Biopsychosocial models of Adolescent Risk Taking

I. INTRODUCTION
A. Introduction

- How can we understand the relation between individual (biological and psychological) and social contextual factors in risk taking?
  - It is too simple to say that individual and social contextual factors are independent of each other.
    - Scarr's notion of an phenotype-based search for compatible environments (niche-picking) shows that they interact.
    - Environmental factors may also affect the expression of genes as in the case of menarche and secondary sex characteristics.
- We need a conceptual model integrating endogenous and exogenous factors

I. INTRODUCTION
A. Introduction

- A Biopsychosocial model offers such an account of dynamic interactions between endogenous and exogenous factors.
  - A BPS model was first presented by Engel (1977) as an alternative to the medical model of illness.
    - The medical model holds that disease is a deviation from a norm of measured biological variables.
      - Reducing disease to biochemistry is problematic because of the role of environmental factors in the onset, expression, and course of disease
    - According to Engel, interactions between the biological, psychological, and social factors in "patienthood" help in understanding when such maladies as "grief" is a disease.

I. INTRODUCTION
A. Introduction

- Applying the Biopsychosocial model to adolescent risk taking involves considering endogenous and endogenous *interactions* in the onset, expression, and course of such behavior.
  - At the center of the model is the individual with biological (genetic and hormonal) and psychological (cognitive and moral regulation) factors that promote or inhibit risk taking.
  - Operating on and interacting with individual factors are social contextual ones which also promote or inhibit risk taking.

I. INTRODUCTION
   B. Perspectives on the Model

- There appears to be two ways to conceptualize a Biopsychosocial model.
  - On the one hand, the model can be presented from **THE PERSPECTIVE OF THE ADOLESCENT**.
    - Such a model would focus on factors affecting the adolescents behavioral system and their _perceptions_ of micro, exo and macrosystems.
  - Measuring such factors and perceptions would offer a biopsychosocial model of risk taking by examining how the behavioral system interacts with the perceived environment to result in risk taking.

I. INTRODUCTION
B. Perspectives on the Model

- Irwin and Millstein (1986) offer such a model of risk taking which brings together two elements: Biological causes of psychosocial functioning and the risk taking consequences of psychosocial functioning.
  - They assume biological maturation affects psychosocial functioning which in turn has four consequences for risk taking:
    - 1. Cognitive scope
    - 2. Self perceptions
    - 3. Perceptions of the social environment
    - 4. Personal values
  - The four psycho-social factors influence peer group selection (social context factor) and risk perception (cognitive factor).
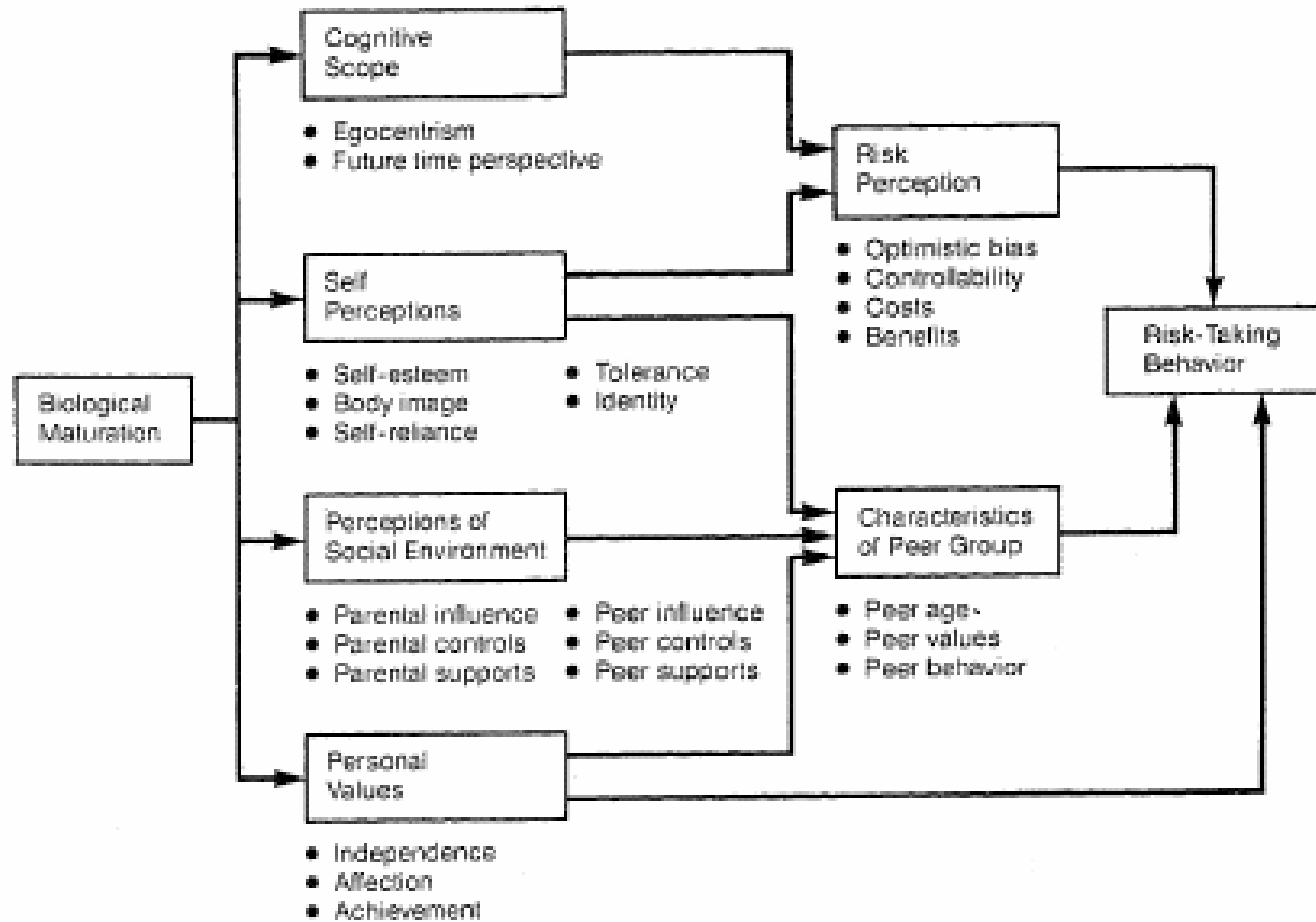
I. INTRODUCTION
A. Introduction

