The Positive Development of Youth: Comprehensive Findings from the 4-H Study of Positive Youth Development

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FOREWORD

The first-of-its-kind research defined and measured positive youth development. The result is a model that is driving new thinking and approaches to youth development around the world.

For more than a decade, preeminent youth development scholars, Drs. Richard M. Lerner and Jacqueline V. Lerner, and the team at the Institute for Applied Research in Youth Development at Tufts University, Medford, MA, partnered with faculty at America's land-grant universities to conduct this groundbreaking research.

The final report, *The Positive Development of Youth: Comprehensive Findings from the 4-H Study of Positive Youth Development,* reviews the multi-year research findings.

RESEARCH SHOWS 4-H YOUTH EXCEL BEYOND THEIR PEERS

The longitudinal study discovered that the structured out-of-school time learning, leadership experiences, and adult mentoring that young people receive through their participation in 4-H plays a vital role in helping them achieve success.

Compared to their peers, the findings show that youth involved in 4-H programs excel in several areas:

Contribution/Civic Engagement

- 4-H'ers are nearly 4 times more likely to make contributions to their communities (Grades 7-12)
- 4-H'ers are about 2 times more likely to be civically active (Grades 8-12)

Academic Achievement

- 4-H young people are nearly 2 times more likely to participate in Science, Engineering and Computer Technology programs during out-of-school time (Grades 10 – 12)
- 4-H girls are 2 times more likely (Grade 10) and nearly 3 times more likely (Grade 12) to take part in science programs compared to girls in other out-of-school time activities. (Data found in Science, Engineering and Computer Technology (SECT) section of report)

Healthy Living

- 4-H'ers are nearly 2 times more likely to make healthier choices (Grade 7)

4-H'ers Excel

- **4-H'ers in Grades 7-12 are nearly 4 times more likely to make contributions to their communities**
- **4-H'ers in Grades 8-12 are about 2 times more likely to be civically active**
- **4-H'ers in Grade 10-12 are nearly 2 times more likely to participate in science programs during out-of-school time**
- **4-H girls are 2 times more likely (Grade 10) and nearly 3 times more likely (Grade 12) to take part in science programs compared to girls in other out-of-school time activities**
- **Grade 7 4-H'ers are nearly 2 times more likely to make healthier choices**

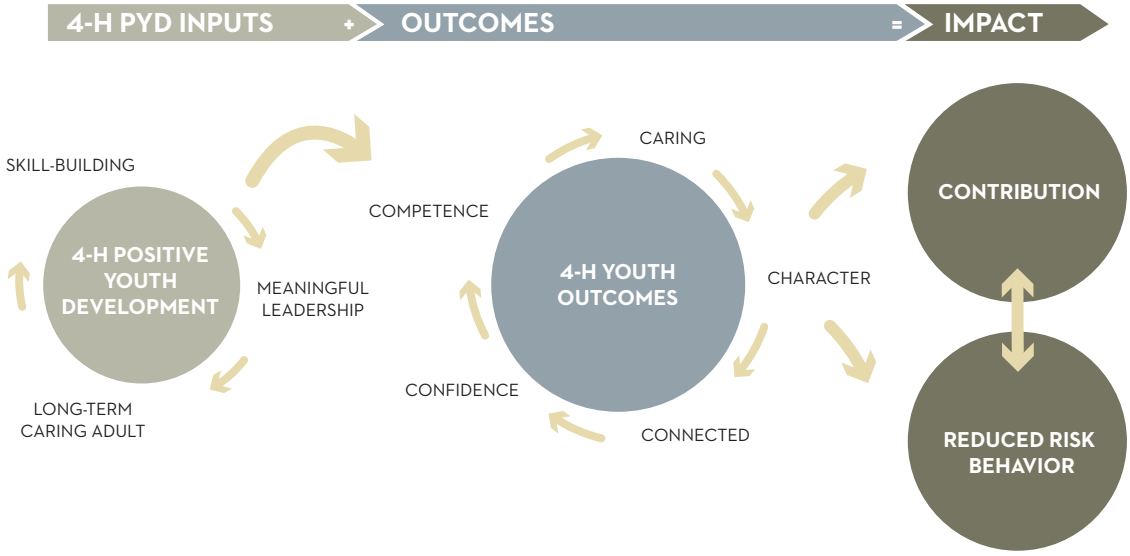
THE POWER OF POSITIVE YOUTH DEVELOPMENT

The research is helping families, schools, communities and youth programs develop strategies to support children and adolescents. Effective youth development programs like 4-H are putting the research to work by focusing on three important areas:

- Positive and sustained relationships between youth and adults
- Activities that build important life skills
- Opportunities for youth to use these skills as participants and leaders in valued community activities

The study assessed the key characteristics of PYD – competence, confidence, character, connection and caring – followed by the impact of valued community programs, including 4-H.

4-H FORMULA FOR SUCCESS



BACKGROUND

The *4-H Study of Positive Youth Development* is a longitudinal study that began in 2002 and was repeated annually for eight years, surveying more than 7,000 adolescents from diverse backgrounds across 42 U.S. states.

The first wave of research began with fifth graders during the 2002-2003 school year and ended with twelfth graders (Wave eight) in 2010. More recently, the Tufts research team examined all eight waves of data and conducted new and more rigorous analyses in order to produce the latest comprehensive report of findings. The new report, while sometimes diverging from earlier results, provides powerful evidence of the impact of 4-H participation throughout Grades 5-12.

"The potential for change is a core strength of all youth – a strength that can be built upon. This strength is cause for optimism for it means we can positively influence the life paths of all children." Lerner et al., 2013

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OVERVIEW

We conducted the 4-H Study to test the idea that when the strengths of youth are aligned with family, school, and community resources across adolescence, positive youth development will occur. These resources include those provided by community-based, out-of-school time youth development programs, including 4-H. For this research, we define positive youth development by the Five Cs of positive youth development (PYD): competence, confidence, character, connection, and caring. Further, we hypothesize that the development of these Five Cs leads to youth contributions, the "Sixth C" of PYD (Bowers et al., 2010; Jelicic et al., 2007; Lerner et al., 2005; Phelps et al., 2009). A key contribution of the 4-H Study was to validate this conception of PYD and to define useful measures of it. We discuss this contribution of our research later on in this report.

In the 4-H Study of Positive Youth Development (PYD) we used a form of longitudinal sequential design (Lerner et al., 2005). Our study began with fifth graders in the 2002-2003 school year, a time period labeled Wave 1. As in all longitudinal studies, we knew we would lose some participants over time for a variety of reasons and added new groups (cohorts) of participants at subsequent waves so that our statistical analyses would maintain sufficient power.

By the end of Wave 8, the research team and our land-grant university partners had collected data from more than 7,000 participants from 42 states. We gathered data through a student questionnaire, a parent questionnaire, and, for a subset of the sample, from school and government sources such as the U.S. Census (Lerner, et al., 2005). We measured several individual characteristics of youth including their scores on the Five Cs of PYD. We studied career goals related to science, engineering, and computer/technology, as well as school engagement and achievement. We assessed youth civic identity and civic engagement (AEC – active and engaged citizenship), a construct that has behavioral, cognitive, and socioemotional components. We assessed sexual behavior and engagement in activities such as exercise and healthy eating. Finally, we appraised engagement in risk/problem behaviors, such as smoking, drinking, bullying, and the presence of characteristics related to depression.

In this report, we first present models for the long-term developmental trajectories of PYD, Contribution, depressive characteristics, and risk/problem behaviors. These trajectories involved information from the nearly 3,000 students who participated in two or more years of the study and who also have outcome data on at least one of the variables of interest (PYD, Contribution, depressive symptoms, and risk/problem behaviors; N = 2,974).

Next, we present findings related to a range of outcomes for youth in 4-H, including positive and negative indicators of development, academic achievement, and civic engagement. For these analyses, we compared youth who participated at least twice per month in 4-H programs to other youth who regularly participated in other out-of-school-time (OST) activities, controlling for gender, race/ethnicity, rural/suburban/urban community, number of parents in the home, family per capita income, mother's education, and region of the country. We use propensity scores as a technique to control for demographic characteristics when making comparisons of 4-H and non 4-H youth. We present these findings across all eight waves of the 4-H Study (Grades 5 to 12). We then repeat these analyses using only participants enrolled in 4-H to determine whether significant differences exist between boys and girls within the 4-H program.

SUMMARY OF KEY FINDINGS: PATTERNS OF POSITIVE YOUTH DEVELOPMENT

Through creating the first-ever measurement tool specifically designed to capture the Five Cs of PYD, the 4-H Study has produced a substantial body of literature examining the strengths of youth. For instance, our research has consistently associated higher levels of intentional self regulation (ISR) with higher levels of both Positive Youth Development (PYD) and community contribution. These findings support the idea that self-regulation skills, defined as the ability to select and reach goals, especially when navigating around obstacles, can place youth on a positive developmental trajectory. These findings hold among boys and girls, both within and across time. Similarly, we have found that higher ISR correlates with lower levels of self-reported risk/problem behaviors.

Our research has shown that school engagement is higher in youth with more individual and ecological assets and these high levels of school engagement predicted greater academic achievement. Across Grades 5 to 8, trajectories reflecting higher school engagement were positively associated with grades and negatively associated with delinquency, depression, and substance use.

Among adolescents, ISR and having a hopeful future were both positively associated with PYD and youth contribution, and negatively associated with depressive symptoms and risk behaviors.

Theokas and Lerner (2006) identified four domains of ecological assets in the families, schools, and communities of fifth grade youth: individuals in the lives of youth; physical and institutional resources present in the social environment; collective activity in the context; and the accessibility of contextual resources. Scores for these four domains were significantly related to both positive and problematic outcomes in expected directions.

In addition, living in asset-poor vs. asset-rich neighborhoods moderates the effects of adolescent involvement in OST activities on positive and negative developmental outcomes.

Trajectory analyses across eight years of the study show that there is marked consistency across adolescence for both PYD and Contribution. In terms of risk/problem behaviors, only a small proportion of youth show increasing risk across adolescence. The trajectories for Depression across the eight years of the study are more complex, however, and we will need to delve deeper into our data to ascertain the correlates of this diversity.

SUMMARY OF KEY FINDINGS: THE ROLE OF 4-H PROGRAMMING IN PROMOTING PYD

In Grades 8 and 11, 4-H participants reported significantly higher levels of PYD than among the comparison group (youth who participated in other out-of-school time (OST) programs). In addition, 4-H girls reported higher levels of PYD than non 4-H girls in Grades 8 and 11, and 4-H boys scored higher than non 4-H boys in Grade 11. These findings were not consistent across grades, and indicate only weak, if any, group differences.

Our findings indicated that 4-H youth are substantially more likely than other youth to make contributions to their communities in Grades 7 through 12 (with similar findings comparing 4-H girls to non 4-H girls). 4-H boys were significantly more likely than non 4-H boys to contribute to their communities at Grades 7, 10, and 11, and 4-H girls contributed more than 4-H boys in Grades 6 to 12. Overall, these findings suggest generally stable differences between youth enrolled in 4-H and youth enrolled in other out of school activities, with especially strong differences observed among females.

Consistent with our analysis of youth contribution, we found that 4-H participants displayed consistently higher Active and Engaged Citizenship (AEC) than youth enrolled in other OST programs. Further, 4-H girls reported higher AEC scores than non 4-H girls in Grades 8 to 11, while 4-H boys only reported higher AEC scores than non 4-H boys at Grade 11. These findings suggest that girls, but not boys, enrolled in 4-H display greater AEC than their peers not enrolled in 4-H.

We generally found no significant differences in reported risk/problem behaviors between 4-H youth and non 4-H youth. 4-H girls were significantly less likely than 4-H boys to engage in risk/problem behaviors in Grades 6, 8, 10, 11, and 12.

4-H participants reported higher academic competence in Grades 7, 9, 11, and 12 and higher school engagement at Grades 11 and 12 than participants enrolled in other OST activities. These results suggest a slight advantage for 4-H youth, especially toward the end of high school.

Also replicating the general trend for 4-H girls to display greater PYD than 4-H boys in our study, 4-H girls showed relatively higher levels of academic competence and school engagement across the eight years of our study.

4-H participants were slightly more likely than youth in other OST programs to have healthier habits, although we only observed statistically significant differences in Grades 7, 11, and 12.

4-H girls were more likely than 4-H boys to endorse healthy habits in all waves of our study, further replicating the finding that 4-H girls tend to display higher indices of positive development than 4-H boys.

With respect to participation in Science, Engineering and Computer Technology (SECT) programs, 4-H participants were generally more likely than youth in other OST programs to participate in SECT programs, with significant differences found for both boys and girls. 4-H girls were less likely than 4-H boys to participate in engineering and computer technology programs, and 4-H boys reported higher performance and were more likely to have plans for a career in engineering and computer technology than 4-H girls across Grades 10 to 12.

ACKNOWLEDGMENTS

The Institute for Applied Research in Youth Development thanks the many contributors who have made this study possible. We especially thank National 4-H Council, under the leadership of Donald T. Floyd, Jr., for its vision, support, and dedication. We gratefully acknowledge the financial support from Philip Morris USA, an Altria company. Together, the prescience, vision, commitment, and generosity of 4-H and the colleagues at Altria helped establish the research field of positive youth development!

