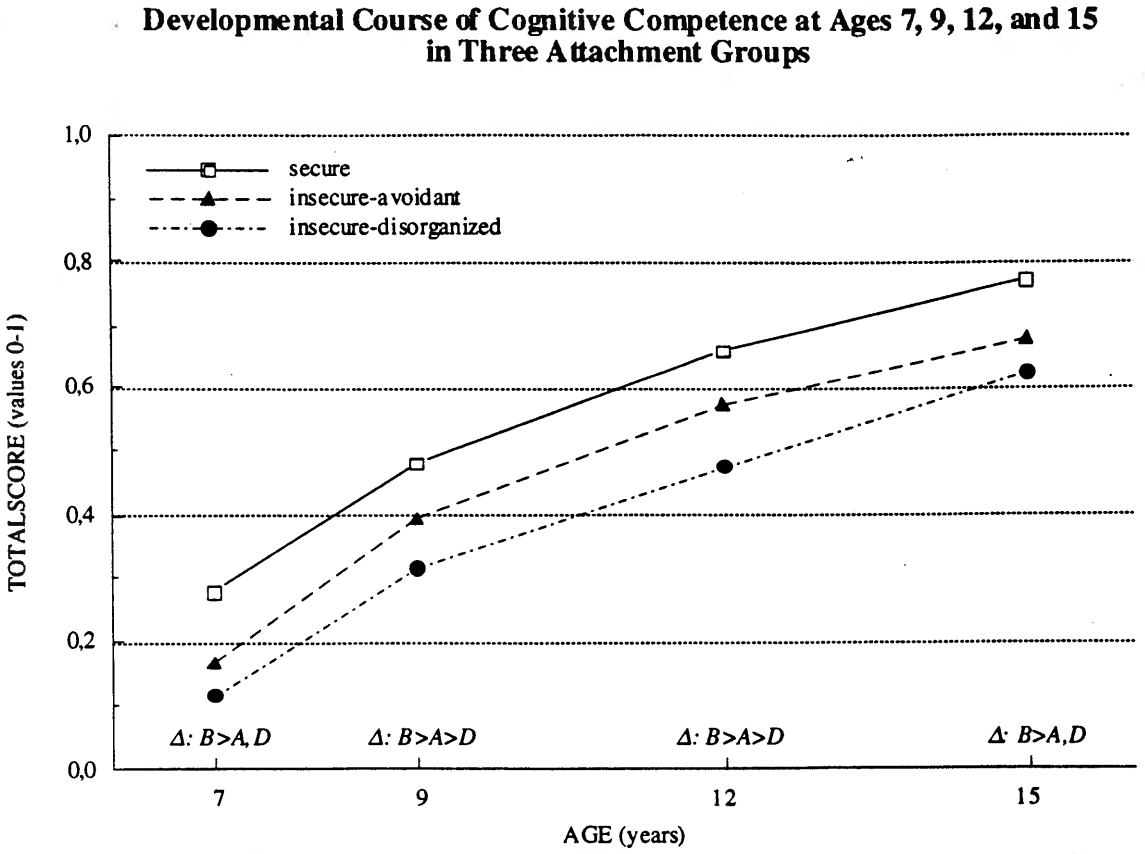


FIG. 2. Developmental course of cognitive competence at ages 7, 9, 12, and 15 in three attachment groups. Scores of 0.2-0.4 represent concrete operations; scores of 0.4-0.6 transitional; scores beyond 0.6 beginning formal operations. Δ = Results of post-hoc Duncan tests of group differences at each age level ($p < .05$): **B** = secure (n=39) ; **A** = insecure-avoidant (n=29); **D** = insecure-disorganized (n=17).

Developmental Course of Syllogistic Reasoning at Ages 9, 12, and 15 in Three Attachment Groups