FIG. 5.1. Causal model of adolescent risk-taking behavior. Adapted and modified from Irwin & Millstein (1986).

I.   INTRODUCTION
B. Perspectives on the Model

- The second conceptualization of a Biopsychosocial model is from the **PERSPECTIVE OF THE EXPERIMENTER.**
  - Such a model focuses on more objective than subjective descriptions of the biopsychosocial factors.
    - Descriptions of the self system (including biological, psychological and behavioral processes) family system (structure and process), extrafamily system (peers, schools, neighborhoods and culture).
  - Measuring such factors objectively would offer a biopsychosocial model of risk taking by examining how specific characteristics of a given factor interacts with other factors to result in risk taking.

I. INTRODUCTION
B. Perspectives on the Model

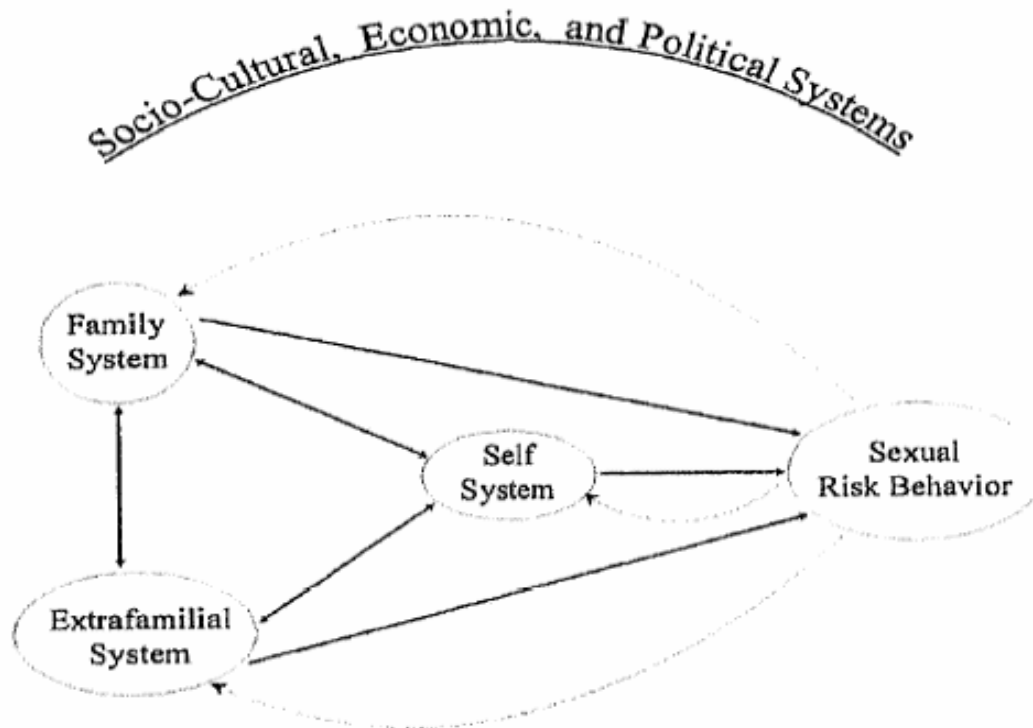- Kotchick et al., (2001) offers such a biopsychosocial model sexual risk taking