We are grateful also for the support we receive from our colleagues at Tufts University and in the Eliot-Pearson Department of Child Development. We are thankful for the support and guidance of Drs. Joan and Gary Bergstrom. Joan Bergstrom's untimely passing in 2010 was an enormous loss to all of the colleagues and students within the Institute and at Tufts University. We again dedicate this report to her memory, as but a small way to acknowledge her unflagging commitment to enhancing the lives of the diverse youth of America and the world.

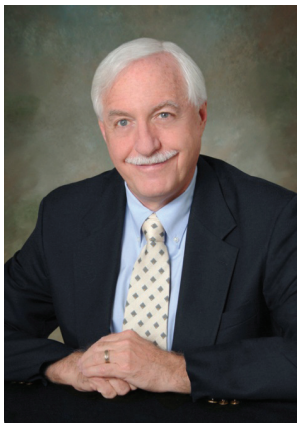
We greatly appreciate the numerous contributions of the members of the Institute, both past and present, for sharing their skills, dedication, and spirit. We acknowledge and value the contributions of the 4-H Study Advisory Board, chaired by Professor Alexander von Eye, and the faculty and staff from numerous land-grant universities in the Extension/4-H system who were instrumental in gathering data and sharing findings. They are:

- University of Alaska
- University of California
- Colorado State University
- Cornell University
- University of Delaware
- Lincoln University
- University of Maryland
- University of Massachusetts
- University of Minnesota
- Mississippi State University
- University of Missouri
- University of Nebraska
- North Carolina State University
- North Dakota State University
- Ohio State University
- Oregon State University
- Purdue University
- Rutgers University
- Texas A & M
- Washington State University
- University of Wyoming

Finally, and most important, we are grateful to the youth and families involved in the 4-H Study. They are creating a world wherein the strengths possessed by all young people are being used to promote positive development and contributions to civil society. Their energy and optimism are profound and impressive.

MESSAGE FROM RICHARD M. LERNER

Director, Institute for Applied Research in Youth Development



I am pleased to once again share a report of the results of the 4-H Study of PYD. The present report presents the findings from eight waves (Grades 5 to 12) of this singular longitudinal study. The 4-H Study embodies the goals of applied developmental science and of the Institute for Applied Research in Youth Development. Both the Institute and the field of scholarship that frames its work seek to conduct good science that enhances the abilities of practitioners, parents, policy makers, and young people themselves to promote positive human development. The results to date of the 4-H Study provide strong evidence that when the strengths of youth are aligned with the resources for healthy development that are found in families, schools, and communities, youth thrive.

The rich data within the 4-H Study underscore the fact that all of us—as individuals, family members, professionals, advocates for youth, or members of the diverse communities of our nation—have resources available that enable us to act to enhance the lives of young people. I believe this message is vital and timely. I am honored that National 4-H Council and the 4-H system have afforded my colleagues, students, and me the opportunity to ground this message in strong developmental science.

Richard M. Lerner, Ph.D.
Bergstrom Chair in Applied Developmental Science
Director, Institute for Applied Research in Youth Development

MESSAGE FROM THE ADVISORY BOARD

The amount of research on positive youth development (PYD) is relatively small, especially when compared to research about the problems of adolescents. The largest portion of research on adolescent development proceeds from the assumption that adolescents are broken, are in danger of being broken, or display deficits. A relatively new perspective, that of positive youth development, tries to counterbalance the deficit assumption with the perspective that youth are developing individuals who display considerable strengths, and who can be guided to become positive and constructive contributors to society. Acknowledging that adolescents may face developmental problems, it is the goal of the healthy youth development perspective to promote positive outcomes. This idea is in stark contrast to a perspective that focuses on the idea that adolescents are broken.

The 4-H Study of PYD has been conducted at the Institute for Applied Research in Youth Development at Tufts University by Richard M. Lerner, Jacqueline V. Lerner, and their colleagues and students. This research constitutes a first, major step toward filling the research gap concerning PYD. The 4-H Study Advisory Board believes that the study conducted by this team constitutes a milestone in developmental research. The 4-H Study has shown, for the first time, that PYD exists, and that youth development programs can play a major role in promoting PYD. The methods that the researchers employ for design, data analysis, and interpretation of results are state-of-the-art. The unique importance of the results speaks for itself.

The 4-H Study is a landmark investigation. The researchers have produced a study of truly historic importance. The study will be able to provide compelling information about the special and vital role that 4-H may play in the lives of America's young people.

Alexander von Eye, Ph.D.
Professor of Psychology, Michigan State University
Chair, The 4-H Study of Positive Youth Development Advisory Board

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INTRODUCTION

Early researchers on adolescent development started out with the wrong set of assumptions (Lerner & Steinberg, 2009). Most, including the founder of the field, G. Stanley Hall (1844–1924), viewed adolescents in terms of what they lacked when compared to mature adults (Hall, 1904). For many decades, this perspective subtly colored not only how researchers but also how teachers, parents, youth workers, and public policy makers looked at this period of development. It influenced what they thought they could expect from teenagers, and how they would interpret what teens said and did.

Researchers and clinicians viewed adolescence as a time of "sturm und drang" (storm and stress), in which emotional turmoil was a necessary step toward maturity. Hall drew upon Darwin's writings on evolution for formulating this perspective (Hall, 1904). Hall interpreted each person's maturation as a retelling of how mankind as a whole evolved from primitive beasts to civilized social animals, with the teenage years reflecting a critical point in that story of transformation. Anna Freud (1969) wrote of emotional upheavals within adolescents and in their close relationships with family and friends. Erik Erikson (1959) described the adolescent's identity crisis as he or she struggled to achieve a more mature sense of self.

In short, early researchers and clinicians alike based their observations and theories on the underlying assumption that adolescents are inherently "at risk" for behaving in uncivilized or problematic ways; they were "broken" in some way, and needed repair. There were problems to be managed (Roth & Brooks-Gunn, 2003). Given that premise, these deficits are largely what they saw.

THE EMERGENCE OF THE POSITIVE YOUTH DEVELOPMENT (PYD) PERSPECTIVE

This frame of reference shifted in the early 1990s as growing numbers of researchers viewed adolescence through the lens of systems theories that look at development throughout the life span as a product of relations between individuals and their world (Lerner, 2005). One key aspect of this new focus was plasticity: the potential that individuals have for systematic change across life. This potential is critically important, for it tells us that adolescents' trajectories of development are not fixed, and can be significantly influenced by factors in their homes, schools, and communities (Lerner, 2006).

Despite the seemingly manifold problems seen during adolescence—drug and alcohol use and abuse, unsafe sex and pregnancy, school failure and dropping out, crime and delinquency, depression, and self-destructive behaviors—most young people do not have a stormy adolescence (Lerner, 2005). Similarly, while teenagers spend much more time with their peers than with their parents and may, sometimes for the first time, openly challenge their parents' actions and beliefs, they value their relationships with their parents tremendously. They also tend to incorporate their parents' core values in such areas as social justice, spirituality, and the importance of education into their own values. Indeed, most adolescents select friends in part because they share these core values and similar perceptions of the world.

Integrating the theoretical ideas about the plasticity of adolescent development and the practical findings about the multiple pathways children take through adolescence led to the framework now known as PYD, which views young people as resources to be developed rather than as problems to be managed (Damon, 2004; Larson, 2000; Lerner, 2005).

FEATURES OF PYD

As discussed by Hamilton (1999), the concept of PYD has been used in at least three interrelated but nevertheless different ways:

1. as a developmental process
2. as a philosophy or approach to youth programming
3. as instances of youth programs and organizations focused on fostering the healthy or positive development of youth.

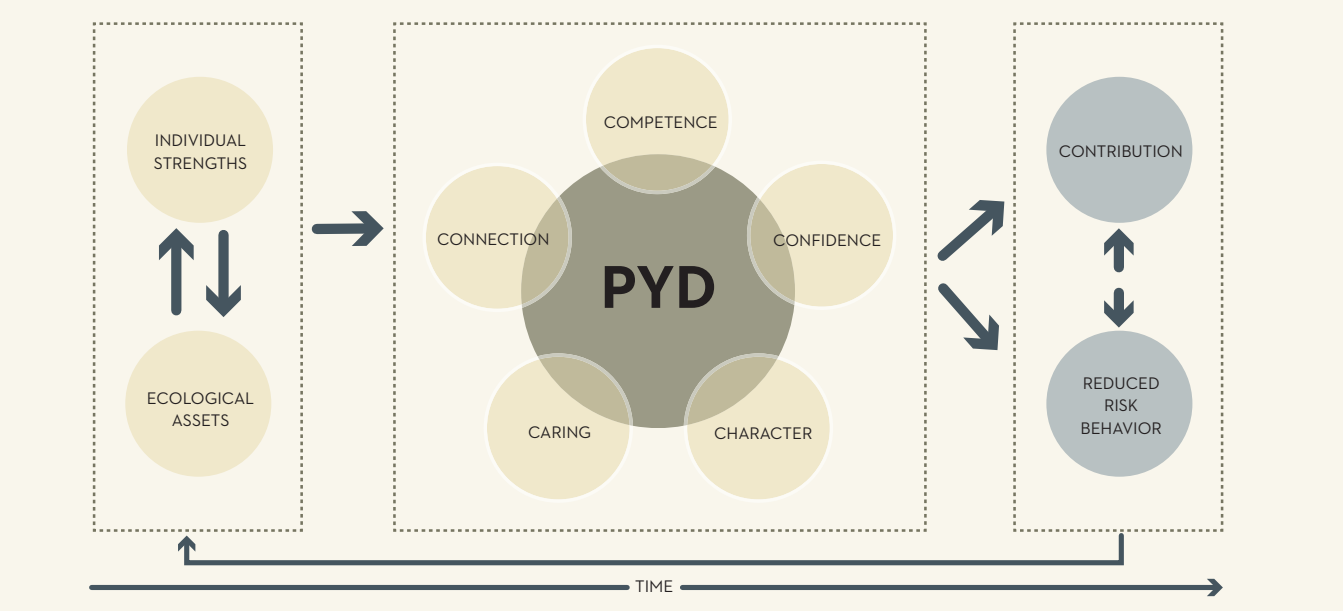
In the decade following Hamilton's (1999) discussion of PYD, several different models of the developmental process believed to be involved in PYD were used to frame descriptive or explanatory research across the adolescent period (e.g., Benson, Scales, & Syversten, 2011; Damon, 2004; Larson, 2000; Lerner et al., 2005; Lerner, et al., 2011). All of these models of the developmental process reflect ideas associated with what are termed "relational, developmental systems" conceptions of human development (e.g., Overton, 2010); these theoretical models emphasize that development involves mutually influential relations between individuals and their contexts. Within these theoretical models, one key approach to understanding PYD has focused on the "Five Cs": Competence, Confidence, Connection, Character, and Caring (Lerner, et al, 2005).

Researchers theorized that young people whose lives incorporated these Five Cs would be on a developmental path that results in the development of a Sixth C: Contributions to self, family, community, and to the institutions of a civil society. In addition, those young people whose lives contained lower amounts of the Five Cs would be at higher risk for a developmental path that included personal, social, and behavioral problems and risks (Lerner, 2004).

THE "5 CS" OF POSITIVE YOUTH DEVELOPMENT	
"C"	**DEFINITION**
COMPETENCE:	**Positive view of one's actions in specific areas, including social and academic skills.**
CONFIDENCE:	**An internal sense of overall positive self-worth and self-efficacy.**
CONNECTION:	**Positive bonds with people and institutions that are reflected in exchanges between the individual and his or her peers, family, school, and community and in which both parties contribute to the relationship.**
CHARACTER:	**Respect for societal and cultural norms, possession of standards for correct behaviors, a sense of right and wrong (morality), and integrity.**
CARING:	**A sense of sympathy and empathy for others.**

THE FIVE CS LEAD TO A SIXTH C – CONTRIBUTION	
CONTRIBUTION:	**Contributions to self, family, community, and to the institutions of a civil society.**

Figure 1. **THE PYD MODEL**



This relationship between PYD and risk/problem behaviors, however, was not seen as simple or uniform. The plasticity of development meant that some children from some homes, schools, and communities that lacked resources and supports showed themselves to be resilient and resistant to problems. Others who came from environments filled with resources and supports were drawn nevertheless into numerous troubles. But, on the whole, PYD researchers hypothesized that the availability of activities that supported the Five Cs would help steer young people toward a life of successful contributions (Benson, Scales, Hamilton, & Sesma, 2006; Benson et al., 2011; Lerner, 2005).

The potential for change is a core strength of all youth—a strength that can be built upon. This strength is cause for optimism for it means we can positively influence the life paths of all children. The contexts in which they live, learn, and play have resources to promote positive youth development. These resources can become the "social nutrients" young people need for healthy development. Researchers and practitioners agree that this concept of developmental assets is key to understanding how to foster PYD in our homes, classrooms, and community-based programs (Benson et al., 2006, 2011).

