DOCUMENT RESUME

ED 407 098 PS 025 235

AUTHOR Spiel, Christiane; And Others
TITLE Sex Differences in the Predictive Power of Risk Conditions for Cognitive Competence and Academic Achievement.
PUB DATE Apr 97
NOTE 7p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (62nd, Washington, DC, April 3-6, 1997).
PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; Age Differences; *At Risk Persons; Children; *Cognitive Ability; Elementary Education; Foreign Countries; Longitudinal Studies; Predictor Variables; *Risk; *Sex Differences
IDENTIFIERS Austria

ABSTRACT

This study examined the effects that cumulation of slight risks-prenatal up to adolescence-had on cognitive competence and school achievement in Austrian students who had not been identified as being at risk. Data were collected on 91 randomly selected 11- to 13-year-olds who participated in the Vienna Developmental Study, which analyzed conditions that facilitate or hinder the development of social competence and school achievement. The following risk conditions were included in the analysis: biological risks, socioeconomic status, hospitalization, severe strains or life events, and change of teacher. Regression analyses indicated that while school achievement and knowledge could be better explained from risk conditions in girls than in boys, performance could be better explained from risk conditions in boys than in girls. The development of girls seemed to be more influenced by biological conditions and hospitalization in the first year of life, while boys seemed to be more affected by life events and change of teachers, risk conditions that occurred later in life. (MDM)

SEX DIFFERENCES IN THE PREDICTIVE POWER OF RISK CONDITIONS FOR COGNITIVE COMPETENCE AND ACADEMIC ACHIEVEMENT

Christiane Spiel[1], Petra Wagner[2], and Ulrike Sirsch[2]
Department of Psychology
[1]University of Graz, [2]University of Vienna

Paper presented at the SRCD Meeting in Washington, DC, USA, April 3-6, 1997.

ABSTRACT

This study focuses on effects that cumulation of slight risks - prenatal up to adolescence - has on cognitive competence and school achievement in girls and boys who had not been identified as at risk. Data were collected for the Vienna Developmental Study (VDS) which analyzes conditions that facilitate or hinder the development of social competence and school achievement (Spiel, 1996).
The data analyzed for this study describe 91 randomly selected children and their families, 47 girls and 44 boys, all white, middle class. The following risk conditions were included in the analyses: biological risks, socio-economic status, hospitalization, severe strains or life events, and change of teacher. Using multiple regression, the gender-specific impact of risk conditions on outcome variables was analyzed. Results suggested gender specific effects both in portion of variance explained by risk conditions and in the predictive power of risk conditions.

Acknowledgements
This research was supported by the Austrian "Fonds zur Förderung der wissenschaftlichen Forschung" Grant No. P7630-SOZ and by the Johann Jacobs Foundation.

THEORETICAL BACKGROUND

Longitudinal studies of children at biological risks have shown great variability in developmental outcome (e.g., Cohen, Parmelee, Sigman, & Beckwith, 1988; Shonkoff, Hauser-Cram, Krauss, & Upshur, 1992). Whereas the prognostic significance of biological risk factors seems to decrease starting at about the age of three, the significance of psychosocial risk factors seems to increase. This applies in particular to performance variables. Boys were shown to be more vulnerable than girls to effects of both biological insults and caregiving deficits (e.g., Goodman, Brumley, Schwartz, & Purcell, 1993; Werner, 1990). However, little is known about the effects that multiple risks have on developmental outcome (Sameroff, Seifer, Baldwin, & Baldwin, 1993; Slee, 1993).

PROJECT GOALS

Identification of gender differences in

1) **risk conditions,**
2) **developmental outcome variables,**
3) **amount of variance explained by risk conditions, and**
4) **differential predictive power of risk conditions for developmental outcome.**

SUBJECTS

Data were collected for the **Vienna Developmental Study (VDS)** that analyzes conditions that facilitate or hinder the development of social competence and school achievement (Spiel, 1996). The first wave of data collection was conducted in 1981. A random sample of infants was drawn from day-care centers representatively located in Vienna, Austria. The data analyzed for this study describe 47 girls and 44 boys, all white, middle class. In 1992, mean subject age was 12.00 years, with a range from 11.22 to 13.06 years.