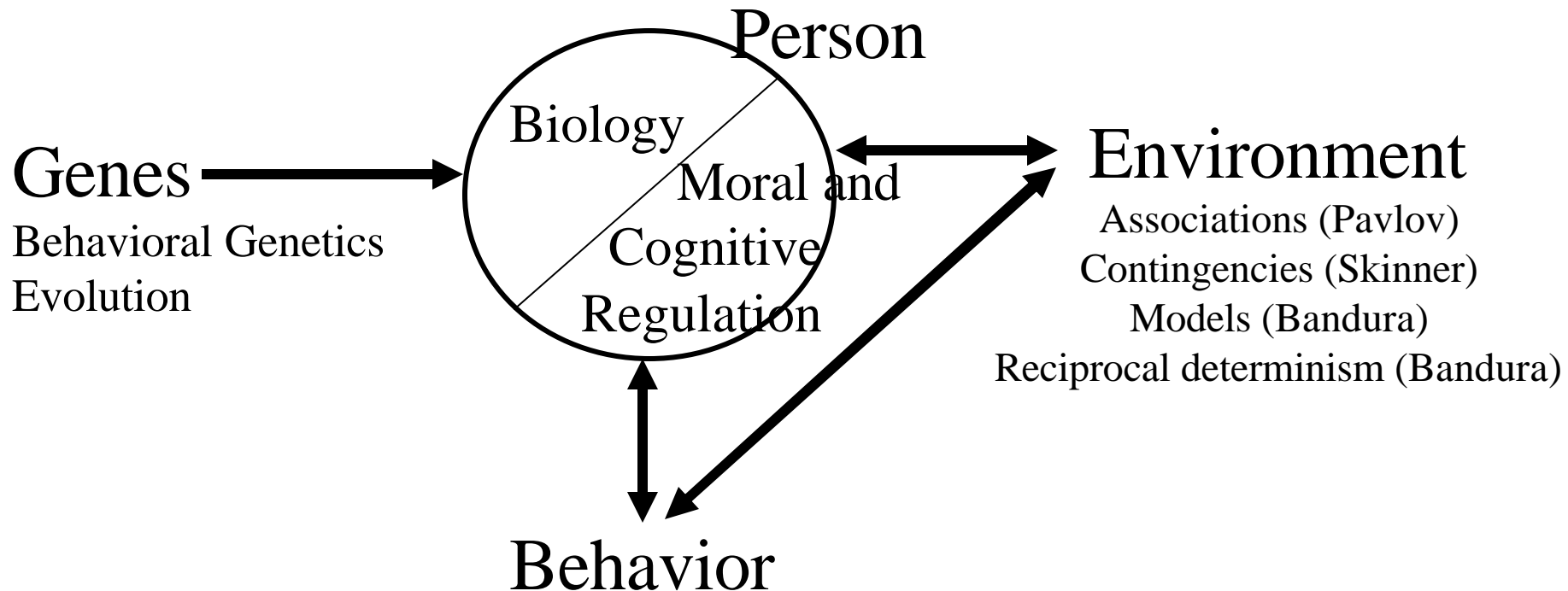FIGURE 1. A Multisystemic Perspective on Adolescent Sexual Risk Behavior.