As suggested by Hamilton (1999), PYD has been defined as a developmental process, as a philosophy or approach to youth programming, and a specific types of youth programs. Studies suggest a link between PYD and the developmental assets associated with youth programs—especially programs that go beyond simple extracurricular activities to focus specifically on promoting youth development. The "Big Three" features of effective youth-serving programs (Blum, 2003; Lerner, 2004; Roth & Brooks-Gunn, 2003) are:

- Positive and sustained relationships between youth and adults.
- Activities that build important life skills.
- Opportunities for youth to use these life skills as both participants in and as leaders of valued community activities.

Programs having these features may be termed youth development (YD) programs (Lerner, 2004; Roth & Brooks-Gunn, 2003). Key question about the link between YD programs and the PYD perspective are: How can we translate PYD theory into specific practices that will help young people thrive, and do YD programs do this successfully? To address this question, National 4-H Council sponsored research to understand the developmental assets already or potentially present in youth programs, especially the programs led by 4-H.

GLOSSARY OF TERMS

POSITIVE YOUTH DEVELOPMENT	Youth thriving and healthy development, measured in the 4-H Study as competence, confidence, character, connection, and caring.
CONTRIBUTION	Youth positively impacting self, family, community, and institutions of civil society.
INTENTIONAL SELF-REGULATION	The ability to control one's behavior successfully, and to select and reach goals, especially when navigating around obstacles. Intentional self-regulation involves the capacity to optimize one's chances of attaining goals, and compensating if goals are blocked or optimization strategies fail.
ECOLOGICAL ASSETS	Resources present in the context, such as the strengths of families, schools, and communities.
TRAJECTORY ANALYSIS	A method of data analysis that uses longitudinal information (from multiple time points) to look at pathways of change in a particular characteristic.
PROPENSITY SCORE ANALYSIS	A method of data analysis that is used to control for the impact of selection effects associated with, for instance, various demographic variables (e.g., residential location, socioeconomic status) when making group comparisons.

THE 4-H STUDY OF POSITIVE YOUTH DEVELOPMENT: WHAT WE DID AND WHY WE DID IT

There are several ways to try to answer the question of whether involvement in specific out-of-school-time (OST) activities predicts positive growth and decreased risk during adolescence. We believe that an especially powerful approach is to conduct a longitudinal study—research that follows young people over a significant period of time and records important changes within individual participants, as well as critical differences between participants, at any given age. We used this approach in this study, which is funded by National 4-H Council through funds provided by *Underage Tobacco Prevention: Altria's tobacco companies: Philip Morris USA, U.S. Smokeless Tobacco Co. and John Middleton.*

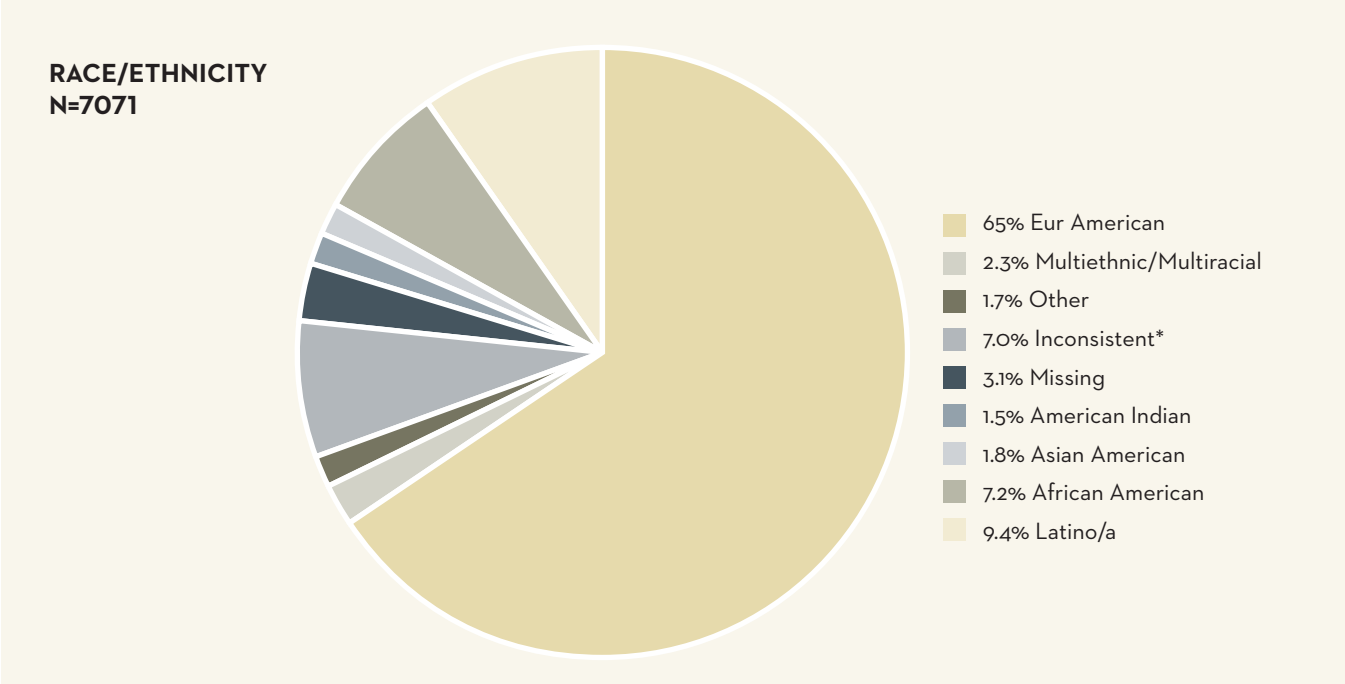
In the 4-H Study of PYD we used a form of what is called a longitudinal sequential design (Lerner et al., 2005). We began with fifth graders in the 2002–2003 school year, a time period labeled Wave 1. Since we knew that, as in all longitudinal studies, we would lose some participants over time for a variety of reasons, we added new groups (cohorts) of participants at other waves so that our statistical analyses would maintain their power.

As in the real world, participants decided on their own to get involved with or to skip OST programs; they were not assigned to a program by the researchers. This distinction is important because we wanted participants in the study to mirror youth who were not part of the study, who chose their own levels of participation in such programs. To look for possible relations between involvement in 4-H and positive youth development, we controlled for a variety of demographic and other variables in our analyses.

The first, second, third, and fourth Annual Reports from the 4-H Study were issued in spring, 2008 and 2009, winter 2010, and spring 2012, and summarized findings published or in press through twelfth grade (Wave 8 of the study). Appendix A presents a list of the books, chapters, articles, dissertations, and theses, completed to date, derived from the 4-H Study.

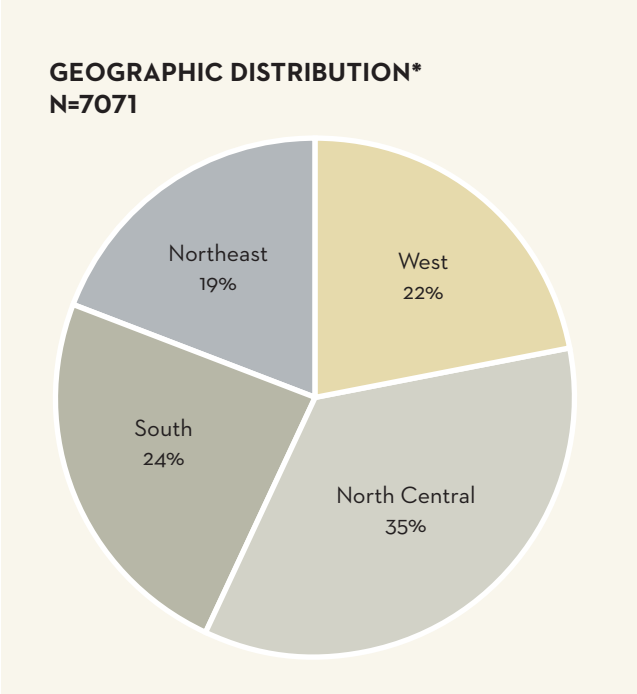
Wave 1 included 1,719 fifth-graders and 1,137 of their parents (Lerner, et al., 2005). They came from 13 states and 61 schools in rural, suburban, and urban areas in different parts of the country and represented a variety of racial, ethnic, and religious backgrounds. By the end of Wave 8, our research team and land-grant university partners had collected data from more than 7,000 participants from 42 states. The following figures provide more details about the youth comprising the 4-H Study sample.

Figure 2. **RACE/ETHNICITY OF THE 4-H STUDY PARTICIPANTS**



*Some youth change, from one wave to another, the racial/ethnic label they use to describe themselves. The variation may reflect the developmental nature of racial/ethnic identity.

Figure 3. **GEOGRAPHIC LOCATION OF THE 4-H STUDY PARTICIPANTS**



*Data about geographic location were missing for 26 youth (0.3% of the sample).

Figure 4. **TYPE OF LIVING ENVIRONMENT OF 4-H STUDY PARTICIPANTS**

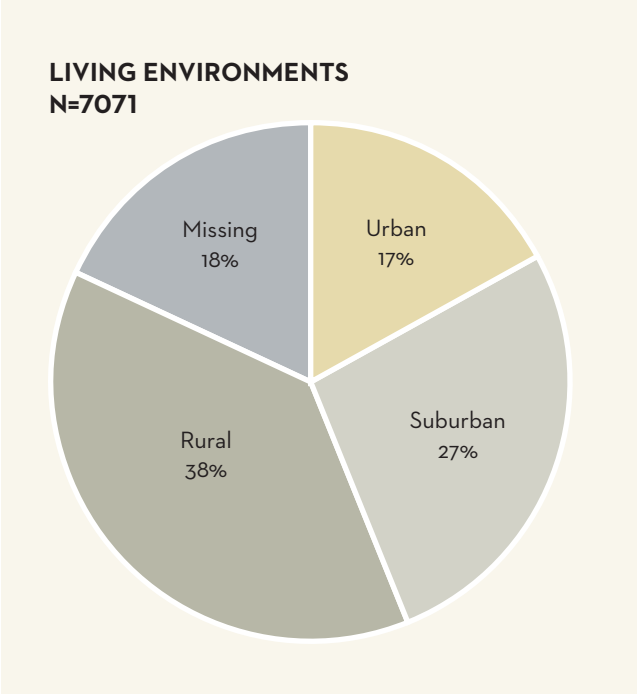


Figure 5. **GENDER BREAKDOWN OF 4-H STUDY PARTICIPANTS**

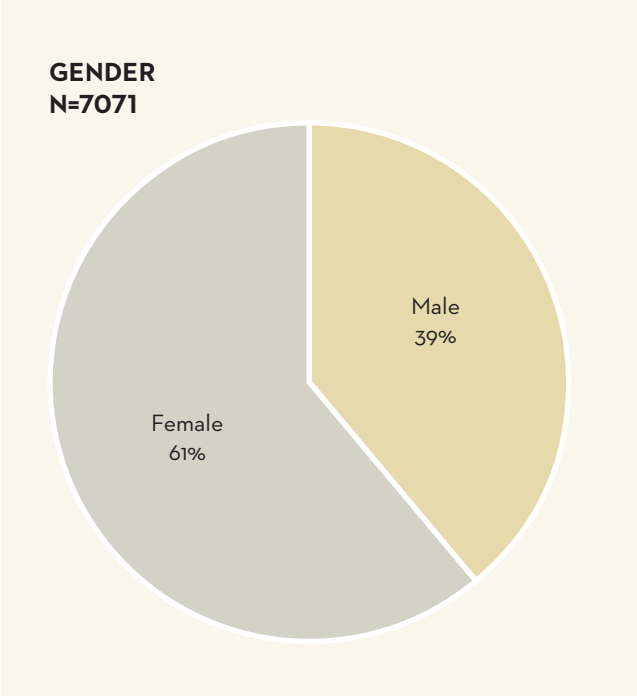
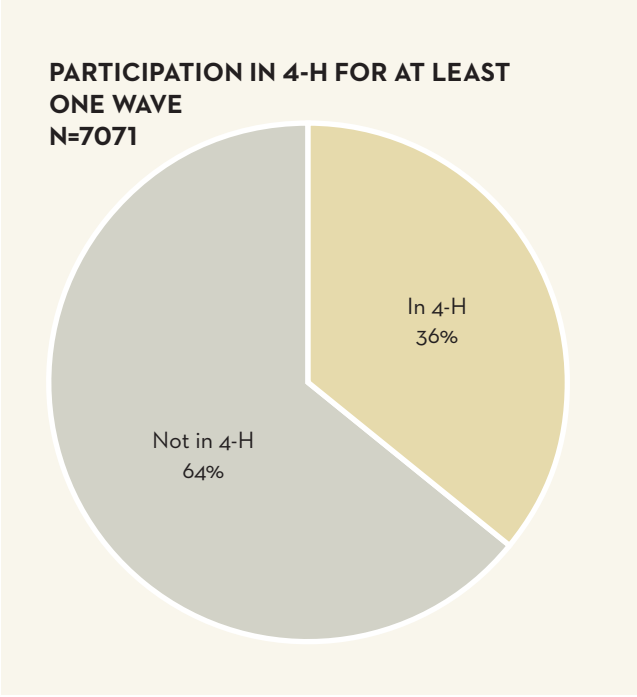


Figure 6. **4-H INVOLVEMENT (IN AT LEAST ONE WAVE) AMONG PARTICIPANTS**



We gathered data through a student questionnaire, a parent questionnaire, and from school and government sources such as the U.S. Census (Lerner, et al., 2005). Our survey contained items measuring a variety of individual characteristics of youth, including behavioral and cognitive strengths such as whether a young person could select positive life goals, optimize what he or she needed to achieve those goals, and compensate for obstacles that stood in the way of goal attainment (i.e., we have measured the Selection, Optimization and Compensation, or SOC, components of intentional self-regulation; Freund & Baltes, 2002). We studied career goals—and, as well, school achievement—related to science, engineering, and computer/technology. We also assessed involvement in OST activities, parent-child relations, and Active and Engaged Citizenship (AEC) among youth, a construct that has behavioral, cognitive, and socioemotional components. We assessed sexual behavior and engagement in activities such as exercise and healthy eating. In addition, we appraised engagement in risk/problem behaviors, such as smoking, drinking, bullying, and the presence of depressive symptoms.

