

# Variation in Developmental Process as a Function of Siblings Consensus on Parental Monitoring and Peer Group Characteristics

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## Abstract:

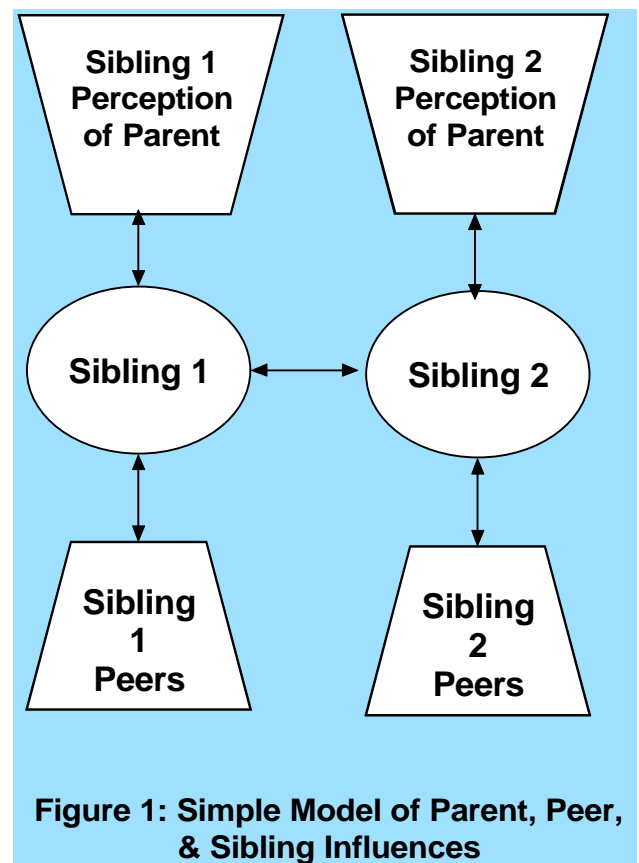
A person-centered approach was used to assess the extent to which the influences of developmental processes vary across four family niches. Niches were defined according to the similarity of sibling dyads on parent and peer characteristics. Two hypotheses were tested. *First, it was hypothesized that facilitative processes would be most powerful in niches where parent, peer, and sibling influences all operated in conjunction with one another.* Concretely, it was predicted that parental monitoring, sibling GPA, and peer GPA would be more strongly associated with individual GPA in niches where siblings were similar in both monitoring and peer group characteristics. *Second, it was hypothesized that buffering processes would be most powerful in niches where there was a disjunction between the buffering process and risk factor and least powerful in niches where there was a conjunction of processes.* Concretely, it was predicted that parental monitoring would be most strongly associated with substance use in niches where siblings experienced similar parenting but had dissimilar peer groups and that sibling and peer substance use would be most strongly associated with substance use in niches where all processes operated in the same direction. A series of HLM analyses confirmed both hypotheses.

## Introduction

***The influence of parents, siblings, and peers.*** Adolescents are exposed to numerous social influences that might foster the development of academic performance or increase the likelihood that they will use alcohol or other drugs. Figure 1 shows a simple model of potential social influences experienced by two siblings in a family. In this model, each sibling is influenced by the other, by their own perception of the parenting they receive, and by their own peer groups.

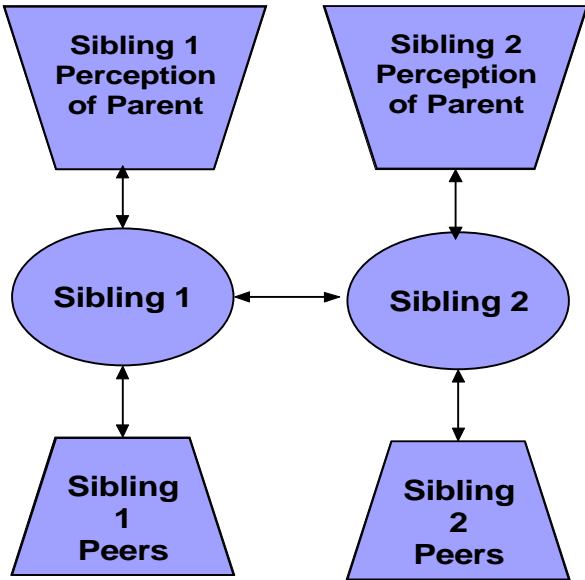
Contextualists (e.g. Bronfenbrenner & Morris, 1998; Magnusson & Stattin, 1998) have argued that the strength of each of these processes will vary systematically as a function of the others. For example, the relationship between parental monitoring and Sibling 1's GPA might vary as a function of Sibling 2's GPA and Sibling 1's peers' GPAs.