I. INTRODUCTION
   C. Essential Features

- Biopsychosocial models of risk taking assume complex endogenous and exogenous factors affecting risk taking at the individual level.
  - Biology
    - Biological (genetic, hormonal and neurological) influences on behavioral tendencies.
  - Cognitive
    - Cognitive and moral regulation of behavioral tendencies
  - Environmental (defined as the local context)
    - Environmental factors influence biological influences (gene expression, hormonal production, neurological functioning and psychological regulation.
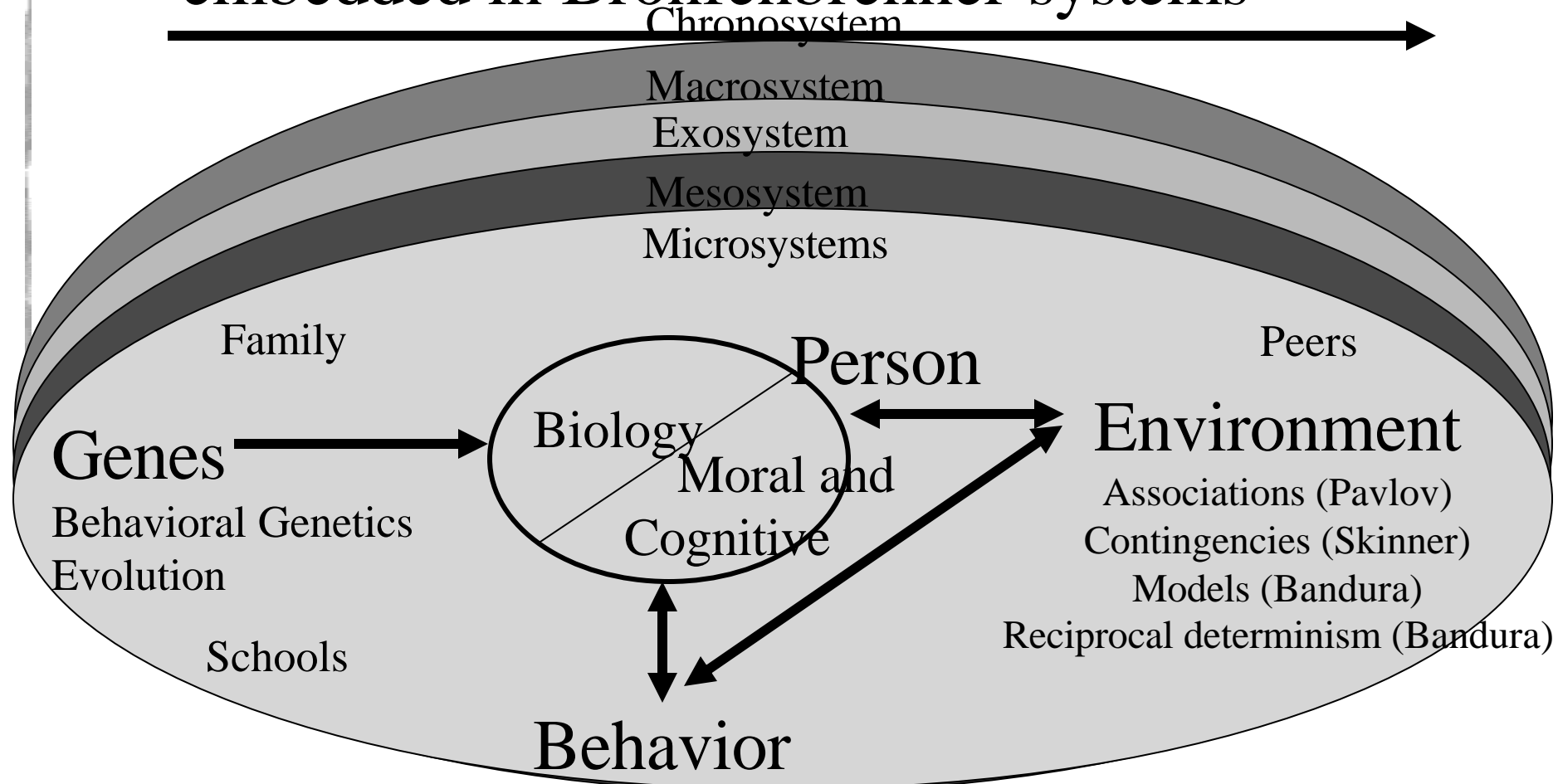
I. INTRODUCTION
C. Essential Features

- These factors interact as well such that Biological, Psychology, and Environmental factors are dynamically related.

Person

Biology

Genes

Behavioral Genetics
Evolution

Moral and Cognitive Regulation

Environment

Associations (Pavlov)
Contingencies (Skinner)
Models (Bandura)
Reciprocal determinism (Bandura)

Behavior

I. INTRODUCTION
C. Essential Features

- This characterization of the individual is embedded in Bronfenbrenner systems

Chronosystem

Macrosystem

Exosystem

Mesosystem

Microsystems

Family

Peers

Person

Genes

Biology

Moral and Cognitive

Environment

Behavioral Genetics
Evolution

Associations (Pavlov)
Contingencies (Skinner)
Models (Bandura)
Reciprocal determinism (Bandura)

Schools

Behavior

I. INTRODUCTION
C. Essential Features

- A Biopsychosocial models raise questions about the onset, and course of risky behavior
  - Objectively, how do different elements of systems in the model interact in the expression of risk taking?
    - Answers to these question are much more available.
  - Subjectively, how do the factors work together phenomenologically and experientially to result in adolescents engaging in risk taking?
    - Answers to these question are far less available.
  - How do these perspectives related to each other?
    - Think of relating parental and adolescent perspectives.

II. EXPERIMENTER'S PERSPECTIVE
A. Rolison & Scherman

- Rolison & Scherman strongly adopted the Experimenter's Perspective on the Biopsychosocial model
  - They assessed 260 adolescents and young adults (18-21) on the Risk Involvement and Perception Scale (RIPS) which assessed participants frequency of risk involvement in 23 behaviors (unspecified), perceived benefits of such behaviors, and perceived risks.
  - They predicted performance on the RIPS on the basis of disposition (sensation seeking; locus of control), decision making (quality and number of outcomes generated for and against risk taking) and environmental factors (Peer influence)

II. EXPERIMENTER'S PERSPECTIVE
A. Rolison & Scherman

- They found that perceived peer involvement, dishabituation, and perceived benefits predicted risk behavior