Because of the design of the 4-H Study and the large sample size, the 4-H data set affords a unique opportunity to assess the nature, bases, and importance of the development of thriving in adolescence with more waves of data than are currently available in any other data set that specifically targets PYD. Across more than 50 empirical publications to date, the study has yielded important information about the bases and implications of PYD, information that can help launch young people into healthy and productive lives. The findings of the 4-H Study continue to be used widely by youth program professionals. For example, we are currently evaluating a tool that mentors in youth-serving organizations may use to assess and develop the SOC skills of their mentees in order to promote PYD. Such impacts on application move the 4-H Study towards its chief objective: To provide strong scientific evidence about actions that may be taken to enhance the lives of the diverse young people of America.

We are often asked by our colleagues how we had the opportunity to conduct such a large-scale study. It is useful to reflect on two key ingredients. First, you need courageous, committed, and visionary funders. Therefore, we would like to thank Don Floyd, President and CEO of the National 4-H Council, as well as the Altria Corporation, for possessing this courage, commitment and vision. Second, you need a talented and motivated research team.

Richard M. Lerner, as PI of the project, and Jacqueline V. Lerner, as its Scientific Director, are deeply grateful for the talented colleagues, doctoral students and post doctoral fellows who have worked on the project. These current and past colleagues include: Mona M. Abo-Zena, Jennifer Agans, Jason Almerigi, Pamela Anderson, Miriam Arbeit, Aida Balsano, Rumeli Banik, Stephanie Black, Deborah Bobek, Edmond Bowers, Michelle J. Boyd, Cornelia Brentano, Aerika Brittian, David Casey, Paul Chase, Elise Christiansen, Jennifer Davison, Leslie Daly, Leslie Dickinson, Dan Du, Kristen Fay, Yulika Forman, John Geldhof, Steinunn Gestsdóttir, Sarah Hertzog, Helena Jeličič , Heidi Johnson, Sonia Isaac Koshy, Jarrett Lerner, Selva Lewin-Bizan, Yibing Li, Alicia Doyle Lynch, Lang Ma, Maria McNamara, Dan Miller, Megan Kiely Mueller, Christopher Napolitano, Sophie Naudeau, Isla Pageau, Marie Pelletier, Jack Peltz, Nancy Pare, Erin Phelps, Dee Pratti, Dave Richman-Rapheal, Kristina Schmid Callina, Lisa Smith, Lauren Sweeney, Jennifer Tanner, Christina Theokas, Jennifer Brown Urban, Amy Alberts Warren, Dan Warren, Michelle Weiner, and Nicole Zarrett.

In addition, we are fortunate to have a superb Scientific Advisory Board for the 4-H Study. Chaired by Alexander von Eye (Michigan State University), other members of this group are: Dale Blyth (University of Minnesota), Lynne Borden (University of Arizona), Constance Flanagan (University of Wisconsin), Suzane LeMenestrel (USDA), Daniel Perkins (The Pennsylvania State University), Michael Rovine (The Pennsylvania State University), and Linda Jo Turner (University of Missouri; National 4-H Council).

COMMONLY USED MEASURES IN THE 4-H STUDY

POSITIVE YOUTH DEVELOPMENT (PYD)

One of the major initial goals of the 4-H Study of PYD was to create and test measures that could be used reliably to understand the strengths of youth. Initially proposed by Little (1993), these theoretical constructs were first discussed as the Four Cs of PYD, that is, Competence, Confidence, (positive social) Connection, and Character. Eccles and Gootman (2002), Roth and Brooks-Gunn (2003), and Lerner (2004) reviewed evidence from research and practice that converges in stressing the use of these Cs and potentially of a Fifth C, Caring (or Compassion), in understanding the goals and outcomes of community-based programs aimed at enhancing youth development.

A PYD score (ranging from 0 to 100) for each participant was computed as the mean of the scores for each of the Five Cs (Competence, Confidence, Connection, Character, and Caring, also ranging from 0-100), Higher scores represent higher levels of the Five Cs and therefore, higher levels of PYD. *Competence* is a positive view of one's action in domain-specific areas including the social and academic domains. *Confidence* is an internal sense of overall positive self-worth, identity, and feelings about one's physical appearance. *Character* involves respect for societal and cultural rules, possession of standards for correct behaviors, a sense of right and wrong, and integrity. *Connection* involves a positive bond with people and institutions that are reflected in healthy, bidirectional exchanges between the individual and peers, family, school, and community in which both parties contribute to the relationship. *Caring* is the degree of sympathy and empathy, i.e., the degree to which participants feel sorry for the distress of others. Full details about these measures, their construction, and validity and reliability can be found in Lerner et al. (2005) and Bowers et al. (2010).

The PYD measure included items from the Profiles of Student Life – Attitudes and Behaviors Survey (PSL-AB; Benson, Leffert, Scales, & Blyth, 1998), the Teen Assessment Project (TAP; Small & Rodgers, 1995), the Self-Perception Profile for Children (SPPC; Harter, 1983), the Self-Perception Profile for Adolescents (SPPA; Harter, 1988), and the Eisenberg Sympathy Scale (ESS; Eisenberg et al., 1996).

CONTRIBUTION

Rick Little (personal communication, March 31, 2000) and Lerner (2004; Lerner, Dowling, & Anderson, 2003) suggested that, when these Five Cs are present in a young person, a Sixth C, Contribution, emerges. That is, a young person enacts behaviors indicative of the Five Cs by contributing positively to self, family, community, and, ultimately, civil society (Lerner, 2004). Such contributions are envisioned to have both a behavioral (action) component and an ideological component (i.e., the young person possesses an identity that specifies that such contributions are predicated on moral and civic duty; Lerner, Dowling et al., 2003). In other words, when youth believe that they should contribute to self and context and when they act on these beliefs, they will both reflect and promote further advances in their own positive development and, also, the health of their social world.

Youth responded to 12 items that were weighted and summed to create two subscales: action and ideology. The Contribution items are derived from existing instruments with known psychometric properties and used in large-scales studies of adolescents, i.e., the Profiles of Student Life-Attitudes and Behaviors (PSL-AB; Benson, Leffert, Scales, & Blyth, 1998) survey and the Teen Assessment Project (TAP; Small, & Rodgers, 1995) Survey Question Bank. Items from the leadership, service, and helping scales measured the frequency of time youth spent helping others (e.g., friends or neighbors), providing service to their communities, and acting in leadership roles. Together, the leadership, service, and helping subsets comprise the action component of Contribution. The ideology scale measured the extent to which Contribution was an important facet of their identities (e.g., "It is important to me to contribute to my community and society"). As with the PYD scores, in this study, the Contribution scores range from 0 to 100.

RISK/PROBLEM BEHAVIORS

We measured indicators of risk behavior and delinquency with a set of questions derived from items included in the Search Institute's Profiles of Student Life-Attitudes and Behaviors (PSL-AB) scale (Leffert et al., 1998) and the Monitoring the Future (2000) questionnaire. These assess the frequency of substance use (e.g., smoked cigarettes, drank alcohol, used marijuana or hashish, used other drugs such as LSD or cocaine, sniffed glue, taken steroid pills or shots without a doctor's prescription) in the past year, and the frequency of delinquent behaviors (e.g., stolen something, gotten in trouble with the police, hit or beat up someone, damaged property just for fun, carried a weapon).

DEPRESSION

The Center for Epidemiological Studies Depression (CES-D) scale is a widely used 20-item self-report measure of depressive symptomatology (Radloff, 1977), and was included in the 4-H Study as a measure of risk. Depression was conceptualized as feelings of frustration, sadness, demoralization, loneliness, and pessimism about the future (Radloff, 1977). Items are summed for a total score, with a maximum score of 60, and higher scores are indicative of higher depressive symptomatology—greater frequency and number of symptoms of depression. In the 4-H Study, we do not assess a clinical cutoff for Depression; rather, we refer to higher scores on the CES-D as indicative of greater depressive symptoms.

ACTIVE AND ENGAGED CITIZENSHIP (AEC)

Using data from the 4-H Study, researchers identified a model to measure civic engagement at Waves 4 to 8 that contained the following four factors: civic duty, civic efficacy, neighborhood social connection, and civic participation (Zaff, Boyd, Li, Lerner, & Lerner, 2010). The factors combined to form an integrated, second-order latent variable measure of civic engagement, termed Active and Engaged Citizenship (AEC). This civic engagement measure not only considered a behavioral (i.e., civic participation) component, but also civic-related factors pertinent to cognition (i.e., perceived civic efficacy) and socio-emotional functioning (i.e., a sense of civic duty and neighborhood social connection).

The civic duty factor was comprised of 12 items drawn from the Social Responsibility Scale of the Teen Assessment Project (TAP) Survey Question Bank (Small & Rodgers, 1995; based on the Social Commitment subscale of the Psychosocial Maturity Inventory, Greenberger & Bond, 1984); the Political Efficacy and Participatory Citizen constructs of the Student Voices measure (Flanagan et al., 2007); and the Search Institute's Profiles of Student Life-Attitudes and Beliefs (PSL-AB) questionnaire (Leffert et al., 1998). The civic efficacy factor was comprised of 6 items adapted from the Political Voice and Competence for Civic Action constructs of the Student Voices measure (Flanagan et al., 2007). The neighborhood social connection factor was comprised of 6 items taken from the Search Institute's PSL-AB questionnaire (Leffert et al., 1998). The civic participation factor was comprised of 8 items created specifically for the 4-H Study and drawn from the Search Institute's PSL-AB questionnaire (Leffert et al., 1998).

ACADEMIC COMPETENCE

Academic competence was measured using a subscale of the Self-Perception Profile for Children in Waves 1 to 3 (SPPC; Harter, 1983), and the Self-Perception Profile for Adolescents in Waves 4 to 8 (SPPA; Harter, 1988). The academic competence subscale assesses perceived competence with regard to school performance. Participants are initially asked to choose between two types of people, for example, "some kids are happy with the way that they look" or "other kids are not happy with the way that they look." After a respondent chooses the person he or she is most like, the participant must decide if it is "really true" or "sort of true" for him or her. Half of the items begin with a positive sentence, reflecting high competence, and the other half with a negative sentence, reflecting low competence.

SCHOOL ENGAGEMENT

Items used to indicate school engagement were drawn from a pool of questions collected from the school engagement literature and other related literatures, such as school connectedness, school bonding, and organizational or institutional membership. The behavioral engagement subscale includes items indicating shallow engagement (attendance) and items tapping deeper engagement (effort). More specifically, items regarding contribution to class discussion, preparation, skipping class, and finishing homework on time are included. The measure focuses on students' voluntary behaviors within the school context, to minimize possible confounding effects of non-student related variables. The emotional engagement subscale includes five items assessing students' sense of belonging and their affects toward school. Sense of belonging was measured by one item asking the extent to which students feel like a part of their schools. Happiness, excitement, and enjoyment were used to measure three related yet distinct types of positive affect. Items used to tap school connectedness, belonging, and bonding were modified to assess different aspects of the emotional relationships students have with their school and classes. Cognitive engagement was measured by five items designed to assess the extent to which students valued education and things learned at school, as well as their thoughts about learning. More specifically, goal orientation, identification with school, and perceptions of the link between students' lives and school were included as core indicators of cognitive engagement.

HEALTHY BEHAVIORS

We used six items revised from the TAP Survey Question Bank (Small & Rodgers, 1995; Healthy Lifestyle Behaviors and Diet and Other Health Practices subscales) to assess health-related behaviors (i.e., sleep, visits to a health professional and oral care, perception of weight, and actions taken to reduce weight). The three items were: 1. "How many hours of sleep a night do you usually get (on average)?" with response options ranging from *4-5 hours* to *10 or more hours*; 2. "When was the last time you were seen by a doctor or other health professional (NOT including the school nurse)?" with response options ranging from *In the last year* to *Over 6 years ago*; and 3. "When was the last time you saw a dentist for a check-up, exam, teeth cleaning, or other dental work," with response options ranging from *In the last year* to *Over 6 years ago*.