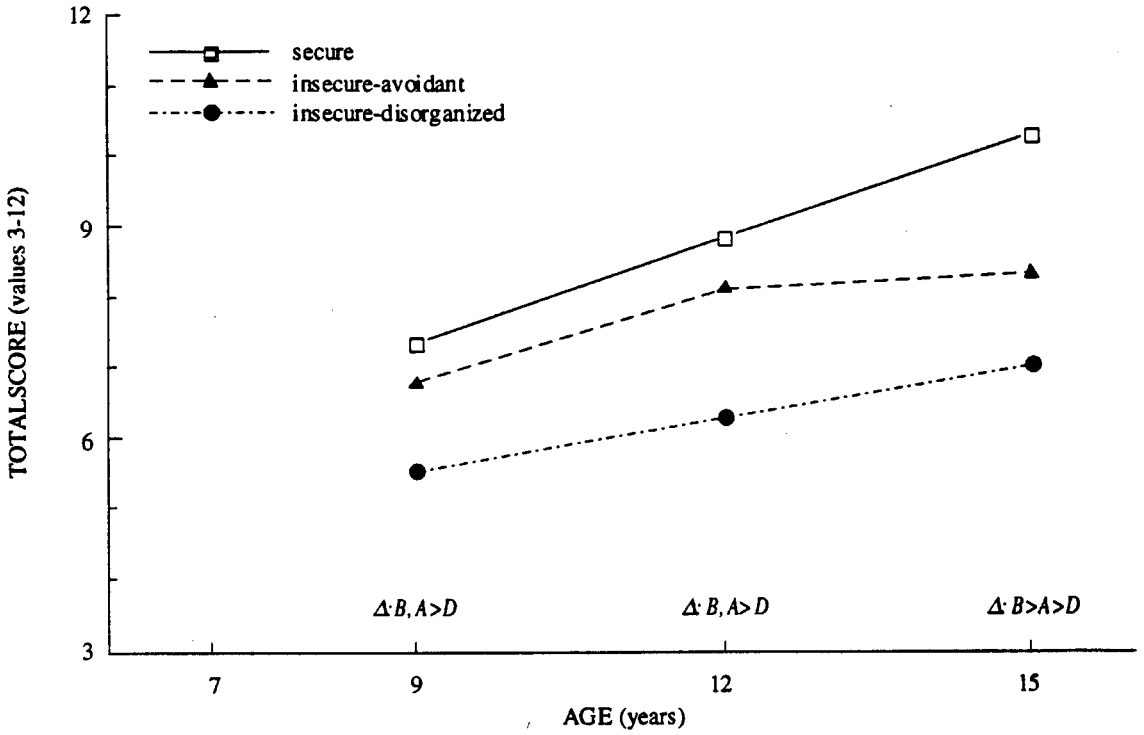


FIG. 3. Developmental course of syllogistic reasoning at ages 7, 9, 12, and 15 in three attachment groups. Scores between 3 and 6 represent preoperational performance; scores between 6 and 9 represent concrete operational performance; scores above 9 represent formal operations. Δ = Results of post-hoc Duncan tests of group differences at each age level ($p < .05$): **B** = secure (n=39); **A** = insecure-avoidant (n=29); **D** = insecure-disorganized (n=17).

In adolescence formal thought may indeed represent a challenge to explore multiple possibilities that call upon the individual to leave concrete reference behind. Insecure children may have added difficulties confronting the novelty and stress implied in a venture entirely within the abstract realm of the mind. In line with the theoretical considerations presented above, painful childhood experience with a deficient holding environment may evoke anxiety in the face of the challenge or failure to engage in the cognitive task.

This interpretation is borne out by two additional features, one relative to self, the other relative to object cognition. Above, we hypothesized that in the anxious and depressive the self was not cathected with positive affect. Some evidence for this is available for the insecure children: On a measure of self-worth, secure children earned significantly better scores: They had better feelings about themselves, and obtained significantly higher self-confidence ratings than both insecure-avoidant and insecure-disorganized children, who were worst off by far. There is evidence in the data that insecure-disorganized children use a disproportionate amount of contradictory responses, and increasingly so with increasing abstractness of task. Thus, contradictory responses attain 80% of all responses by insecure-disorganized children in the abstract syllogistic task, more than double the amount found in the concrete task, and more than four times the amount found among secure children. The insecure children thus show signs of low self-confidence, deficient cognitive regulation and an abnormal disequilibrium of thought under cognitive stress (Jacobsen, Edelstein & Hofmann, 1994).

What is the regime of experience that induces, in the child, the delay in cognitive development and the deficit in cognitive regulation that appear to be typical for the insecure children? Reverting once more to effects tied to objects of experience, mechanisms and outcomes, we may speculate that the process of accommodation, i.e., reaching out to novel epistemic experience, is adversely affected by an insecurity that curbs exploration. The necessary cathexis of epistemic objects may be withdrawn, and the developmental outcomes are found increasingly deficitary.

In the case of insecurity of attachment, then, the regime of experience in the close dyadic relationship of caretaker and child is upset, and with it the basic mechanism of epistemic relations with the world, placing the massive and frequently irrevocable constraints of an unpropitious epistemic working model on cognitive development.

Anxiety and Depression

We are rather well informed about the basic relationship structure that determines attachment and its consequences (Bowlby, 1969; Bretherton, this volume; Shaver, this volume; Sroufe, 1983). There is little evidence that maladaptive modes of attachment relate to inequalities in the system of opportunities available to families. In contradistinction, anxiety and depression that emerge uniquely in the group of insecurely attached children, are examples of risk factors that, through the social and psychological resources available to families tend to be connected with social class.