Table 2

Multiple Regression for Variables Predicting Risk Involvement, Including Sensation-Seeking Subscale Scores ($n = 194$)

Variable	r	B	$SE\ B$	β
Perceived risks	-.37	-.02	.03	-.03
Perceived peer participation	.78	.43	.05	.50**
Social desirability	-.28	-.10	.01	-.07
Perceived benefits	.58	.36	.11	.17*
Peer influence	.48	.06	.04	.08
Thrill and adventure seeking	.15	.01	.01	.02
Experience seeking	.29	.02	.02	.04
Disinhibition	.65	.07	.02	.24**
Boredom susceptibility	.31	-.10	.02	-.03

Note. r = zero-order correlation; R^2 = .72 for overall model ($p < .001$).
*$p < .01$, **$p < .001$.

II. EXPERIMENTER'S PERSPECTIVE
B. Jessor et al.

- Jessor et al.'s biopsychosocial model also adopted an Experimenter's perspective.
  - The dependent measure was a standardized measure of "problem behavior" (the MPBI), which assesses alcohol and drug abuse, delinquency, and sexual precocity.
    - Scores for each problem were transformed into T-scores and forced into a distribution with a mean of 50 and a SD of 10. Overall a score of 200 is "average"
  - The participants were 7th, 8th, and 9th grade students in a large urban school district, designed to increase minority representation.
  - The data was collected in 3 waves, 1-year apart

II. EXPERIMENTER'S PERSPECTIVE
     B. Jessor et al.

- The predictor variables were the total risk (RFI) and protective (PFI) factors in the adolescents' biopsychosocial world
  - Risk and protective factors sampled from the personality, perceived environment, and behavioral systems in the adolescent's Biopsychosocial world.
    - **Risk factors** includes low expectations for success, low self esteem, hopelessness about life; deviant friends who model problem behavior; poor school achievement.
    - **Protective factors** includes positive attitudes towards school, health, intolerance of deviance religiosity; positive relations with adults, perception of strong social controls for transgressions, friends who model conventional behavior; involvement of prosocial behaviors.

II.   EXPERIMENTER'S PERSPECTIVE
B. Jessor et al.

- They found that problem behaviors are predicted by both risk (+) and protective (-) factors and an interaction between them
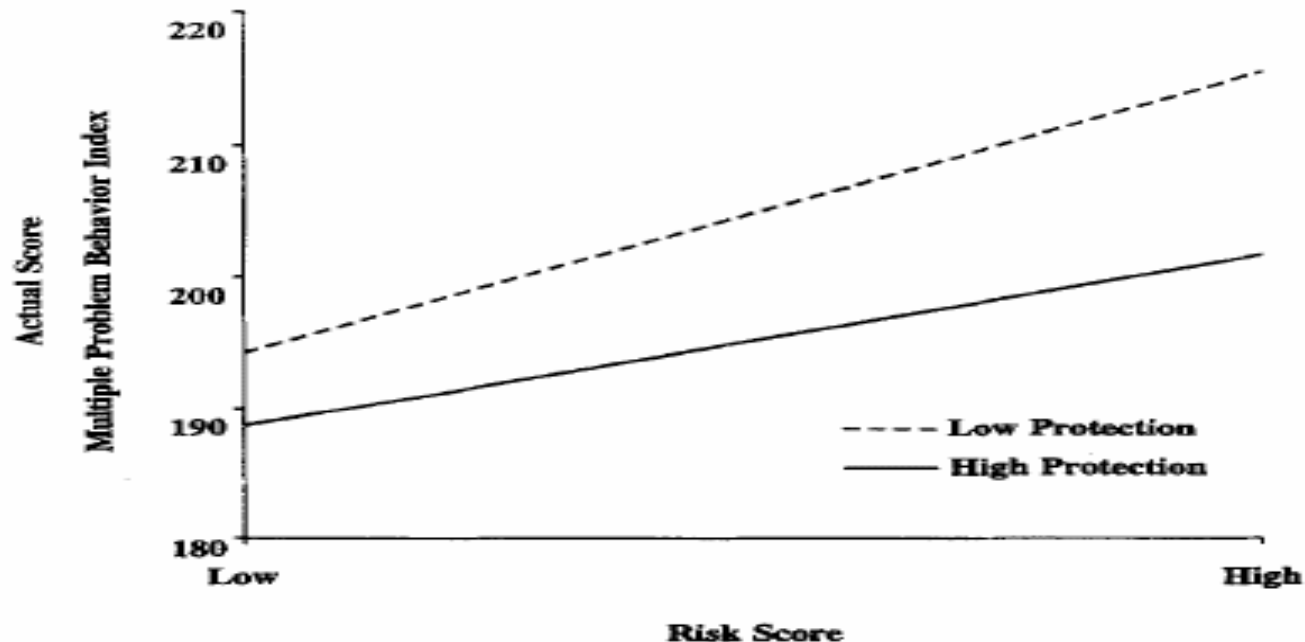

Figure 2. The moderator effect of protection on the relationship of risk to problem behavior: actual curves.