ADULT MENTORS

We used one item from the Search Institute's PSL-AB (Leffert, Benson, Scales, Sharma, Drake, & Blyth, 1998) questionnaire to assess participants' relationships with adults other than their parents. This item asks: "Not including your parents or teachers, how many adults have you known for one or more years who talk with you at least once a month?" Response options range from "0" to "5 or more".

SCIENCE, ENGINEERING, AND COMPUTER TECHNOLOGY (SECT)

To assess respondent's participation in and attitudes toward various types of activities related to Science, Engineering, and Computer Technology (SECT), we included eight questions in Grades 10 through 12 on participation in SECT programs, performance in SECT-related classes, whether youth plan to take courses in SECT in the future, and whether they plan to pursue a SECT-related career. A sample item is, "The programs that I participate in after school and in the summer include science, engineering, and/or technology" with response options ranging from *never* to *often*.

INTENTIONAL SELF-REGULATION (ISR)

We used the Selection, Optimization, and Compensation (SOC) questionnaire (Freund & Baltes, 2002) to measure intentional self-regulation. In particular, we used four subscales from the short version of the SOC Questionnaire: Elective Selection, Loss-based Selection (Waves 6-8 only), Optimization, and Compensation. Elective Selection (ES) represents the construction of a goal hierarchy and the commitment to a one or a small set of goals. Loss-based selection (LBS) refers to the reorganization of one's goal hierarchy due to a loss in goal-relevant means. Optimization (O) refers to the acquisition, deployment, and refinement of goal-relevant means to achieve one's goals. Compensation (C) refers to the use of alternative means to maintain a given level of functioning or achieve a goal when initial goal-relevant means are no longer available.

Each of the subscales has six items; each item consists of two statements, one describing behavior reflecting ES, LBS, O, or C and the other describing a non-SOC related behavior. Participants are asked to decide which of the statements is more similar to how they would behave. An item from the Elective Selection subscale is "I concentrate all my energy on few things [Person A]" or "I divide my energy among many things [Person B]." An item from the Loss-Based Selection subscale is "When I can't do something as well as I used to, I think about what exactly is important to me [Person A]" or "When I can't do something as well as I used to, I wait and see what comes [Person B]." An Optimization subscale item is "When I do not succeed right away at what I want to do, I don't try other possibilities for very long [Person A]" or "I keep trying as many different possibilities as are necessary to succeed at my goal [Person B]." An item from the Compensation subscale is "Even if something is important to me, it can happen that I don't invest the necessary time or effort [Person A]" or "For important things, I pay attention to whether I need to devote more time or effort [Person B]." Affirmative responses are summed to provide a score for each individual on each subscale.

KEY FINDINGS FROM THE 4-H STUDY OF PYD

While the findings we note later in this report underscore the role that 4-H participation can play in placing youth on positive developmental trajectories, the larger aim of the 4-H Study of Positive Youth Development was to identify factors that are involved in the process of positive development among youth.

Accordingly, we summarize here the key findings about the PYD process discovered within the 4-H Study:

1. PYD is constituted by "Five Cs": Competence, Confidence, Character, Caring, and Connection.

2. Intentional Self Regulation (ISR) provides key cognitive and behavioral bases of PYD. For instance, intentional self regulation positively predicts both PYD and youth Contribution, and negatively predicts risk/problem behaviors within and across grades.

3. Hopeful future expectations are a key emotional basis of PYD. Hopefulness about the future is measured by youth's expectations for positive future outcomes. Within and across grades, participants' hopeful future scores are associated with high scores on ISR, PYD, and youth Contribution, and with low risk behaviors and depressive symptoms.

4. School engagement is a foundation of achievement in the school context. School engagement has behavioral, emotional, and cognitive components. Within and across grades, school engagement is associated with better self-reported grades and lower involvement in delinquency and substance use. School engagement is predicted by adolescents' ISR.

5. Key ecological assets promoting PYD are individuals, including parents, mentors, teachers, coaches, and faith leaders; institutions, such as OST activities, parks, and libraries; collective action involving youth-adult collaboration and partnerships in valued family, school, and community activities; and access, indexed by factors such as transportation and safety. In each setting, within and across grades, individuals are always the most important asset in predicting PYD and youth Contribution.

6. Contribution is a key outcome of PYD. Contribution may involve Active and Engaged Citizenship (AEC). To assess AEC, we asked youth about their perceptions of their civic duties, civic skills, neighborhood social connections, and civic participation. Within and across grades, AEC is predicted by ISR, hope, and PYD.

7. Higher scores on PYD are generally associated with lower risk/problem behaviors. Such behaviors include externalizing problems such as bullying, substance use, and delinquency, as well as internalizing problems such as depression. ISR, hope, and PYD are negatively related to risk/problem behaviors within and across grades.

TRAJECTORIES: PATHWAYS OF DEVELOPMENT GRADES 5 TO 12

We used information from students who participated in two or more years of the study and who had outcome data on at least one variable of interest (PYD, Contribution, depressive symptoms, and risk/problem behaviors; *N* = 2,930) to explore developmental pathways, or trajectories, through Grade 12. We developed models for several long-term trajectories (optimal, problematic, and gradations in between) involving PYD, Contribution, depressive symptoms, and risk/problem behaviors.

Trajectory analysis uses longitudinal data to estimate patterns of change (pathways) in an outcome of interest. Specifically, the procedure identifies groups within a population with qualitatively different developmental pathways. One assumption of the analysis used is that every individual assigned to a particular trajectory group follows the same or a similar pathway in the outcome. Thus, the analysis is focused on change at the group level, not the individual level. Despite this, it is often helpful to examine the general characteristics of different groups, such as the number of males versus females in each trajectory. Tables 1 through 4 provide descriptive information about the gender breakdown for the following trajectories.

Figure 7. **PYD TRAJECTORIES GRADES 5-12/WAVES 1-8**

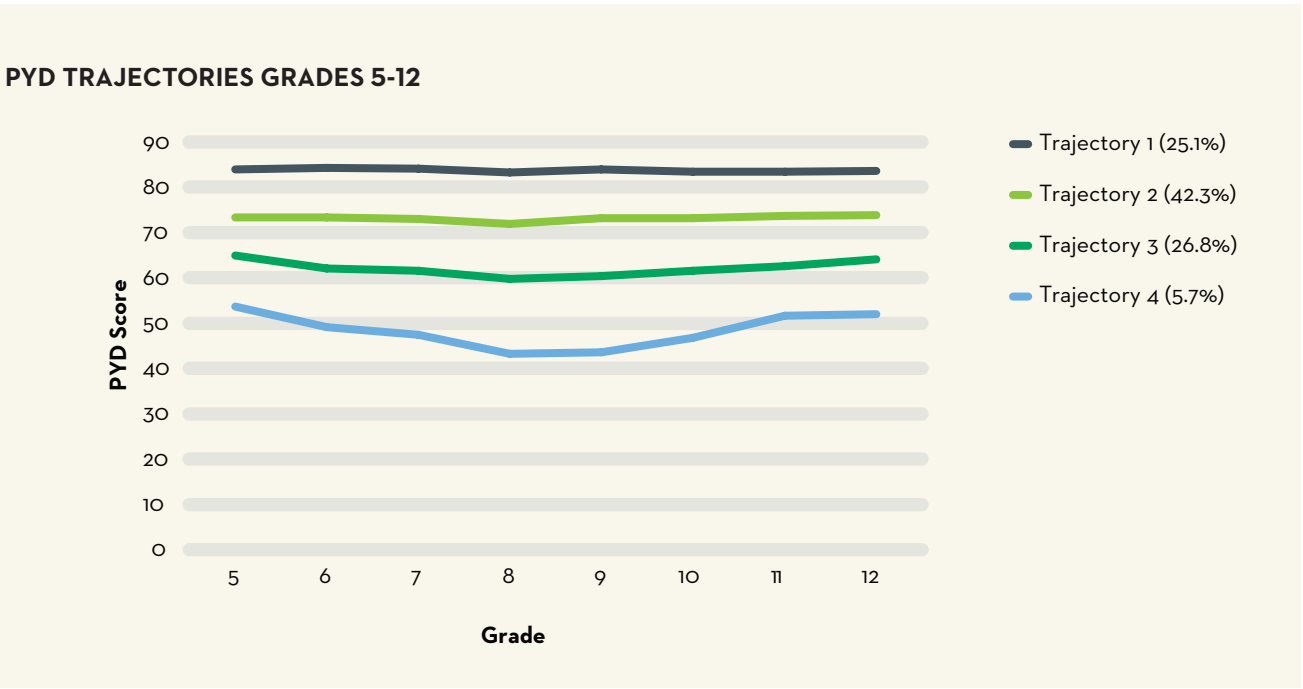


Table 1. **PERCENTAGE OF SAMPLE IN EACH TRAJECTORY BY GENDER.**

	PERCENT OF TOTAL SAMPLE	PERCENT OF MALE SAMPLE (N=1134)	PERCENT OF FEMALE SAMPLE (N=1764)
TRAJECTORY 1	23.6%	16.4%	28.4%
TRAJECTORY 2	45.8%	43.1%	47.3%
TRAJECTORY 3	25.9%	32.5%	21.8%
TRAJECTORY 4	4.7%	8.0%	2.6%

Note: Percentages based on most likely group membership for each individual.

In regard to PYD, we found four pathways that indicate relative stability in PYD across adolescence. It appears that fifth graders (approximately age 10 years, the beginning of adolescence) tended to maintain a relatively stable level of PYD through Grade 12 (*N* = 2,887).

The finding of such marked consistency suggests that the individual and ecological factors that place youth on a particular pathway tend to exert a continuous influence across adolescence. Accordingly, future interventions that seek to move youth from a lower level of PYD to a higher level will need to take into account the power and persistence of such individual and ecological factors. Future research and practice must identify effective ways to modify these factors if there is an interest in enhancing the positive development of adolescents.

Figure 8. **CONTRIBUTION TRAJECTORIES GRADES 5-12/WAVES 1-8**

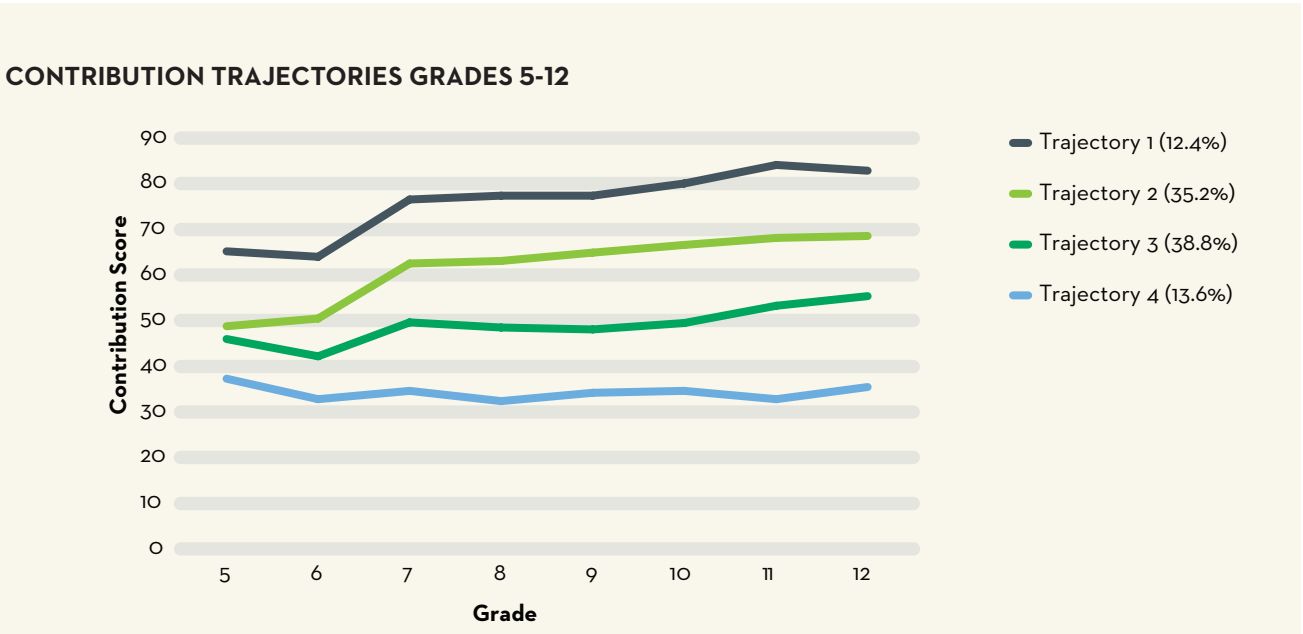


Table 2. **PERCENTAGE OF SAMPLE IN EACH TRAJECTORY BY GENDER.**

	PERCENT OF TOTAL SAMPLE	PERCENT OF MALE SAMPLE (N=1134)	PERCENT OF FEMALE SAMPLE (N=1764)
TRAJECTORY 1	10.2%	6.1%	12.9%
TRAJECTORY 2	35.9%	30.0%	40.0%
TRAJECTORY 3	43.1%	47.6%	39.7%
TRAJECTORY 4	10.8%	16.3%	7.4%

Note: Percentages based on most likely group membership for each individual.