Although this type of hypotheses have typically been tested using interaction terms in standard regression models, such interaction terms do not capture systemic characteristics that are important to understanding developmental processes. Magnusson (1998) argues that by focusing on individual variables or the interaction of variables, we ignore important information about the naturally occurring interrelationship of environmental features and the functioning of developmental processes within particular settings. To use Bronfenbrenner's (1998) metaphor, the same process might be expected to function quite differently in different ecological niches, just as drought will have a different effect on plants in a desert environment than plants in a swamp. Such systemic differences may not be reflected in the statistical interaction between rainfall and individual properties along which these two ecological niches vary.



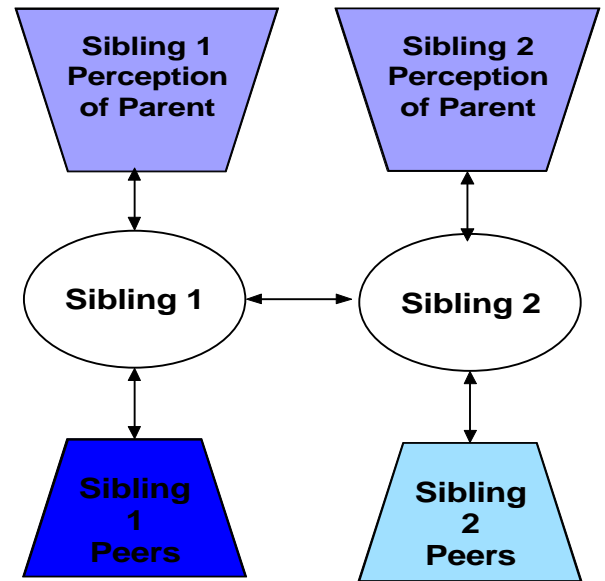
***System properties: Conjunction & Disjunction.*** Bronfenbrenner (1971, 1989) has argued that the strength of

individual developmental processes will be strongest when all processes within the system are moving the developing person in the same direction (a condition we will refer to as 'conjunction'). As illustrated in the figures below, families differ in the extent to which they are characterized by conjunction.

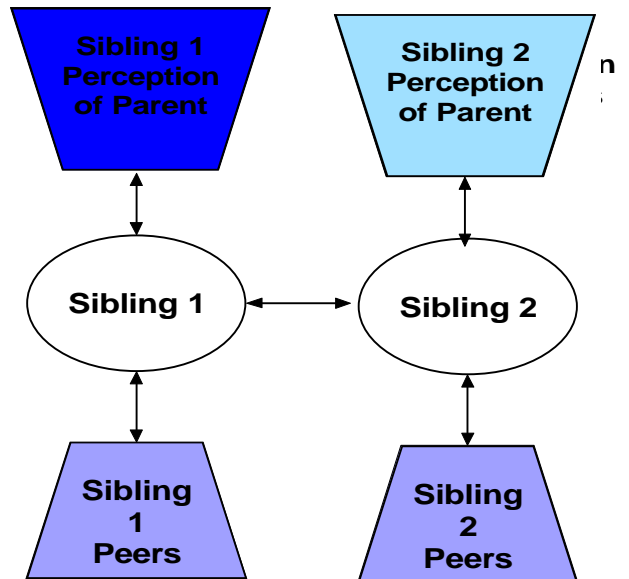


**Niche 1: Sibling Dyads Similar in Monitoring & Peers**

**Niche 2: Disjunction between parent and peer influences: parents similar.** Both siblings might experience high monitoring, but one sibling will have high achieving and one sibling low achieving peers. Alternatively, both siblings will experience low monitoring and their peers will differ. In this niche, you have a lack of responsiveness to apparent sibling differences from parents, but responsiveness in the peer group.