Typically, or in a more theoretical perspective normatively, the opportunity structure is biased against the lower class with regard to resources that provide developmental benefits. These resources include workload on parents, time for child, and educational level of mothers, as well as certain patterns of child rearing and intrafamiliar discourse. Interestingly, however, it is mainly atypical or non-normative conditions within social class that specifically explain the emergence of the risk factors of depression and anxiety in children. Families that differ from the relatively low level of educational aspiration characteristic of the lower class are at risk for anxiety. And in this class, a working mother represents a protective factor against depression. On the other hand, children from families that deploy high levels of punitive control strategies are at risk for depression in the middle class. Excessive control may provide the key to the mechanism producing these pathologies. Identical behavioral phenomena may thus acquire contrary meanings depending on their location in the social matrix, and their nonstandard deployment may unleash the developmentally maladaptive mechanism that generates constraints on accommodation, slowing down the role of cognitive growth and imposing a ceiling on developmental outcome (Edelstein, 1992).

The factors described differentiate families at risk for developmental pathology from non risk families. The gender-specific interaction between parents and children in situations of conflict regulation contributes towards the differentiation between the two risk conditions, anxiety and depression (Edelstein, 1992). Specifically, boys in lower class families with punitive fathers are predominantly affected by anxiety. In middle class children, boys with punitive fathers and girls with over-controlling mothers are predominantly affected by depression. Again, nonstandard levels of control in close relationships appear to be the key to the pathological condition.

In the longitudinal study mentioned above we compared the developmental trajectories of children who were consistently high on a measure of family anxiety (17%) derived from Sarason's General Anxiety Scale (Sarason et al., 1960) with children low on this measure throughout childhood and adolescence. Like the securely and insecurely attached children, these groups differ significantly and cumulatively in their course of cognitive growth as shown by the developing curve of the composite score of all Piagetian measures included in the study. The

difference, at age 15, exceeds one standard deviation and equals close to 3 years of developmental time (Fig. 4). Again, we find considerable differences in self-confidence between the groups (Schellhas, 1993).