PREDICTOR VARIABLES

Information about all risk conditions was collected via interviews with parents.

Biological Risks. 21 pre- and perinatal risk factors were established in the interviews, including placenta function, gestation age, and birth weight. Because of the random nature of the sample only slight risks were observed. From this information a weighted biological risk score was established.

Socio-economic Status. From a number of socio-economic variables, length of maternal education and family income had significant effects on developmental outcome. Therefore, a socio-economic risk score was established that combined both variables.

Hospitalization in the first year of life. It was expected that both length of hospitalization and age of child when hospitalized have negative effects on developmental outcome. Previous analyses have shown that only hospitalization in the first year of life has effects on outcome variables.

Severe Strains and Life Events. Both, severe strains and life events, e.g. divorce of parents, death of a relative, can have negative effects on developmental outcome. Based on the interviews we established a life event score.

Change of Teacher. Entering kindergarten and starting grade school are normative developmental tasks in childhood. However, it was assumed that overly frequent changes of teachers can have negative effects on developmental outcome. Therefore, we counted for each child the number of changes of teachers.

OUTCOME VARIABLES

Cognitive Competence was assessed using the Adaptive Intelligence Test Battery (AID; Kubinger & Wurst, 1988) which is a revision of the Wechsler Intelligence Scale for Children. The AID was divided in two subscales that measure

- **Knowledge**, e.g. everyday knowledge, and
- **Performance**, e.g. digit span - number (parallel to Cattell's crystallized and fluid intelligence dimensions).

The division of the AID-subscales was confirmed by confirmatory factor analysis. As indicated by Kubinger and Wurst (1988), the knowledge subscales are more strongly influenced by parental support than the performance subscales.

School Achievement in fourth grade was operationalized using the mean score of the main school subjects, German Language and Mathematics; different school types were taken into account.

For **DATA ANALYSES multiple regressions** were performed separately for boys and girls.

RESULTS

ad 1) We found neither differences in risk conditions

ad 2) nor in outcome variables between boys and girls.

ad 3) However, regression analyses suggest gender-specific effects in the amount of variance explained by risk conditions, depending on the outcome variable under study (see Figure 1).

ad 4) In addition, the relative impact of risk conditions on developmental outcome was different for boys and girls (see Figures 2, 3 and 4).

SUMMARY AND DISCUSSION

In general, results suggest that risk conditions strongly affect developmental outcome both in girls and boys. However there are gender-specific patterns. While school achievement and knowledge can be better explained from risk conditions in girls than in boys, performance can be better explained from risk conditions in boys than in girls. The development of girls seems to be more influenced by biological conditions and hospitalization in the first year of life - risk conditions that occur early in life - boys seem to be more affected by life events and change of teachers - risk conditions that occur later in life.

REFERENCES

Cohen, S.E., Parmelee, A., Sigman, M., & Beckwith, L. (1988). Antecedents of school problems in children born preterm. *Journal of Pediatric Psychology, 13*, 493-507.

Goodman, S.H., Brumley, H.E., Schwartz, K.R. & Purcell, D.W. (1993). Gender and age in the relation between stress and children's school adjustment. *Journal of Early Adolescence, 13*, 329-345.

Kubinger, K.D. & Wurst, E. (1988). *Adaptives Intelligenzdiagnostikum (Adaptive Intelligence Diagnosticum).* Weinheim: Beltz.

Sameroff, A.J., Seifer, R., Baldwin, A., & Baldwin, C. (1993). Stability of intelligence from preschool to adolescence: The influence of social and family risk factors. *Child Development, 64*, 80-97.