**Niche 3: Disjunction between parent and peer influences: peers similar.** Both siblings might have high achieving peers, but one sibling will experience high and one low monitoring. Alternatively, both siblings might have low achieving peers and experience different levels of monitoring. In this situation, you have a lack of responsiveness to apparent sibling differences from peers, but responsiveness from parents.

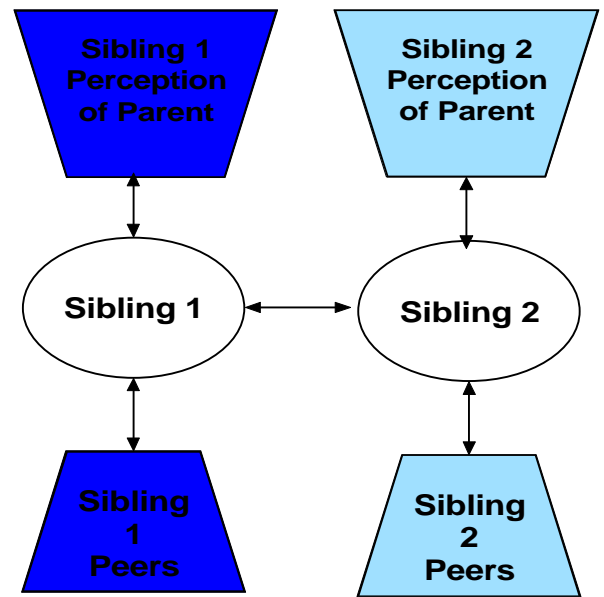


**Niche 3: Sibling Dyads Disimilar in Monitoring & Similar in Peers**

**Niche 1: Conjunction of sibling, parent, and peer processes.** Individuals might experience high parental monitoring, and have peers and siblings who achieve academically. Alternatively, individuals may experience low monitoring and have peers and siblings who do not achieve academically.

**Niche 4: Conjunction between parent and peer processes/Disjunction between siblings.**

Siblings differ both in their monitoring and their peer groups. This is most likely to occur when siblings differ from one another and this difference is reflected in the environment they experience both inside and outside the family.



**Niche 4: Sibling Dyads Disimilar in Monitoring & Peers**

Bronfenbrenner predicts that developmental processes will be strongest when they are operating in conjunction, all influencing adolescents in the same direction (as in Niche 1). Such processes might be said to be *facilitative*, in that each is positively correlated with the outcome of interest (GPA), even in the absence of other processes, and each process complements the other. The first goal of this paper is to test this hypothesis.

**Question 1:** Are facilitative processes strongest in niches where parent, peer, and sibling influences all operate in conjunction?

**Hypothesis 1:** Yes. Concretely, parental monitoring, sibling GPA, and peer GPA will be more strongly associated with individual GPA in niches where siblings are similar in both monitoring and peer group characteristics (Niche 1). They will be least powerful in niches where there is a disjunction between the direction of parent and peers influence (Niches 2 & 3).

**Facilitative v. Buffering Processes.** Do buffering processes work the same way? Buffering processes work by disrupting other processes. For example, parental monitoring buffers adolescents from substance use by disrupting processes of peer and sibling influence. In the absence of a risk factor (i.e. peer or sibling substance use), there should be no relationship between parental monitoring and adolescent substance use.

Because buffering processes operate only in the presence of risk, they should operate most powerfully in niches characterized by a disjunction between processes: i.e. in niches where parent processes are less highly correlated with peer or sibling processes. The second goal of this paper is to examine this question.

**Question 2:** Are buffering processes strongest in niches where there is a disjunction between parent, peer, and sibling influences?

**Hypothesis 2:** Yes. Buffering processes will be most powerful in niches where there is a disjunction between the buffering process and risk factor and least powerful in niches where all processes operate in the same direction. Concretely, parental monitoring will be most strongly associated with substance use in niches where siblings experience similar parenting but have dissimilar peer groups (Niche 2) and sibling and peer substance use will be most strongly associated with substance use in niches where all processes operate in the same direction (Niche

## Methods

***Procedure:*** During the 1988-1989 academic year, all students in 6 California high schools were asked to complete a series of questionnaires. Approximately 85% of students agreed to participate in the study and were in school on each of the two days the questionnaires were administered.