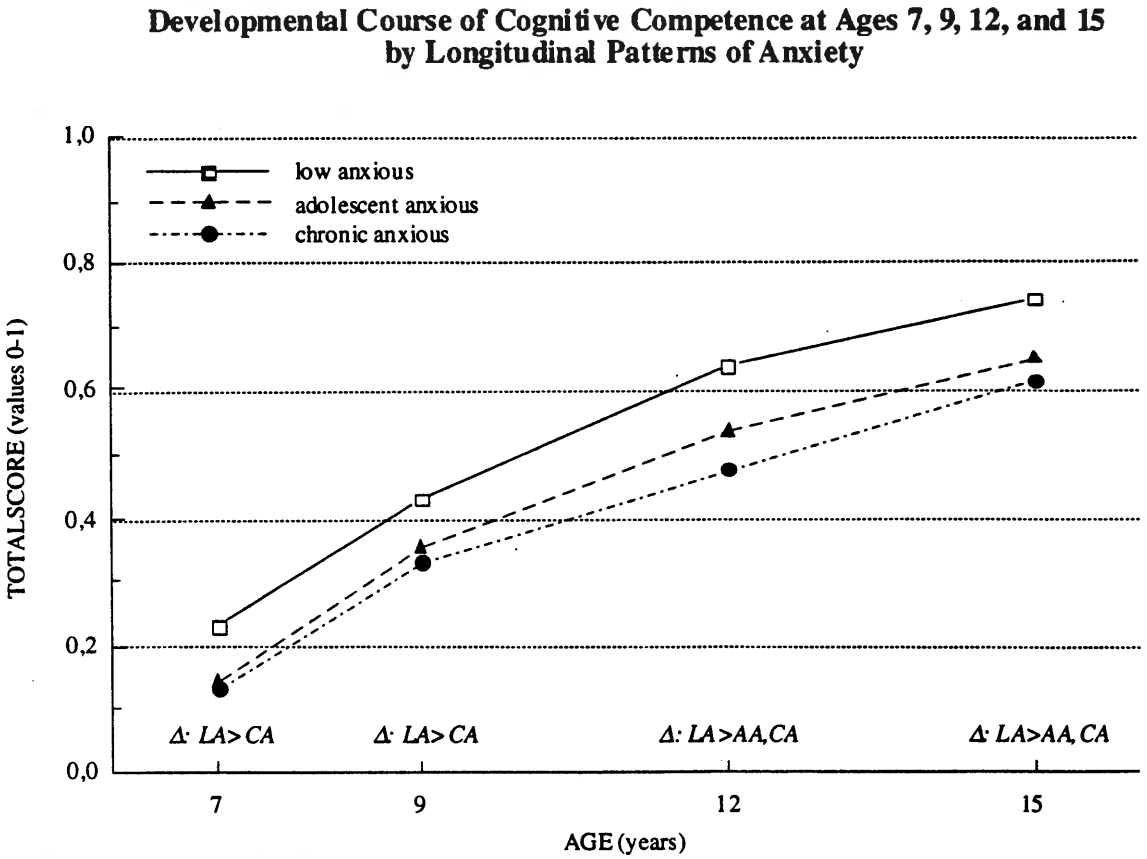


FIG. 4. Developmental course of cognitive competence at ages 7, 9, 12, and 15 by longitudinal patterns of anxiety. Scores of 0.2-0.4 represent concrete operations; scores of 0.4-0.6 transitional; scores beyond 0.6 beginning formal operations. Δ = Results of post-hoc Duncan tests of group differences at each age level ($p < .05$): LA = low anxious (n=55); AA = adolescent anxious (n=14); CA = chronic anxious (n=16).

Developmental Course of Cognitive Competence at Ages 7, 9, 12, and 15 by Longitudinal Patterns of Depression

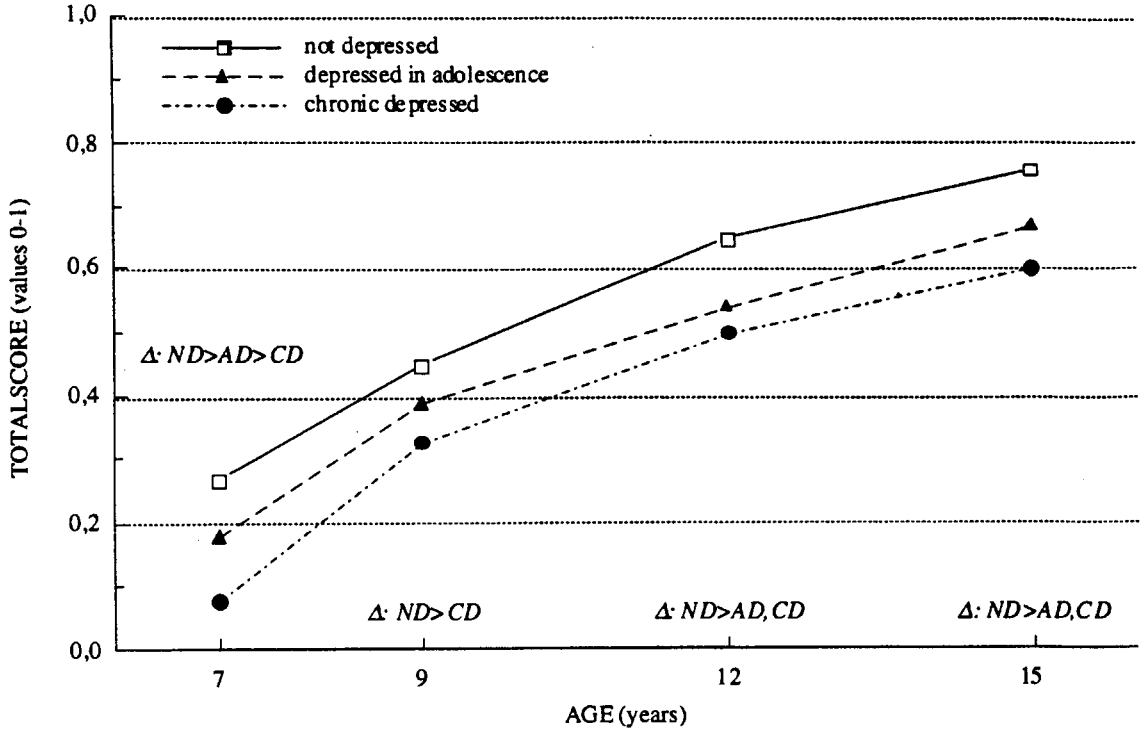


FIG. 5. Developmental course of cognitive competence at ages 7, 9, 12, and 15 by longitudinal patterns of depression. Scores of 0.2-0.4 represent concrete operations; scores of 0.4-0.6 transitional; scores beyond 0.6 beginning formal operations. Δ = Results of post-hoc Duncan tests of group differences at each age level ($p < .05$): **ND** = not depressed (n=43); **AD** = depressed in adolescence (n=14); **CD** = chronic depressed (n=21).