II.   EXPERIMENTER'S PERSPECTIVE
C. Dekovic

- Dekovic attempted to replicate much of Jessor et al.'s finding with a different set of problem behaviors.
  - 508 adolescents between 12 and 18-years old and their parents were participants.
  - The dependent variables were internalizing (depression, etc.) and externalizing (aggression etc.) behaviors.
  - The independent variables were risk and protective factors that were similar although certainly not identical to Jessor et al.'s set
  - Parents completed relevant parental measures.

II. EXPERIMENTER'S PERSPECTIVE
   C. Dekovic

- Dekovic found a different result for internalizing and externalizing behavior
  - Internalizing behavior was predicted by both risk and protective factors, but with no interaction.
  - Externalizing behavior was predicted by only risk factors, not protective factors.

Table III. Hierarchical Multiple Regression Analysis Predicting Adolescent Problem Behavior from the Risk Factor and Protective Factor Indexes

Step/Predictor	Internalizing			Externalizing		
	Beta	R^2	R^2 Change	Beta	R^2	R^2 Change
1. Demographic Variables		0.04^a			0.06^a	
Age	0.03			0.18^a		
Gender	0.18^a			-0.16^a		
2. Risk Factor Index (RFI)	0.44^a	0.28^a	0.24^a	0.48^a	0.28^a	0.22^a
3. Protective Factor Index (PFI)	-0.25^a	0.34^a	0.06^a	0.04	0.28^a	0.00
4. Risk × Protection Interaction	-0.00	0.34^a	0.00	-0.06	0.28^a	0.00

$^a p < 0.001$.
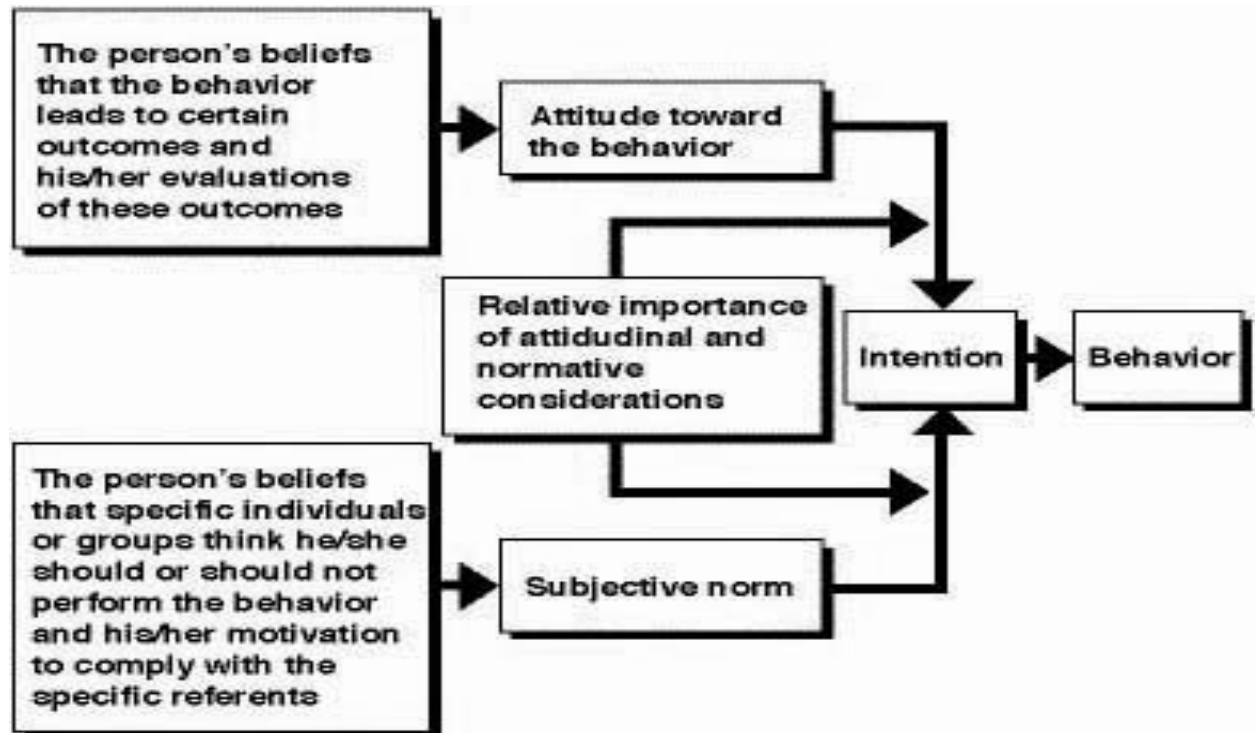
II. ADOLLESCENT PERSPECTIVE
A. Gibbons et al.