***Sample:*** Student addresses were obtained from the school. Students with the same last name and address were identified as sibling dyads. Only sibling dyads from intact families were retained for these analyses. Of the 516 sibling dyads identified in the sample, 67.8% (350) were from intact families. Of these, 22.7 % (117) were boy-boy, 26.9% (139) girl-girl, and 50.4 % (260) mixed-sex dyads.

### Measures:

***GPA:*** Students were asked to list the last report card grade they received in math, science, English, and social studies, with "0" indicating an F and "4" indicating an A. Answers for each of the four classes were averaged. Previous work indicates that self-reported grades and actual grades taken from official school records are highly correlated ( $r = .80$ ) (Donovan & Jessor, 1985; Dornbusch et al., 1987).

***Substance Use:*** Adolescent *substance use* was assessed using three questions asking respondents to report how often they used alcohol, smoked marijuana, or used a drug other than marijuana since the beginning of school year on a four point scale from 1 (Never) to 4 (Often). A measure of substance use was derived from this information, in which adolescents were classed on a 5 point scale from non-users of either drugs or alcohol, experimenters with alcohol only, experimenters with marijuana and/or alcohol, regular alcohol or marijuana users, or experimenters with drugs other alcohol or marijuana. These five categories were used as a linear variable of substance use.

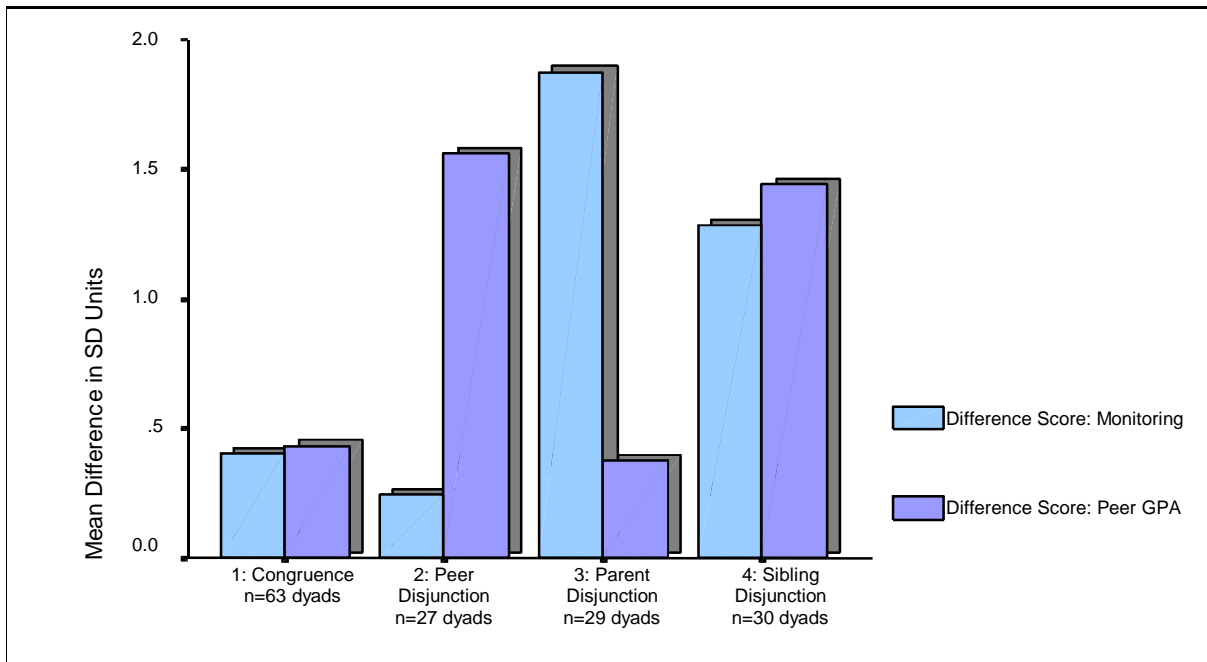
***Age:*** Each student indicated the year in which they were born.

***Monitoring:*** Parental monitoring was assessed using a standard 5 question monitoring questionnaire (Patterson & Stouthamer-Loeber, 1984). Sample item: "How much do your parents REALLY know . . . Where you are most afternoons after school?" Adolescents responded on a three point scale, with 1 representing "Don't know" and 3 representing "Know a lot".