The children in the longitudinal study were also assessed for depression at four measurement occasions between ages seven and 15 (Hofmann, 1991). Children who were identified as consistently depressed throughout childhood and adolescence (about 25%) were compared with children either not depressed at all (roughly 50%), or depressed only in adolescence (16%). The results were strikingly similar to those reported for chronically anxious children (fig. 5). Again, the measure of self worth showed similar differences between the groups.

At this point, one should remind oneself of the relationship between attachment, anxiety and depression. They all derive from the vicissitudes of intimate relationships in childhood. Security of attachment, it will be remembered, provides a protective factor against the affective disorders represented by the latter. Yet, insecurity of attachment does predict neither anxiety nor depression, nor does depression predict anxiety. Anxiety and depression thus represent independent risk factors. Depressives are at risk for anxiety, but not necessarily so. Those who are, suffer additional vulnerability as expressed by increased cognitive delay. Considered alone, depression has the more massive consequences. Perhaps, we may speculate, anxiety leaves the individuals able to continue their efforts at the accommodation and assimilation of novel experience in spite of the impediments it puts in their way. In contradistinction, depression may withdraw the energizing affect altogether and subvert even the attempt to meet the world through the accommodatory activity of the subject's cognitive schemata.

Summary

The developmental vulnerabilities represented by attachment, anxiety and depression are substantive and quantifiable in terms of age equivalent years of developmental progress or incremental deprivations. They originate from different social contexts, some confined to dyadic relationships, others class-specific and collective. They all affect basic processes of cognition.

The findings presented in this chapter show the potential architecture of a theory configuration linking cognitive developmental theory with a psychology of personality and individual differences. On the antecedent side certain patterns of socializing interaction nested in specific social contexts produce risks for the development of the child's ability for successful epistemic interaction with the world. Vulnerabilities contracted in maladaptive relationships between caregiver and child affect the capacity to explore the world from a secure base and to manage self-confidence in the face of ambiguity and novelty. On the consequent side we reconstruct the unfolding effects of the developmental vulnerabilities in the course of cognitive growth.

The collective patterns of experience that provide the external conditions or socio-structural determinants of development merit a much closer look than is traditional within structural developmental theory. The cross-cultural near-universality of the basic Piagetian stage structures may have diverted our attention from the individual differences in rate, trajectory and outcome that obtain in groups exposed to different opportunity structures or different collective standards for the appraisal of their cognitive and social-cognitive worlds. Décalage systems and interindividual differences in intraindividual change provide a royal road towards understanding the dynamics of development under different regimes of experience. For a significant part, however, the dynamic is constituted by children's fate in close relationships that affect their lives from early on.

References

Ainsworth, M. D. S. (1990). Considerations regarding theory and assessment relevant to attachment beyond infancy. In M. Greenberg, D. Ciccetti, & M. Cummings (Eds.), Attachment in the preschool years (pp. 463-488). Chicago: University of Chicago Press.

American Psychiatric Association (1987). Diagnostic and statistical manual of mental disorders. 3rd. ed. revised (DSM III-R). Washington, DC: Author.

Baltes, P. B., & Schaie, K. W. (1973). On life-span developmental research paradigms: Retrospects and prospects. In P. B. Baltes, & K. W. Schaie (Eds.), Life-span developmental psychology: personality and socialization (pp. 366-395). New York: Academic Press.

Baumrind, D. (1986). Sex differences in moral reasoning: Response to Walker's (1984) conclusion that there are none. Child Development, 57, 511-521.

Berkowitz, M. W., & Keller, M. (1994). Transitional processes in social cognitive development: A longitudinal study. International Journal of Behavioral Development, 17, 447-467.

Bloom, B. S. (1964). Stability and change in human characteristics. New York: Wiley.

Bowlby, J. (1969). Attachment and loss: Vol. 1: Attachment. New York: Basic Books.

Bretherton, I. (1995). Internal working models of attachment and resilient coping. In G. Noam & K. Fischer (Eds.), Development and vulnerability in close relationships. Hillsdale, NJ: Erlbaum.

Bronfenbrenner, U., & Crouter, A. (1983). The evolution of environmental models in developmental research. In P. H. Mussen (Ed.), Handbook of child psychology (pp. 357-414). New York: Wiley.

Case, R., & Edelstein, W. (Eds.). (1993). The new structuralism in cognitive development. Theory and research on individual pathways. Basel: Karger.

Cassidy, J. (1988). Child-mother attachment and the self in six-year-olds. Child Development, 59, 121-134.

Cellérier, G. (1987). Structures and functions. In B. Inhelder, D. de Caprona, & A. Cornu-Wells (Eds.), Piaget today (pp. 15-36). Hillsdale, NJ: Erlbaum.