Shonkoff, J. P., Hauser-Cram, P., Krauss, M. W., & Upshur, C. C. (1992). Development of infants with disabilities and their families: implications for theory and service delivery. *Monographs of the Society for Research in Child Development, 57,* 1-151.

Slee, P.T. (1993). Children, stressful life events and school adjustment: an Australian study. *Educational Psychology, 13*, 3-10.

Spiel, C. (1996). Long-term effects of minor biological and psychosocial risks on cognitive competence, school achievement, and personality traits. In S. Harel & J.P. Shonkoff (Eds.), *Early childhood intervention and family support programs: Accomplishments and challenges* (pp. 223 - 242). Jerusalem: JDC - Brookdale Institute of Gerontology and Human Development..

Werner, E.E. (1990. Protective factors and individual resilience. In S.J. Meisels & J.P. Shonkoff (Eds.), Handbook of early childhood intervention (pp. 97-116). Cambridge: Cambridge University Press.

Authors' addresses: Christiane Spiel[1], Petra Wagner[2], Ulrike Sirsch[2]

[1]Department of Psychology, University of Graz
Universitätsplatz 2, A-8010 Graz; Tel. +43 316 386092

[2]Department of Psychology, University of Vienna
Liebiggasse 5/1, A-1010 Vienna; Tel. +43 1 40103/2932