Across Grades 5 through 12, youth showed four different trajectories of contribution. Many youth increased in contribution across the study, but only about 12% (Trajectory 1) of youth show the highest and most desired levels of contribution (*N* = 2,870).

Figure 9. **DEPRESSIVE SYMPTOMS TRAJECTORIES GRADES 5-12/WAVES 1-8**

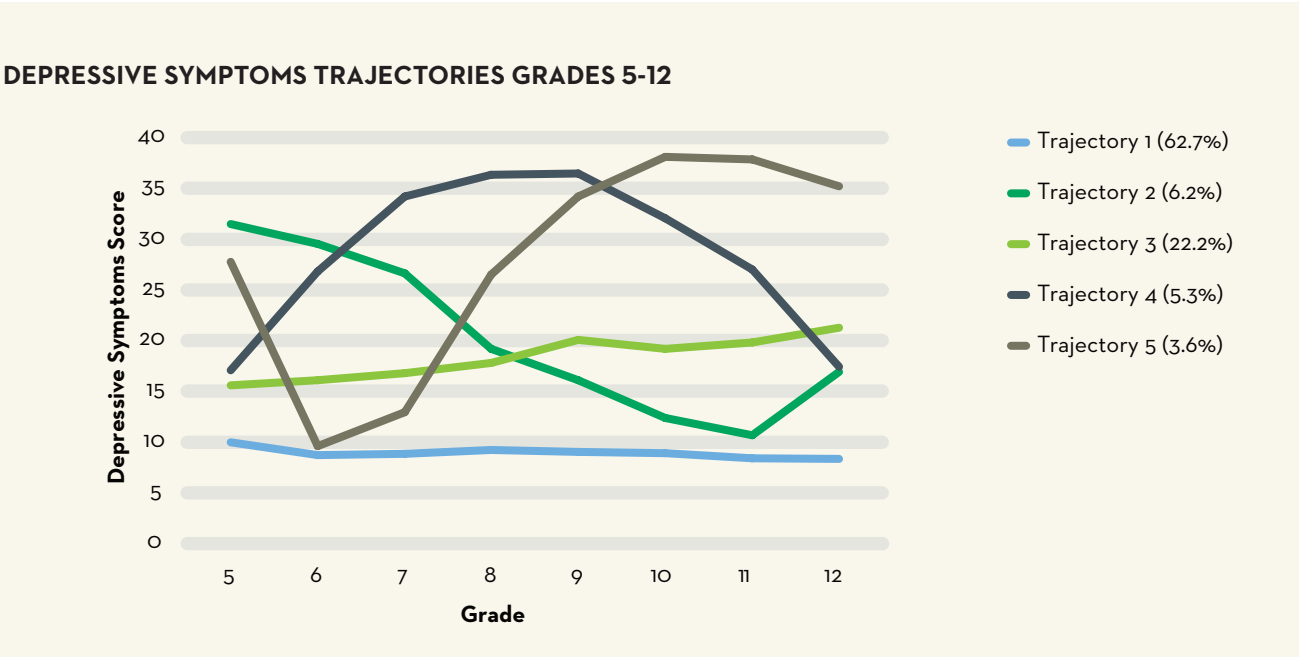


Table 3. **PERCENTAGE OF SAMPLE IN EACH TRAJECTORY BY GENDER**

	PERCENT OF TOTAL SAMPLE	PERCENT OF MALE SAMPLE (N=1134)	PERCENT OF FEMALE SAMPLE (N=1764)
TRAJECTORY 1	68.0%	73.2%	64.7%
TRAJECTORY 2	4.0%	4.2%	3.9%
TRAJECTORY 3	20.5%	18.2%	21.9%
TRAJECTORY 4	4.7%	2.6%	6.1%
TRAJECTORY 5	2.8%	1.8%	3.5%

Note: Percentages based on most likely group membership for each individual.

Our indicator of youth depressive symptoms displayed a variety of developmental trajectories across Grades 5 through 12. Most youth (approximately 62.7 % - Trajectories 1 and 2) showed stable, low levels of depression over time; yet, the remaining 37.3% of youth deviated from this optimal trajectory. While the present data suggest many interesting interpretations, disentangling these complex trajectories, and what places youth on one trajectory versus another, will require more nuanced research in the future (*N* = 2,909).

Figure 10. **RISK BEHAVIOR TRAJECTORIES GRADES 5-12/WAVES 1-8**

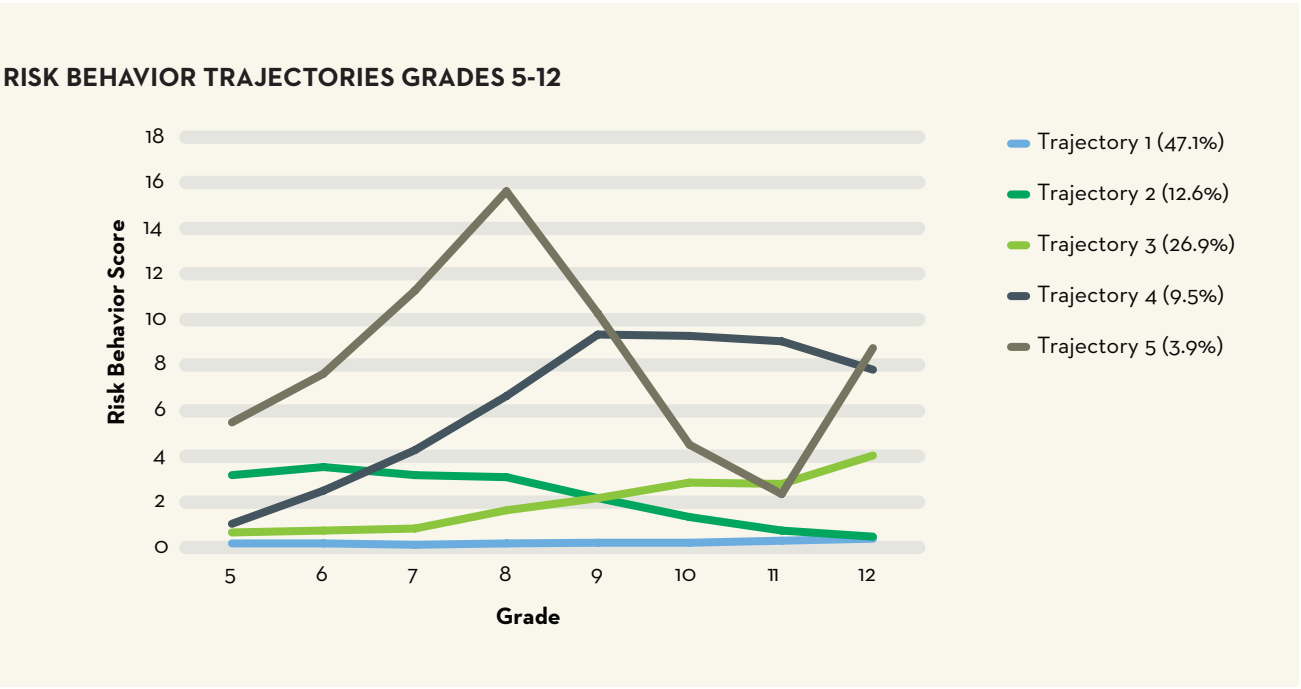


Table 4. **PERCENTAGE OF SAMPLE IN EACH TRAJECTORY BY GENDER.**

	PERCENT OF TOTAL SAMPLE	PERCENT OF MALE SAMPLE (N=1134)	PERCENT OF FEMALE SAMPLE (N=1764)
TRAJECTORY 1	51.0%	38.7%	59.0%
TRAJECTORY 2	10.1%	14.0%	7.6%
TRAJECTORY 3	26.9%	29.2%	25.3%
TRAJECTORY 4	8.8%	12.7%	6.3%
TRAJECTORY 5	3.2%	5.4%	1.8%

Note: Percentages based on most likely group membership for each individual.

Across grades, most youth (more than 86.6%; Trajectories 1, 2, and 3) reported no or very low levels of risk/problem behaviors. This finding counters the youth stereotype of storm and stress, at least among the adolescents in the 4-H Study sample. Indeed, only 9.5% of youth (Trajectory 4) show moderate levels of risk/problem behaviors that slightly decrease in high school. Another 3.9 % of youth (Trajectory 5) show a steady increase in risk/problem behaviors as they move into high school, with a decrease one to two years later, and then another increase in Grade 12 (N = 2,905).

Overall, the above trajectory analyses show that there is marked consistency across adolescence in our sample for both PYD and Contribution. In terms of risk/problem behaviors, only a small proportion of youth show increasing risk across adolescence. As we mentioned above, the trajectories for depression across the eight years of the study are more complex. We will need to delve deeper into our data to ascertain the correlates of this diversity.

4-H PARTICIPATION AND YOUTH DEVELOPMENT

In this comprehensive report, we present the results of outcomes across all eight waves in order to ascertain patterns of differences across all grades. Specifically, we assessed the relationships between PYD and participation in 4-H clubs and 4-H after-school programs, compared to participation in other OST activities. We compared youth who participated at least twice per month in 4-H programs to other youth who regularly participated in other OST activities and controlled for the probability that a given youth would participate in 4-H (as indicated by gender, race/ethnicity, rural/suburban/urban community, family per capita income, mother's education, and region of the country).

The tables below represent the significant mean differences (standard errors in parentheses) between scores of 4-H youth and scores of youth in other OST programs in our sample. Blank cells indicate that there were no significant differences between the groups noted in the rows (i.e., 4-H youth vs. non 4-H youth, 4-H girls vs. non 4-H girls, 4-H boys vs. non 4-H boys, 4-H boys vs. 4-H girls). The table below describes how we compared youth in our sample and serves as a guide for interpreting findings:

	POSITIVE MEAN DIFFERENCE IN OUTCOME	NEGATIVE MEAN DIFFERENCE IN OUTCOME
4-H YOUTH VS. NON 4-H YOUTH	**4-H youth score higher on outcome than OST youth**	**4-H youth score lower on outcome than OST youth**
4-H GIRLS VS. NON 4-H GIRLS	**4-H girls score higher on outcome than OST girls**	**4-H girls score lower on outcome than OST girls**
4-H BOYS VS. NON 4-H BOYS	**4-H boys score higher on outcome than OST boys**	**4-H boys score lower on outcome than OST boys**

For example, a mean difference of 6.27 in PYD scores of 4-H girls vs. 4-H boys indicates that 4-H girls score 6.27 points *higher* on PYD (in Grade 9; see Table 21, *Significant mean differences in PYD*,). A mean difference of -3.32 in depressive symptoms scores of 4-H girls vs. non 4-H girls indicates that girls in 4-H score 3.32 points *lower* than girls in other OST activities (in Grade 8; see Table 9, *Significant mean differences in Depression*,).

The findings presented in this section may differ from the results presented in the Annual Reports from Waves 6, 7, and 8 (Grades 10, 11, and 12). This variation may be due to improvements in our methods of analysis. Specifically, we did two things differently for the Comprehensive Report analyses:

1. *Improved the quality of the sample*: At some waves of data collection, a small number of youth took the survey who fell outside of the age range we wanted to capture. We removed these participants from the analyses for this report.
2. *Used a different method of analysis:* In previous reports, we used a technique called *logistic regression analysis*, which involves estimating the significance level of a distribution involving youth being either high or low on an outcome. The technique we used for the present report is a different form of regression analysis (termed "Ordinary Least Squares") that is more sensitive to the range of values of each outcome.

Due to these changes, the results presented below are more precise than those presented in previous reports. These results thus provide a more *conservative* estimate of the relationships that may exist in the population. Discrepancies between the following results and previous findings do not necessarily mean that previous findings were wrong; discrepancies indicate where relationships are especially weak and do not hold in a more constrained sample. A majority of such discrepancies were sporadic and unless otherwise noted the interpretation of the following findings is in line with the findings presented in previous reports.

Table 5. **SAMPLE SIZES FOR GROUP COMPARISONS IN EACH GRADE/WAVE**

	GRADE 5 WAVE 1	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH	56	164	354	320	187	617	315	201
NON 4-H YOUTH	79	114	238	196	135	343	200	129
4-H GIRLS	29	105	225	216	126	437	243	148
NON 4-H GIRLS	45	69	144	112	92	217	129	90
4-H BOYS	27	58	123	104	60	176	71	52
NON 4-H BOYS	33	45	93	81	42	123	70	36

PYD AND CONTRIBUTION

In Grades 8 and 11, 4-H participants reported significantly higher levels of PYD than among the comparison group (youth who participated in other OST programs). In addition, 4-H girls reported higher levels of PYD than non 4-H girls in Grades 8 and 11, and 4-H boys scored higher than non 4-H boys in Grade 11. These findings are not consistent across grades and indicate that if there are any population differences, then they are weak at best.

Table 6. **SIGNIFICANT MEAN DIFFERENCES IN PYD (ON A SCALE OF 0 TO 100)**

	GRADE 5 WAVE 1	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH				2.95* (1.25)			3.47*** (0.92)	
4-H GIRLS VS. NON 4-H GIRLS				3.57* (1.54)			2.94** (1.05)	
4-H BOYS VS. NON 4-H BOYS							4.67* (1.81)	

*p < .05; **p < .01; ***p < .001

Findings indicated that 4-H youth are substantially more likely than other youth to make contributions to their communities in Grades 7 through 12. Similar results were found when comparing 4-H girls to non 4-H girls. 4-H boys were significantly more likely than non 4-H boys to contribute to their communities at Grades 7, 10, and 11. Overall, these findings suggest generally stable differences between youth enrolled in 4-H and youth enrolled in other out of school activities.