Chapman, M. (1988). Constructive evolution. Origins and development of Piaget's thought. Cambridge: Cambridge University Press.

Colby, A., Kohlberg, L., Speicher, B., Hewer, A., Candee, D., Gibbs, J., & Power, C. (1987). The measurement of moral judgment. Vol. II: Standard issue scoring manual. New York: Campridge University Press.

Colby, A., & Kohlberg, L. (1987). The measurement of moral judgment.: Vol 1. Theoretical foundations and research validation. New York: Cambridge University Press.

Cole, M., Gay, J., Glick, J. A., & Sharp, D. W. (1971). The cultural context of learning and thinking. New York: Basic Books.

Cole, M., & Scribner, S. (1974). Culture and thought. A psychological introduction. New York: John Wiley.

Damerow, P. (1994). Vorüberlegungen zu einer historischen Epistemologie der Zahlbegriffsentwicklung. In G. Dux (Ed.), Der Prozeß der Geistesgeschichte: Studien zur ontogenetischen und historischen Entwicklungslogik des Geistes (pp. 248-322). Frankfurt am Main: Suhrkamp.

Damon, W. (1984). Peer education: The untapped potential. Journal of Applied Developmental Psychology, 5, 331-343.

Dasen, P. (Ed.) (1977). Piagetian psychology. Cross-cultural contributions. New York: Gardner Press.

De Ribaupierre A., Rieben L., & Lautrey J. (1991). Developmental change and individual differences: A longitudinal study using Piagetian tasks. Genetic, Social and General Psychology Monographs, 111, 1, 285-311

Doise, W., & Mugny, G. (1984). The social development of the intellect. Oxford: Pergamon Press.

Edelstein, W. (1983). Cultural constraints on development and the vicissitudes of progress. In F. S. Kessel, & A. W. Siegel (Eds.), The child and other cultural inventions (pp.48-88). New York: Praeger.

Edelstein, W. (1992, September). Development and socialization. An interactionist account of the dynamics of development under social constraints. Invited address at the 5th European Conference of Developmental Psychology, Seville.

Edelstein, W. (1993). Soziale Konstruktion und die Äquilibration kognitiver Strukturen: Zur Entstehung individueller Unterschiede in der Entwicklung. In W. Edelstein, & S. Hoppe-Graff (Eds.), Die Konstruktion kognitiver Strukturen. Perspektiven einer konstruktivistischen Entwicklungspsychologie (pp. 92-106). Bern: Huber.

Edelstein, W. (1995) The social construction of cognitive development. In G. Noam & K. Fischer (Eds.), Development and vulnerability in close relationships. Hillsdale, NJ: Erlbaum.

Edelstein, W., & Hoppe-Graff, S. (Eds.). (1993). Die Konstruktion kognitiver Strukturen. Perspektiven einer konstruktivistischen Entwicklungspsychologie. Bern: Huber.

Edelstein, W., Keller, M., & Schröder, E. (1990). Child development and social structure: A longitudinal study of individual differences. In P. B. Baltes, D. L. Featherman, & R. M. Lerner (Eds), Life-span development and behavior, Vol. 10 (pp. 152-185). Hillsdale, NJ: Erlbaum.

Eichorn, D. H. (1981). Samples and procedures. In D. H. Eichorn, J. A. Clausen, N. Haan, M. P. Honzik, & P. A. Mussen (Eds.), Present and past in middle life. New york: Academic Press.

Elder, G. H. Jr. (1974). Children of the great depression. Chicago: University of Chicago Press.

Elder, G. H. Jr. (1984). Families, kin, and the life course: A sociological perspective. In R. D. Parke (Ed.), Review of child development research: The family (Vol. 7). Chicago: University of Chicago Press.

Elder, G. H. Jr., & Caspi, A. (1988). Human development and social change: an emerging perspective on the life course. In N. Bolger, A. Caspi, G. Downey, & M. Moorehouse (Eds.), Persons in context: Developmental processes. New York: Cambridge University Press.

Elder, G. H. Jr., & Liker, M. (1982). Hard times in woman's lives: Historical influences across 40 years. American Journal of Sociology, 88, 241-269.

Elder, G. H. Jr., Van Nguyen, T., & Caspi, A. (1985). Linking family hardship to children's lives. Child Development, 56, 361-375.

Garbarino, J. (1992). Children in danger. Coping with the consequences of community violence. San Francisco: Jossey Bass.

Gifi, A. (1981): Nonlinear. multivariate analysis. Leiden: Department of Data Theory, University of Leiden.

Gilligan, C. (1982). In a different voice. Cambridge: Harvard University Press.

Haan, N. (1977). Coping and defending. New York: Academic Press.