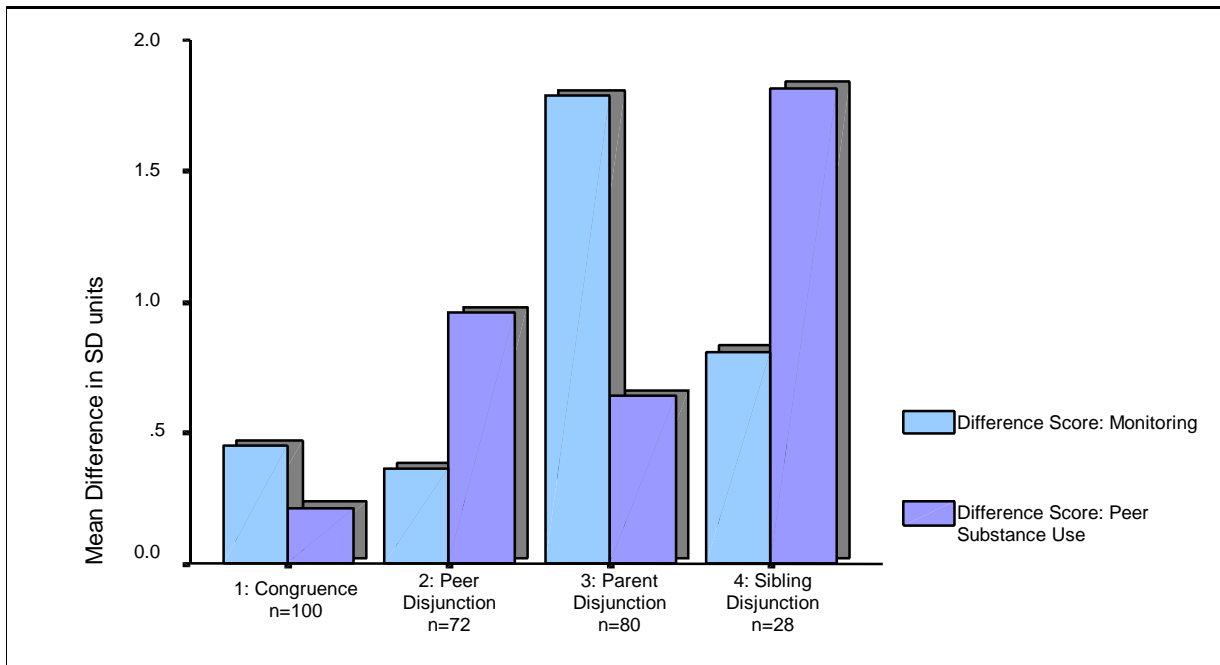
***Sibling GPA, substance use, and monitoring:*** The GPA, substance use, and parental monitoring reported by the identified sibling was used to measure GPA and monitoring.

***Peer GPA and substance use.*** Each student was asked to name up to 5 close friends from school. These friends were identified and information from their surveys was used to calculate mean GPA and mean substance use.

***Family Niche Type:*** A 3 stage procedure was used to classify sibling dyads according to family niche type. First, all variables were standardized into standard deviation units (z-scores). Difference scores were calculated on sibling monitoring, sibling peer GPA, and sibling peer substance use by taking the absolute difference of the respective sibling scores. These difference scores thus reflect the difference between siblings in standard deviation units. Finally, K-means cluster analysis was used to classify dyads into one of the four family niche types described above. This procedure was carried out separately for substance use and GPA. For the purpose of defining initial cluster centers, sibling characteristics were considered different if they were 2 standard deviations apart from each other and similar if they were identical. Descriptive statistics of the parent and peer characteristics of sibling dyads in each niche are presented in Figures 2 & 3.



**Figure 2: Monitoring & Peer GPA Family Niches**



**Figure 3: Monitoring & Peer Substance Use Family Niches**

## Results

**Question 1:** Are facilitative processes strongest in niches where parent, peer, and sibling influences all operate in the same direction?

A series of HLM analyses were carried out for all siblings and separately for each cluster. GPA was predicted for parental monitoring, peer GPA, and sibling GPA controlling for birth year. Results are reported in Table 1.