Table 7. **SIGNIFICANT MEAN DIFFERENCES IN CONTRIBUTION (ON A SCALE OF 0 TO 100)**

	GRADE 5 WAVE 1	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH			6.32*** (1.37)	7.81*** (1.57)	6.82*** (1.80)	5.59*** (1.11)	10.00*** (1.35)	5.66** (1.92)
4-H GIRLS VS. NON 4-H GIRLS			6.17*** (1.71)	11.14*** (1.93)	7.05** (2.16)	5.62*** (1.27)	10.75*** (1.54)	5.04* (1.95)
4-H BOYS VS. NON 4-H BOYS			6.47** (2.21)			5.23* (2.07)	8.56** (2.66)	

*p < .05; **p < .01; ***p < .001

RISK/PROBLEM BEHAVIORS

There were generally no significant differences in reported risk/problem behaviors between 4-H youth and non 4-H youth.

Table 8. **SIGNIFICANT MEAN DIFFERENCES IN RISK BEHAVIORS (ON A SCALE OF 0 TO 30)**

	GRADE 5 WAVE 1	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH								
4-H GIRLS VS. NON 4-H GIRLS							-0.41* (0.19)	
4-H BOYS VS. NON 4-H BOYS								

*p < .05; **p < .01; ***p < .001

DEPRESSION

There were generally no significant differences in reported depression between 4-H youth and non 4-H youth.

Table 9. **SIGNIFICANT MEAN DIFFERENCES IN DEPRESSION (ON A SCALE OF 0 TO 60)**

	GRADE 5 WAVE 1	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH							-1.53* (0.78)	
4-H GIRLS VS. NON 4-H GIRLS				-3.32** (1.18)				
4-H BOYS VS. NON 4-H BOYS								

*p < .05; **p < .01; ***p < .001

ACTIVE AND ENGAGED CITIZENSHIP

Active and Engaged Citizenship (AEC) is a construct that reflects young people's responses to measures of civic duty, civic skills, neighborhood connection, and civic participation. Consistent with our analysis of youth contribution, we found that 4-H participants displayed consistently higher AEC than youth enrolled in other OST programs. Furthermore, 4-H girls reported higher AEC scores than non 4-H girls in Grades 8 to 11, while 4-H boys only reported higher AEC scores than non 4-H boys at Grade 11. It is therefore likely that the observed differences between 4-H and non-4-H youth reflect the higher levels of AEC displayed by 4-H girls as compared to non-4-H girls.

Table 10. **SIGNIFICANT MEAN DIFFERENCES IN ACTIVE AND ENGAGED CITIZENSHIP (ON A SCALE OF 0 TO 25)**

	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH	1.23** (0.35)	1.32** (0.43)	0.94*** (0.24)	1.57*** (0.29)	0.85* (0.43)
4-H GIRLS VS. NON 4-H GIRLS	1.87*** (0.44)	1.31* (0.50)	1.11*** (0.28)	1.74*** (0.34)	
4-H BOYS VS. NON 4-H BOYS				1.22* (0.57)	

*p < .05; **p < .01; ***p < .001

EDUCATIONAL OUTCOMES

4-H participants reported higher academic competence in Grades 7, 9, 11, and 12, and higher school engagement at Grades 11 and 12 than participants enrolled in other OST activities. While the results for school engagement suggest very few differences, the results for academic competence are somewhat more robust and may indicate a slight advantage for youth enrolled in 4-H.

Table 11. **SIGNIFICANT MEAN DIFFERENCES IN ACADEMIC COMPETENCE (ON A SCALE OF 1 TO 4)**

	GRADE 5 WAVE 1	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH				0.19** (0.07)	0.21* (0.09)		0.12* (0.06)	0.22** (0.07)
4-H GIRLS VS. NON 4-H GIRLS				0.26** (0.09)				
4-H BOYS VS. NON 4-H BOYS								0.43** (0.15)

*p < .05; **p < .01; ***p < .001

Table 12. **SIGNIFICANT MEAN DIFFERENCES IN SCHOOL ENGAGEMENT (ON A SCALE OF 1 TO 5)**

	GRADE 5 WAVE 1	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH							0.27*** (0.06)	0.19* (0.08)
4-H GIRLS VS. NON 4-H GIRLS	0.31* (0.56)						0.20** (0.07)	0.19* (0.08)
4-H BOYS VS. NON 4-H BOYS							0.44** (0.13)	

*p < .05; **p < .01; ***p < .001

HEALTHY BEHAVIORS

As displayed in Table 13, 4-H participants were more likely than youth in other OST programs to have healthier habits in Grades 7, 11, and 12. These habits include wearing a seatbelt, using sunscreen, and wearing a bicycle helmet. These inconsistent, yet uniformly positive findings suggest that any differences between 4-H youth and youth enrolled in other OST activities are small.

Table 13. **SIGNIFICANT MEAN DIFFERENCES IN HEALTHIER HABITS (ON A SCALE OF 0 TO 4)**

	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH	0.19* (0.08)				0.33*** (0.08)	0.27* (0.10)
4-H GIRLS VS. NON 4-H GIRLS					0.38*** (0.09)	0.27* (0.11)
4-H BOYS VS. NON 4-H BOYS						

*p < .05; **p < .01; ***p < .001

HEALTH ROCKS!® (HR!)

Over the course of the 4-H study, we were able to conduct analyses on the 2782 youth who said they had participated in an Anti-smoking/Healthy Decision Making Program at some point in their life. Of this total, 979 youth were 4-Hers. Many of these 4-H youth are likely to have participated in the 4-H Healthy Decision Making Program called *Health Rocks*!® (HR!). However, since HR! has been called other names and integrated into health education curriculum, the responses to the survey did not allow for an exact count of how many youth were exposed to the HR! program. In addition, youth who are not in 4-H could also have had the HR! program. For this reason we conducted analyses on the group of youth who reported participation in an Anti-Smoking/Healthy Decision Making program, whether or not they were in 4-H.

In Grades 6 through 12, we asked youth whether they participated in an anti-smoking/healthy decision making program. Controlling for demographic characteristics, we analyzed whether participation predicted smoking behaviors and attitudes, and the results are summarized below in Table 14. Overall, the findings suggest that participation in an anti-smoking/healthy decision making program was a robust predictor of anti-smoking behaviors and attitudes. It is important to note that the samples varied in their composition across waves, and items used to assess whether youth participated in an anti-smoking program also varied. Results indicate that in Grades 8 through 10, youth who participated in an anti-smoking program were more likely to report that they do not smoke. In Grades 9, 10, and 12, youth who had participated in an anti-smoking program were less likely to approve of smoking among people their age. In Grades 7, 8, 10, and 12, youth who had participated in an anti-smoking program were more likely to say that they think they will not smoke in the future. There were no significant differences in smoking attitudes or behaviors for youth in Grades 6 or 11. See Appendix B - **Effects of Anti-Smoking Programs on Smoking Behaviors and Attitudes** for more detailed analyses.

Table 14. **SIGNIFICANT FINDINGS FOR SMOKING ATTITUDES AND BEHAVIORS AMONG YOUTH WHO PARTICIPATED IN AN ANTI-SMOKING PROGRAM COMPARED WITH THOSE WHO DID NOT.**

	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
DOES NOT SMOKE			✔	✔	✔		
DOES NOT APPROVE OF SMOKING				✔	✔		✔
WILL NOT SMOKE IN THE FUTURE		✔	✔		✔		✔

✔ Indicates the Grade in which youth who participated in an anti-smoking program were more likely to endorse the anti-smoking behavior or attitude.

ADULT MENTORS

There were generally no significant differences in our measure of adult mentors between 4-H youth and non 4-H youth.

Table 15. **SIGNIFICANT MEAN DIFFERENCES IN NUMBER OF ADULT MENTORS (ON A SCALE OF 0 TO 5)**

	GRADE 5 WAVE 1	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH							0.38*** (0.10)	
4-H GIRLS VS. NON 4-H GIRLS				0.30* (0.14)			0.43*** (0.11)	
4-H BOYS VS. NON 4-H BOYS								

*$p < .05$; **$p < .01$; ***$p < .001$

SCIENCE, ENGINEERING, AND COMPUTER TECHNOLOGY

Beginning at Grade 10 (Wave 6) we measured youth participation in after-school science, engineering and computer technology (SECT) programs, as well as youth performance in these areas, future plans to take courses, or plans to pursue careers in science, engineering, and computer technology. We obtained individual scores for participation, performance, and future plans for courses and careers, as well as a composite SECT score for participation, performance and future plans for all three areas (science, computer technology and engineering). With respect to participation in SECT programs, 4-H participants were generally more likely than youth in other OST programs to participate in SECT programs, with significant differences found for both boys and girls. However, there were no consistent differences between 4-H youth and non-4-H youth in SECT performance, plans to pursue courses, and plans to pursue careers.

As noted earlier, the findings presented in this section may differ from the results presented in the Annual Reports from Waves 6, 7, and 8 (Grades 10, 11, and 12). These variations may be due to improvements in our methods of analysis. We improved the quality of our sample by removing participants whose age fell outside the bounds of our target cohort and/or who reported being substantially outside the target cohort's grade in school. That is, we removed participants whose ages were not within 1.5 years of the target cohort's age, or who reported being in a grade more than one grade above or below the target cohort's expected grade in school.

In previous reports, we also used a technique called *logistic regression analysis*, which involves estimating the significance level of a distribution involving youth being either high or low on an outcome. The technique we used for the present report is a different form of regression analysis (termed "Ordinary Least Squares") that is more sensitive to the range of values of each outcome.

Several of the tables below are blank (i.e., Tables 17 and 19), because there were no significant findings for these outcomes. These tables are included to maintain transparency in reporting of both significant and non-significant results.

Table 16. **SECT PARTICIPATION (ON A SCALE OF 0 TO 3)**

	SCIENCE			ENGINEERING			COMPUTER TECHNOLOGY			SEC T COMPOSITE		
	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH	0.32*** (0.07)	0.31** (0.10)	0.44*** (0.13)	0.21*** (0.05)	0.26** (0.08)		0.22*** (0.06)	0.25** (0.09)	0.30** (0.11)	.248*** (.054)	.271*** (.077)	.319** (.101)
4-H GIRLS VS. NON 4-H GIRLS	0.27** (0.08)	0.23* (0.12)	0.52*** (0.15)	0.13* (0.06)			0.16* (0.07)	0.21* (0.10)		.186** (.060)	.197* (.085)	.318** (.108)
4-H BOYS VS. NON 4-H BOYS	0.40** (0.12)	0.55** (0.18)		0.39*** (0.12)	0.50** (0.18)		0.32** (0.12)	0.38* (0.19)		.371*** (.105)	.477** (.159)	

*$p < .05$; **$p < .01$; ***$p < .001$

Table 17. **SECT PERFORMANCE (ON A SCALE OF 0 TO 3)**

	SCIENCE			ENGINEERING			COMPUTER TECHNOLOGY			SEC T COMPOSITE		
	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH												
4-H GIRLS VS. NON 4-H GIRLS												
4-H BOYS VS. NON 4-H BOYS												

*$p < .05$; **$p < .01$; ***$p < .001$

Table 18. **SECT PLAN TO TAKE COURSES (ON A SCALE OF 0 TO 4)**

	SCIENCE			ENGINEERING			COMPUTER TECHNOLOGY			SEC T COMPOSITE		
	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH							-0.23* (0.10)					
4-H GIRLS VS. NON 4-H GIRLS	-0.28** (0.11)			-0.28* (0.14)			-0.35** (0.13)					
4-H BOYS VS. NON 4-H BOYS												

*p < .05; **p < .01; ***p < .001

Table 19. **SECT PLAN TO PURSUE CAREER (ON A SCALE OF 0 TO 4)**

	SCIENCE			ENGINEERING			COMPUTER TECHNOLOGY			SECT COMPOSITE		
	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H YOUTH VS. NON 4-H YOUTH												
4-H GIRLS VS. NON 4-H GIRLS												
4-H BOYS VS. NON 4-H BOYS												

*p < .05; **p < .01; ***p < .001

Note: Previous reports found significant differences between 4-H and non-4-H youth regarding their plans to pursue a career in one of the SECT fields. While these findings do not replicate in the more constrained sample used in the present report, we emphasize that actual SECT participation remains significantly higher among 4-H youth. Thus, 4-H and non-4-H participants in the more constrained sample were equally likely to intend on pursuing a SECT career, but 4-H participants were more likely to be actively participating is SECT activities.

GENDER DIFFERENCES AMONG 4-H YOUTH

In addition to comparing 4-H youth to non 4-H youth in developmental outcomes, we also explored gender differences within the 4-H sample. Table 20 shows the sample sizes for 4-H girls and 4-H boys in each wave. Table 21 summarizes positive mean differences in outcomes, indicating that 4-H girls scoring higher on the particular outcome as compared to 4-H boys.