Hollos, M. (1974). Growing up in Flathill. Oslo: Universitetsforlaget.

Hollos, M., & Cowan, P. A. (1973). Social isolation and cognitive development: Logical operations and role-taking abilities in three Norwegian social settings. Child Development, 44, 630-641.

Hofmann, V. (1991). Die Entwicklung depressiver Reaktionen in Kindheit und Jugend. Eine entwicklungspathologische Längsschnittuntersuchung. Berlin: Sigma.

Inhelder, B. (1968). The diagnosis of reasoning in the mentally retarded. New York: Chandler.

Inhelder, B. (1989). Du sujet épistémique au sujet psychologique. (From the epistemic to the psychological subject). Bulletin de Psychologie, 42, 466-467.

Inhelder, B., & Piaget, J. (1958). The growth of logical thinking from childhood to adolescence. New York: Basic Books.

Inhelder, B., & Piaget, J. (1971). Closing remarks. In D. R. Green, M. P. Ford & G. B. Flamer (Eds.), Measurement and Piaget (pp. 210-213). New York: McGraw-Hill.

Jacobsen, T., Edelstein, W, & Hofmann, V. (1994). A longitudinal study of the relation between representations of attachment in childhood and cognitive functioning in childhood and adolescence.Developmental Psychology, 30, 112-124.

Kaplan, N. (1987). Individual differences in six-year olds thoughts about separation: Predicted from attachment to mother at age one year. Unpublished doctoral dissertation, University of California, Berkeley.

Keller, M. (1984). Resolving conflicts in friendship. The development of moral understanding in everyday life. In W. Kurtines, & J. Gewirtz (Eds.), Morality, moral behavior, and moral development (pp. 140-158). New York: Wiley.

Keller, M. (1990, June). Intra- and interindividual differences in social cognitive development: Results of a longitudinal study in 7 to 15 year old children. Paper presented at the Twentieth Annniversary Symposium of the Jean Piaget Society, Philadelphia.

Keller, M. (1992, May). Interpersonal and moral responsibilities in friendship and parent-child relationships. Paper presented at the invited symposium "Relationships and the development of moral reciprocity", 22nd Annual Symposium of the Jean Piaget Society, Philadelphia.

Keller, M. (1994). Moral und Beziehung: Die Entwicklung sozialer und moralischer Sensibilität von der Kindheit bis zum Jugendalter. Unveröffentlichte Habilitationsschrift, Max-Planck-Institut für Bildungsforschung, Berlin.

Keller, M., Eckensberger, L., & Rosen, K. von (1989). A critical note on the conception of preconventional morality: The case of stage 2 in Kohlberg's theory. International Journal of Behavioral Development, 12, 57-69.

Keller, M., & Reuss, S. (1984). An action-theoretical reconstruction of the development of social cognitive competence. Human Development, 27, 211-220.

Keller, M., v. Essen, C., & Reuss, S. (1984). Manual zur Entwicklung von sozio-moralischem Denken (Manual for scoring socio-moral reasoning). Unpublished manuscript, Max Planck Institute for Human Development and Education, Berlin.

Kohn M. L., & Schooler C. (1983). Work and personality: An inquiry into the impact of social stratification. New Jersey: Ablex Publishing Corporation.

Kohut, H. (1978). The search of the self: Selected writings of Heinz Kohut, 1950-1978 (P. Ornstein, Ed.). New York: International Universities Press.

Krappmann, L. (1991, April). Peer relationships and social competence: Culture specific performance or universal competence (or both)? Paper presented at the Symposium "Peer relationships and social skills in other cultures" at the SRCD Preconference on Peer Relationships, Seattle.

Krohne, H.W. (1985). Angstbewältigung in Leistungssituationen. Weinheim: VCH-Verlags-gesellschaft.

Lautrey, J. (1980). Classe sociale, milieu familial, intelligence. Paris: Presses Universitaires de France.

Macfarlane, J. W. (1938). Studies in child guidance. I. Methodology of data collection and organization. Monographs of the Society for Research in Child Development, 3 (Serial No. 6).

Main, M., & Hesse, E. (1990). Parents' unresolved traumatic experiences are related to infant disorganized attachment status: Is frightening and/or frightened parental behavior the linking mechanism? In. M. Greenberg, D. Cicchetti, & M. Cummings (Eds.), Attachment in the preschool years (pp. 161-182). Chicago: University of Chicago Press.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood and adulthood: A move to the level of representation. In I. Bretherton, & E. Waters (Eds.), Growing points in attachment theory and research. Monographs of the Society for Research in Child Development, 50(1-2), 66-104).

Mugny, G. (Ed.) (1985). Psychologie sociale du développement cognitif. Bern: Lang.