*As predicted, Niche 1, where all facilitative processes (parental monitoring, sibling GPA, and peer GPA) are working in conjunction, shows the clearest pattern of relationship between process and outcome. Not only do all three variables predict GPA only in that niche, but friend and sibling GPA are more strongly associated with GPA in that cluster than in any other.*

*Niches 2 and 3, where there is a disjunction between parent, sibling, and peer characteristics, show the weakest pattern of relationship.*

Table 1. HLM Results with GPA as an outcome variable<sup>1</sup>.

	All Clusters		Niche 1: Congruence		Niche 2: Peer Disjunction		Niche 3: Parent Disjunction		Niche 4: Sibling Disjunction	
intercept	-3.83		-2.65		7.30		-7.70		-10.33	
age	.06*		.03		-.08		.12#		.16*	
monitoring	.17*		.26#		-.17		.05		.30	
peer GPA	.50***		.61***		.51**		.46*		.38*	
sibling GPA	.24***		.28**		.08		.16		.18	
n	298		126		54		58		60	
	Level 1	Level 2	Level 1	Level 2	Level 1	Level 2	Level 1	Level 2	Level 1	Level 2
Base Model Variance	0.20708	0.29362	0.28827	0.19246	0.07995	0.43981	0.14594	0.31466	0.14914	0.35417
Current Model Variance	0.00332	0.33771	0.00234	0.2489	0.03752	0.40393	0.00786	0.36916	0.00368	0.38671
% Variance Explained	41.36	58.64	59.98	40.02	15.38	84.62	31.68	68.32	29.63	70.37

<sup>1</sup> HLM analyses calculate the equivalent of a regression equation, allowing for the lack of independence of sibling pairs. The reported statistics are equivalent to non-standardized regression coefficients. Analyses were carried out with variables uncentered and assume equivalence of regression slopes across dyads.

**Question 2: Are buffering processes strongest in niches where there is a disjunction between parent, peer, and sibling influences?**

A series of HLM analyses were carried out for all siblings and separately for each cluster. Substance use was predicted for parental monitoring, peer substance use, and sibling substance use controlling for birth year. Results are reported in Table 2.

*As predicted, parental monitoring is most strongly associated with substance use in Cluster 2, where there is a disjunction between parent, sibling, and peer characteristics and parents are perceived as monitoring similarly, despite disparity in sibling peer group characteristics. Peer characteristics are not associated with substance use in this group, supporting the buffering interpretation. Interestingly, in Cluster 3, monitoring is not predictive, although siblings belong to similar peer groups. Contrary to the hypothesis, peer group characteristics were not more strongly associated with substance use in Niche 1.*

Table 2. HLM Result with Substance use as an outcome variable<sup>2</sup>.

	All Niches	1 parents same friends same		2 parents same friends different		3 parents different friends same		4 parents different friends different		
intercept	7.05	4.59		10.69		13.64		12.05		
age	-.08*	-.05		-.11		-.18*		-.16		
monitoring	-.32**	-.41*		-.87*		-.19		-.23		
peer sub. use	.71***	.71***		.45**		.76***		.70***		
sibling substance use	.09#	.02		.11		.08		.30*		
n	280	100		72		80		28		
	Level 1	Level 2	Level 1	Level 2	Level 1	Level 2	Level 1	Level 2	Level 1	Level 2
Base Model Variance	0.4325	0.83929	0.45622	0.7907	0.35238	0.79167	0.26955	0.825	0.42857	1.1786
Current Model Variance	0.00928	0.69946	0.01845	0.79223	0.01896	0.85236	0.00199	0.5639	0.01598	0.47561
% Variance Explained	34.01	65.99	36.59	63.41	30.8	69.2	24.63	75.37	26.67	73.33

## Discussion

These results are consistent with two major hypotheses about systemic variation in the strength of developmental processes:

1. Facilitative developmental processes are strongest in niches where socializing influences operate towards the same goal (i.e. in conditions of conjunction).
2. Buffering developmental processes are strongest in niches where there is a disjunction between the buffering processes and the risk factor.

In addition, these results illustrate the benefits of a person-centered approach to the study of developmental processes.

<sup>2</sup> HLM analyses calculate the equivalent of a regression equation, allowing for the lack of independence of sibling pairs. The reported statistics are equivalent to non-standardized regression coefficients. Analyses were carried out with variables uncentered and assume equivalence of regression slopes across dyads.