- To account for the phenomenology of risk taking, Gibbons et al., examined the biopsychosocial world from the perspective of the adolescent.
  - They gave up the assumption that these forces or factors compel adolescents to take risks
- Instead they tried to examine how the forces and factors would be experienced by adolescents.
  - They assumed that adolescents take risks willingly and tries to measure Behavioral Willingness (BW) as distinct from Behavioral Intention (BI) or Behavior Expectation (BE)

II. ADOLLESCENT PERSPECTIVE
A. Gibbons et al.

- Behavioral Intention (BI) and/or expectation (BE) have been often used in social psychology to explain the condition when attitudes lead to behavior.

Reasoned Action Model – Azjen & Fishbein, 1975

The person's beliefs that the behavior leads to certain outcomes and his/her evaluations of these outcomes → Attitude toward the behavior

Relative importance of attidudinal and normative considerations

Intention → Behavior

The person's beliefs that specific individuals or groups think he/she should or should not perform the behavior and his/her motivation to comply with the specific referents → Subjective norm

II. ADOLLESCENT PERSPECTIVE
A. Gibbons et al.

- The Theory was updated in 2002.

Planned Behavior Model – Azjen, 20002

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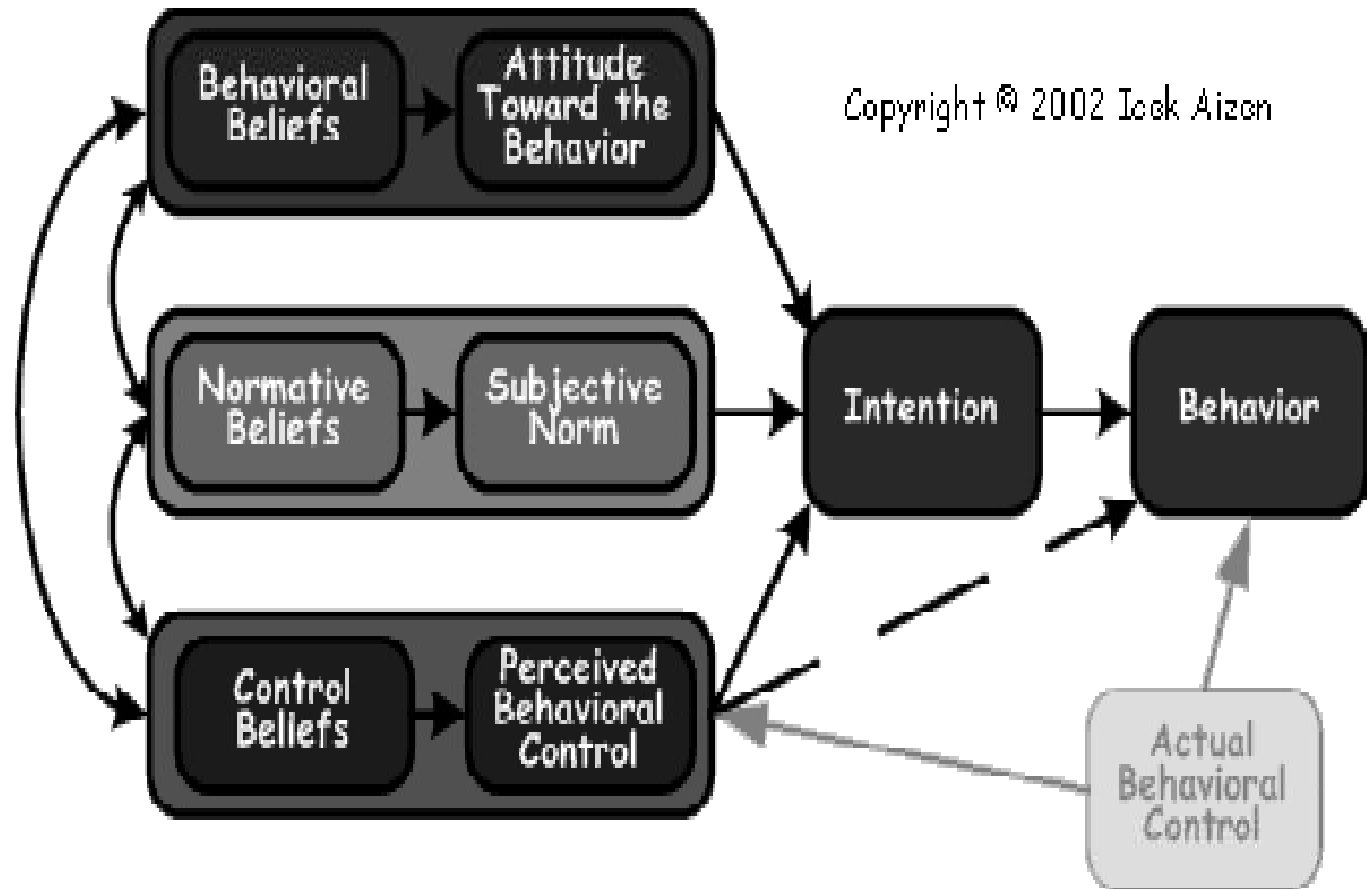
II. ADOLLESCENT PERSPECTIVE
A. Gibbons et al.