Oswald, H., & Krappmann, L.(1991). Der Beitrag der Gleichaltrigen zur sozialen Entwicklung von Kindern in der Grundschule. In R. Pekrun, & H. Fend (Eds.), Schule und Persönlichkeitsentwicklung (pp. 201-216). Stuttgart: Enke.

Perret-Clermont, A.-N. (1980). Social interaction and cognitive development in children. London: Academic Press.

Piaget, J. (1952). Jean Piaget. In E. G. Boring, H. S. Langfeld, H. Werner, & R. M. Yerkes (Eds.), A history of psychology in autobiography, Vol. 4. Worcester, Mass.: Clark University Press.

Piaget, J. (1970). Structuralism. New York: Basic Books.

Piaget, J. (1981). Intelligence and affectivity: Their relationship during child development. In T. A. Brown & C. E. Kaegi (Eds.), Annual Reviews Monograph. Palo Alto, Cal.: Annual Reviews Inc. (French original 1962).

Piaget, J. (1983). Meine Theorie der geistigen Entwicklung. Frankfurt/Main: Fischer.

Piaget, J., & Inhelder, B. (1977). Von der Logik des Kindes zur Logik des Heranwachsenden. Olten: Walter Verlag.

Radding, C. M. (1985). A world made by men. Chapel Hill: The University of North Carolina Press.

Sarason, S. B., Davidson, K. S., Lighthall, F. F., Waite, R. R., & Ruebush, B. K. (1960. Anxiety in elementary school children. New York: Wiley.

SAS Institute Inc. (1989). SAS/STAT User's Guide, Version 6, Fourth Edition, Volume 2. Cary, NC: SAS Institute Inc.

Schellhas, B. (1993). Die Entwicklung der Ängstlichkeit in Kindheit und Jugend: Befunde einer Längsschnittstudie über die Bedeutung der Ängstlichkeit für die Entwicklung der Kognition und des Schulerfolgs Berlin: Sigma.

Schröder, E. (1989). Vom konkreten zum formalen Denken. Individuelle Entwicklungsverläufe von der Kindheit bis zum Jugendalter. Bern: Huber.

Schröder, E., & Edelstein, W. (1991). Intrinsic and external constraints on the development of cognitive competence. In M. Chandler ,& M. Chapman (Eds.), Criteria for assessment: Controversies in the conceptualization and assessment of children's abilities. (pp. 131-152). Hillsdale, NJ: Erlbaum.

Schütz, A. (1982). Das Problem der Relevanz. Frankfurt am Main: Suhrkamp.

Seligman, M. E. P. (1975). Helplessness: on depression, development, and death. San Francisco: Freeman.

Shaver, P. R. (1995). Forms of adult attachment and their cognitive emotional underpinnings. In G. Noam & K. Fischer (Eds.), Development and vulnerability in close relationships. Hillsdale, NJ: Erlbaum.

Shweder, R.A. (1984). Ähnlichkeit und Korrelation im Alltagsleben: Magisches Denken in Persönlichkeitsurteilen. In T. Schöfthaler & D. Goldschmidt (Hrsg.), Soziale Struktur und Vernunft. Frankfurt / Main: Suhrkamp.

Snyder, S. S., & Feldman, D. H. (1984). Phases of transition in cognitive development: Evidence from the domain of spatial representation. Child Development, 55, 981-989.

Spitz, R. A. (1945). Hospitalism: an inquiry into the genesis of psychiatric conditions in early childhood. Psychoanalytic Study of the Child, 1, 153-172.

Spitz, R. A. (1946). Hospitalism: a follow-up report on investigation described in volume 1, 1945. Psychoanalytic Study of the Child, 2, 113-117.

Sroufe, L. A. (1983). Infant-caregiver attachment and patterns of adaptation in preschool: The roots of maladaptation and competence. In M. Perlmutter (Ed.), Minnesota Symposia on Child Psychology (Vol. 16). Hillsdale, NJ: Erlbaum.

Walker, L. J. (1991). Sex differences in moral reasons. In W. Kurtines, & J. Gewirtz (Eds.), Handbook of moral behavior and development, Vol. 2 (S. 333-364). Hillsdale, NJ: Erlbaum.

Walker, L. J., & Taylor, J. H. (1991). Stage transitions in moral reasoning: A longitudinal study of developmental processes. Developmental Psychology, 27, 330-337.

Youniss, J. (1980). Parents and peers in social development. Chicago: University of Chicago Press.

Youniss, J., & Damon, W. (1992). Social construction in Piaget's theory. In H. Beilin, & P. Pufall (Eds.), Piaget's theory (pp. 267-286). Hillsdale, NJ: Erlbaum.