Figure 1: Regression Analyses

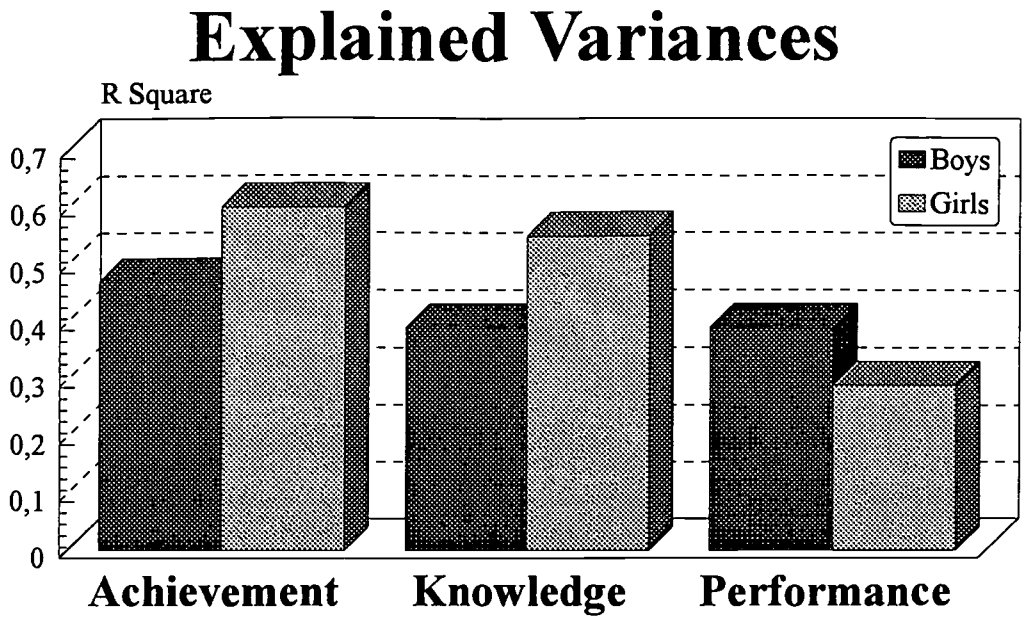
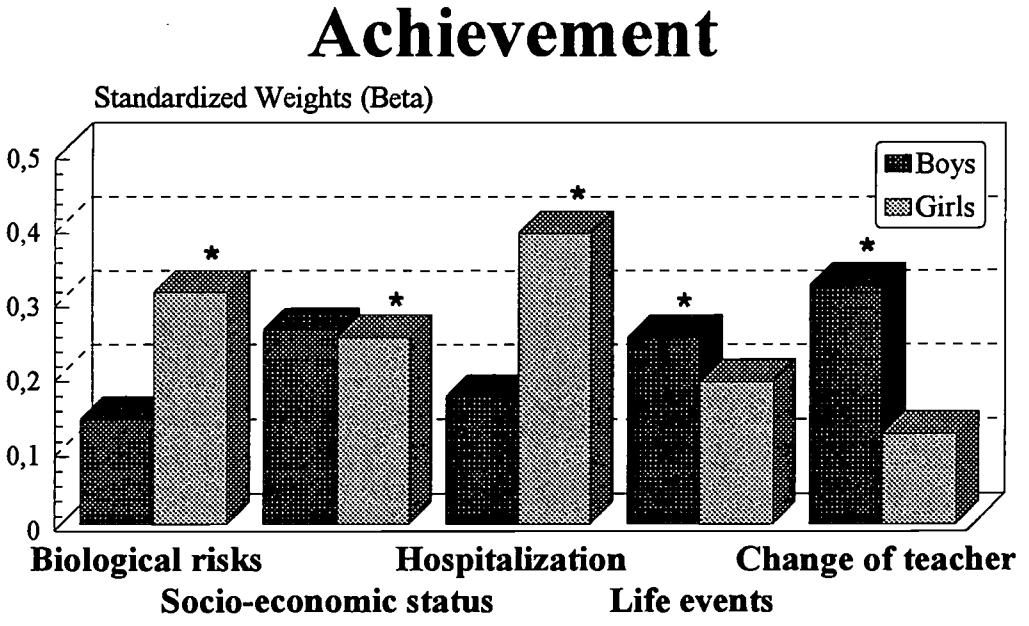
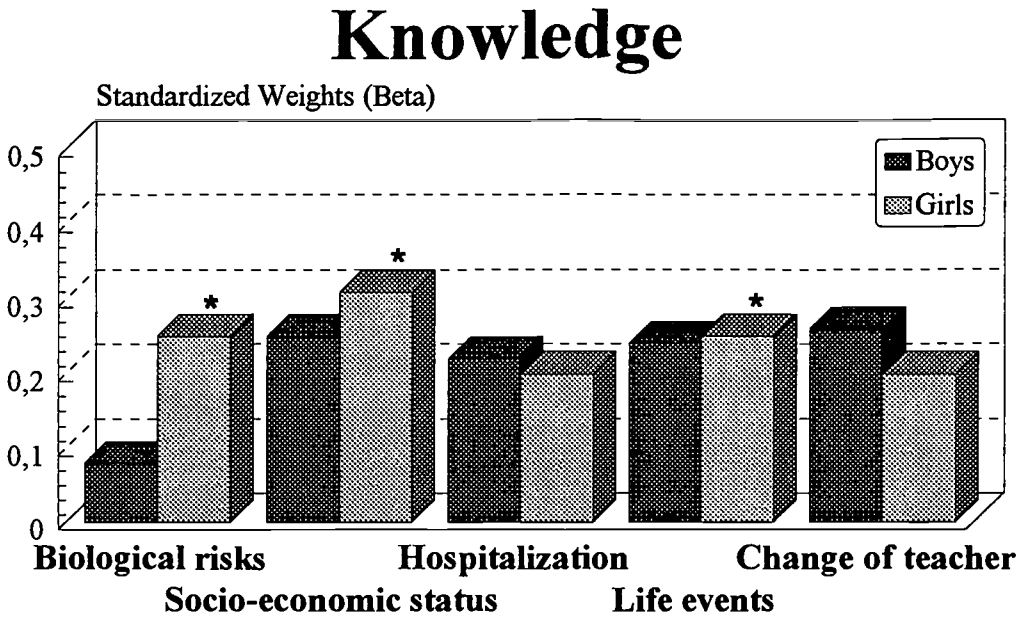