- To augment the model, Gibbons et al., added a behavioral willingness element to account for risk behavior which may not be intentional or expected.
  - Willing behavior is not deliberative (as intended behavior) but reactive to specific situational conditions.
  - It is assumed to be strongly affected by the the attractiveness to the adolescents of the social image associated with the targeted behavior (prototype)
    - How cool is kid who smokes in the boys' room.

II. ADOLLESCENT PERSPECTIVE
A. Gibbons et al.

- They examine various elements of the model in using 628 college students who were assessed 3 times, 1 year apart, for pregnancy risk.
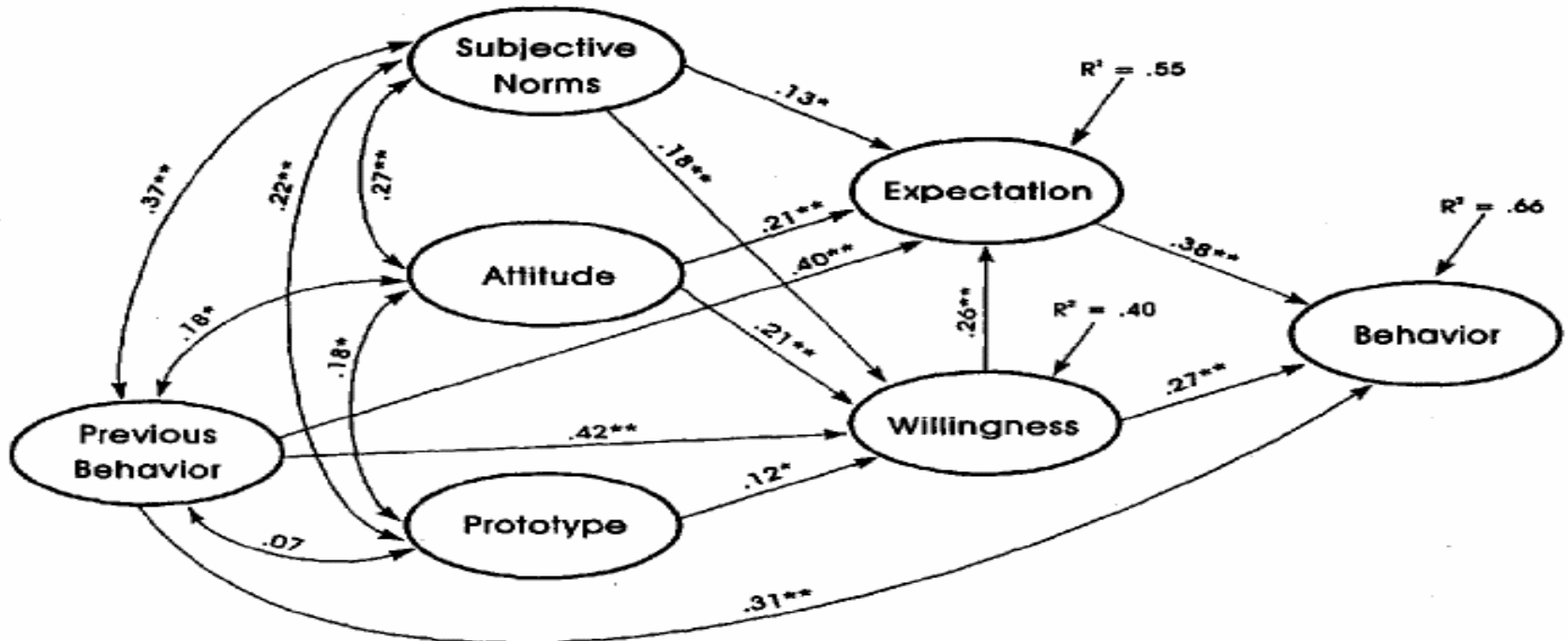

Figure 2. Structural model for pregnancy risk (Study 2). N = 469. Goodness-of-fit index = .95. *p < .05. **p < .001.

III. DEVELOPMENTAL ISSUES
A. Growth of Regulatory Skills

- Missing in these studies is the developmental significance of risk taking.
  - We have learned that in adolescence, risk taking is the perfect storm
    - Biologically (genetically, neurological) normative.
    - Psychologically (cognitive and moral) dysregulated.
    - Socially (autonomy, peer acceptance) significant.
  - These factors are identified in both objective and subjective studies.
    - Over adolescence, the biological conditions change, psychological regulation improves, and the social significance of risk taking reduces.