Figure 2: Regression Analysis



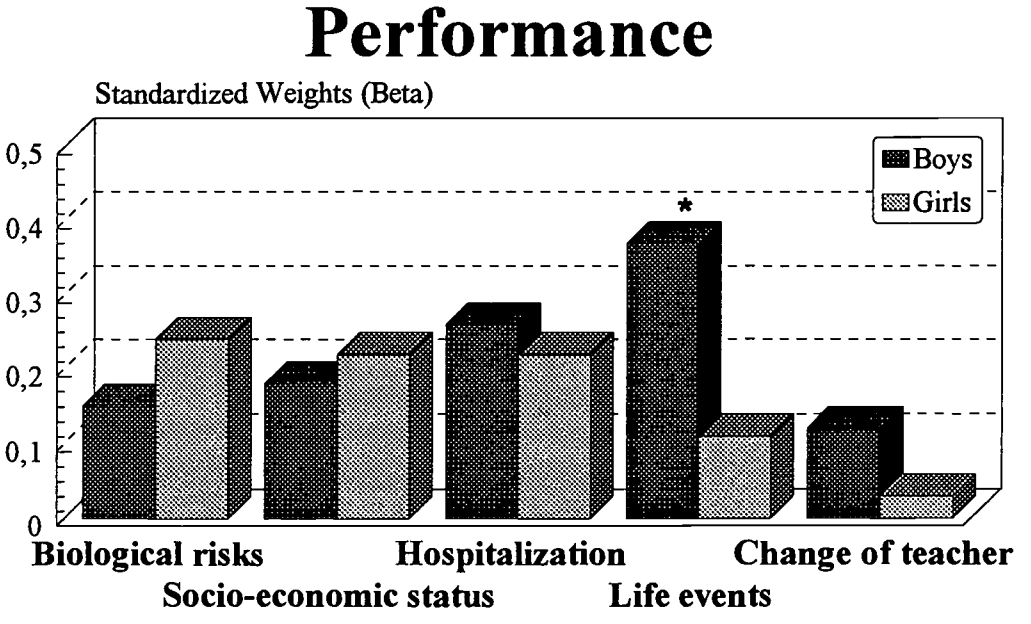
* = sign. with Alpha=5%

Figure 3: Regression Analysis



* = sign. with Alpha=5%

Figure 4: Regression Analysis



* = sign. with Alpha=5%

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
Educational Resources Information Center (ERIC)

ERIC®

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: Sex differences in the predictive power of risk conditions for cognitive competence and academic achievement	
Author(s): Christiane Spiel, Petra Wagner & Ulrike Strodl	
Corporate Source:	Publication Date:

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic/optical media, and sold through the ERIC Document Reproduction Service (EDRS) or other ERIC vendors. Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following two options and sign at the bottom of the page.

	The sample sticker shown below will be affixed to all **Level 1** documents	The sample sticker shown below will be affixed to all **Level 2** documents	
Check here **For Level 1 Release:** Permitting reproduction in microfiche (4" x 6" film) or other ERIC archival media (e.g., electronic or optical) *and* paper copy.	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)	PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN OTHER THAN PAPER COPY HAS BEEN GRANTED BY Sample TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)	Check here **For Level 2 Release:** Permitting reproduction in microfiche (4" x 6" film) or other ERIC archival media (e.g., electronic or optical), but *not* in paper copy.
	Level 1	**Level 2**	

Documents will be processed as indicated provided reproduction quality permits. If permission to reproduce is granted, but neither box is checked, documents will be processed at **Level 1**.

"I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic/optical media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries."

Sign here→ please

Signature:	Printed Name/Position/Title: CHRISTIANE SPIEL, Ph.D. Professor	
Organization/Address: Department of Psychology University of Graz Universitätsplatz 2, A-8010 Graz	Telephone: +43 316-380 5123	FAX: +43 316 380 9809
	E-Mail Address: CHRISTIANE.SPIEL@KFUNIGRAZ.AC.AT	Date:

PS 02535

Return to: ERIC/EECE, Children's Research Center, 51 Gerty Drive, Champaign, IL 61820-7469 (over)

5.4.97