	POSITIVE MEAN DIFFERENCE IN OUTCOME	NEGATIVE MEAN DIFFERENCE IN OUTCOME
4-H GIRLS VS. 4-H BOYS	4-H girls score higher on outcome than 4-H boys	4-H girls score lower on outcome than 4-H boys

Table 20. **SAMPLE SIZES FOR GROUP COMPARISONS IN EACH GRADE**

	GRADE 5 WAVE 1	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
4-H GIRLS	29	105	225	216	126	437	243	148
4-H BOYS	27	58	123	104	60	176	71	52

As summarized in Table 21, our findings indicate that 4-H girls generally displayed higher indices of positive thriving than 4-H boys. 4-H girls reported significantly higher levels of both PYD and Contribution than 4-H boys in nearly every wave of our study (and AEC in all of the waves measured), suggesting generally stable differences between girls and boys over time.

Furthermore, 4-H girls were significantly less likely than 4-H boys to engage in risk/problem behaviors in Grades 6, 8, 10, 11, and 12. However, the results suggested few differences in depression between 4-H girls and 4-H boys.

As we mentioned earlier in this report, an important individual strength related to PYD is an adolescent's school engagement. Our analyses indicated that 4-H girls showed relatively higher levels of academic competence and school engagement across the eight years of our study, replicating the general trend for 4-H girls to display higher indices of positive developmental outcomes than 4-H boys in our study. In addition, 4-H girls were more likely than 4-H boys to endorse healthy habits in all waves of our study. Finally, the results indicated no meaningful differences between 4-H boys and 4-H girls on the presence of adult mentors.

Table 21. **GENDER DIFFERENCES AMONG 4-H YOUTH**

	GRADE 5 WAVE 1	GRADE 6 WAVE 2	GRADE 7 WAVE 3	GRADE 8 WAVE 4	GRADE 9 WAVE 5	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
PYD		7.18** (2.32)	3.66** (1.30)	4.85** (1.51)	6.27** (1.98)	5.89*** (1.03)	2.96* (1.27)	5.57** (1.71)
CONTRIBUTION		7.55** (2.49)	5.24** (1.64)	9.77*** (1.94)	5.49* (2.34)	7.63*** (1.39)	7.66*** (1.78)	9.46*** (2.56)
AEC	Not measured	Not measured	Not measured	1.80*** (0.45)	1.27* (0.57)	1.54*** (0.31)	1.21** (0.41)	1.48** (0.55)
RISK/ PROBLEM BEHAVIORS		-2.55*** (0.54)		-1.09** (0.36)		-1.89*** (0.26)	-1.25*** (0.30)	-1.73*** (0.44)
DEPRESSION							2.82* (1.14)	
ACADEMIC COMPETENCE	-0.43* (0.17)	0.27* (0.12)		0.21* (0.08)	0.24* (0.11)	0.31*** (0.06)		
SCHOOL ENGAGEMENT			0.10* (0.05)	0.32*** (0.09)	0.34** (0.13)	0.32*** (0.07)	0.17* (0.86)	0.36*** (0.11)
HEALTHY BEHAVIORS	Not measured	Not measured	0.23* (0.11)	0.25* (0.11)	0.42** (0.14)	0.39*** (0.08)	0.40*** (0.12)	0.55*** (0.15)
ADULT MENTORS	0.75* (0.36)							

*p < .05; **p < .01; ***p < .001

In regard to science, engineering, and computer technology (SECT) outcomes, 4-H girls were less likely than 4-H boys to participate in engineering and computer technology programs, consistent with the general paucity of women who pursue college degrees in STEM-related fields (e.g., Hill, Corbett, & St. Rose, 2010). 4-H boys similarly reported higher performance and were more likely to have plans for a career in engineering and computer technology than 4-H girls across Grades 10 to 12.

Table 22. **GENDER DIFFERENCES AMONG 4-H YOUTH**

	SCIENCE			ENGINEERING			COMPUTER TECHNOLOGY			SECT COMPOSITE		
	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8	GRADE 10 WAVE 6	GRADE 11 WAVE 7	GRADE 12 WAVE 8
PARTICIPATION				-0.48*** (0.07)	-0.49*** (0.12)	-0.50*** (0.14)	-0.33*** (0.08)	-0.43** (0.13)		-0.33*** (0.07)	-0.38** (0.12)	
PERFORMANCE				-0.64*** (0.09)	-0.77*** (0.13)	-0.67*** (0.15)	-0.20* (0.09)	-0.35** (0.13)	-0.43** (0.14)	-0.31*** (0.07)	-0.41*** 0.10)	-0.39** (0.12)
PLANS TO TAKE COURSES				-0.35** (0.14)	-0.43* (0.20)	-0.58* (0.25)			-0.51* (0.23)	-0.35*** (0.09)	-0.28* (0.13	0.59*** (0.16)
PLANS TO PURSUE A CAREER				-0.59*** (0.14)	-0.53* (0.21)	-0.87*** (0.25)	-0.39** (0.14)		-0.71** (0.24)	-0.23* (.09)		-0.42** (0.15)

*p < .05; **p < .01; ***p < .001

CONCLUSIONS ABOUT 4-H YOUTH

In the 4-H Study we have found some important relations between 4-H participation and the characteristics and correlates of positive youth development (PYD). These findings have been identified in both the point-in-time and the longitudinal analyses. Of course, the true value of 4-H programs may come not from short-term results or even the results over the few years spanned by our study. The value may instead come from the program's influence on life-long pathways of development. Continued study of the 4-H Study participants beyond the high school years is needed to assess whether such longer-term influences exist. Nevertheless, there is great value in ascertaining if, during middle and high school, youth with a history of 4-H participation appear to be on a healthy trajectory. From the findings we have represented, it seems to be the case that 4-H youth are on such a positive trajectory.

Clearly, 4-H youth are contributing more to their world than youth in similar OST activities. This difference includes the higher levels of active and engaged citizenship shown by 4-H youth. The consistency across adolescence of greater contributions by 4-H youth is arguably among the most important findings of the 4-H Study.

Indeed, the finding highlights the unique power of longitudinal investigations. Given the large number of comparisons made at any point in time between 4-H youth and other youth, a difference, or even a few differences, seen at a given point in adolescence may not lend itself to the interpretation that a developmental advantage has been identified. However, when a difference is found consistently across time, and in different configurations of samples, the contention that a developmental advantage exists is on much stronger footing.

The major limitation to this finding, however, is that the advantage for 4-H youth was by and large manifested among girls only. Findings comparing 4-H boys to non-4-H boys suggest a much weaker and more sporadic benefit for 4-H youth than do the same analyses for girls. Future research must therefore investigate the cause of these differences and determine if it is possible to find ways to ameliorate them.

Nevertheless, the consistently greater levels of contribution by 4-H youth and our findings in regard to indicators of healthy living (e.g., healthier habits), educational outcomes (e.g., school engagement), and SECT (e.g., participation and interest in science, engineering and technology) provide evidence for arguing that 4-H youth are thriving across substantial portions of their adolescence. We expect that these indicators of positive and healthy development will provide assets for 4-H youth as they enter their adult years. Although only future longitudinal research can indicate if this hope is realized, our "best bet" would be that such advantages are indeed the case.

CHALLENGES AND LESSONS LEARNED

Many of the youth who participated in the 4-H study of PYD were recruited through schools and, as such, their participation depended on their informed consent and on permission from a superintendent and principal, as well as on consent from their parents. While our sample provides regional, rural/urban, racial/ethnic, and socioeconomic variation, it does not provide for generalizability in the manner associated with a sample that is representative of the overall adolescent population in the United States. In particular, schools that are stressed for time and resources may find it challenging to participate in a study such as the 4-H Study, and parents who do not speak English as a first language may be less likely to send in a signed consent form. Moreover, the survey methodology that we used to assess participants provides only a single means of appraising participants' behaviors.

Despite these challenges, the 4-H Study was able to recruit a *relatively* diverse initial sample for the first several waves, albeit not one from either far extremes of the "normal distribution." For example, neither at risk/in risk youth nor very privileged youth were systematically or intentionally sampled. Moreover, it became increasingly difficult to follow up with many marginally at risk/in risk participants as the study progressed. Many of these participants were not geographically stable and it became challenging to obtain forwarding addresses and contact information for these youth and their families. If families moved and did not provide researchers or schools with updated contact information, it was not possible to follow up with these youth in subsequent waves. Although additional youth were added at later waves to increase the size of the sample, the sample became increasingly less diverse as the study progressed due to the specific challenges associated with recruiting diverse samples, such as youth with language barriers, residential mobility, etc.

The challenge of obtaining and maintaining a diverse longitudinal sample is one that is common to many large-scale research studies in the field (Verdonik & Sherrod, 1984; Young, Savola, & Phelps, 1991). Maintaining a sample that is comprised of potentially at-risk or in-risk youth requires different methodology and techniques that are both intensive and expensive. Given the goals of the 4-H Study, these methods (e.g., qualitative or ethnographic methods) were not within the scope of the project. Nevertheless, although the longitudinal sample for the 4-H Study may not be representative of all youth in the United States, it still provides important and innovative information about adolescent development for large segments of the U.S. youth population.

Finally, one of the key limitations of the 4-H Study of PYD, and, indeed, any longitudinal study, was attrition. Attrition in the 4-H Study sample is not randomly distributed across schools or youth program sites. For example, in Wave 2 and Wave 3, some principals withdrew consent for their school to participate. Thus, these students "dropped out" without having had the opportunity to remain in the study. The withdrawal of principal or superintendent permission to continue testing resulted in a large loss of participants in Wave 2. However, attrition from Wave 1 to Wave 2 for students who were allowed to be asked to remain in the study was only 10%.

Fortunately, we consistently contacted all youth who ever participated in the study, and many youth who were not surveyed in earlier waves came back into the study in later waves. During Waves 4, 5, 6, 7, and 8 we continued to contact all youth who were part of the first three waves. In addition, we increased the sample by expanding our recruitment of youth in 4-H clubs around the country.

Despite any potential sampling issues in the 4-H Study, it is important to distinguish between these issues and 4-H programs in general. 4-H has been extremely successful in the reach and the scope of its programs, with more than 540,000 volunteers and 3,500 professionals involved in 4-H programming within diverse communities across the U.S. While it was difficult for the 4-H Study of PYD to maintain a sample that included a large number of at-risk or in-risk youth from widely diverse backgrounds, 4-H programs have been very successful in continuing to involve such diverse youth in their programs. 4-H programs successfully target diverse youth in both urban and rural settings, and have maintained inclusion of these participants as a critical part of their programmatic goals.

CODA: NEXT STEPS FOR THE STUDY OF PYD

The 4-H Study is a first-of-its-kind longitudinal investigation that continues to yield important information about the bases and implications of PYD, information that can help launch young people into healthy and productive lives. The findings continue to be used widely by youth program professionals and, to an increasing extent, policy makers. These impacts on application move the 4-H Study toward its chief objective: To provide useful scientific evidence about actions that may be taken to enhance the lives of the diverse young people of America.

One of the conclusions we have drawn from our findings to date is that youth programs cannot remain static; they must expand and change in order to address the diverse and changing characteristics, needs, and interests of adolescents and their families (e.g., Balsano, Phelps, Theokas, Lerner, & Lerner, 2009; Mueller, Lewin-Bizan, & Urban, 2011; Theokas, Lerner, Lerner, & Phelps, 2006; Zarrett & Lerner, 2008). We also have concluded that youth programs must address both prevention and promotion; contrary to popular belief, focusing on one does not necessarily affect the other (Lewin-Bizan, Lynch, Fey, Schmid, McPherran, Lerner, & Lerner, 2010; Phelps et al., 2007).

We are grateful that we have been given support from National 4-H Council and Philip Morris USA, an Altria company, to continue this study through Grade 12. Their generous support has allowed us to gather and analyze important new information that will help the youth of today and tomorrow. We hope that in the future we can build upon and extend this longitudinal study so we can gain powerful and practical insights into what guides a thriving young person into a productive and successful adulthood. With such additional research, we would also be able to determine which PYD assets are related to critical life events, such as completing high school, going to college, successful entry into the workforce, or embarking on military service to our nation (Lerner, et al., 2009). Following the 4-H Study participants beyond high school remains an important next step that will provide novel insights into how youth development programs such as 4-H can help adolescents develop into productive and healthy adults. Such knowledge would be of inestimable value for science, for practitioners, and for developing the social policy of tomorrow.

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APPENDIX A

THE 4-H STUDY OF POSITIVE YOUTH DEVELOPMENT: PUBLICATIONS

Books and Monographs:

Lerner, R. M. (2004). *Liberty: Thriving and civic engagement among America's youth*. Thousand Oaks, CA: Sage Publications.

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APPENDIX B

EFFECTS OF ANTI-SMOKING PROGRAMS ON SMOKING BEHAVIORS AND ATTITUDES

From the beginning of the 4-H Study of Positive Youth Development, we were very interested in identifying youth who had participated in the 4-H Healthy Decision Making Program named HealthRocks! (HR!) During the course of the first year of the study, we interviewed many youth and their parents to determine whether they (the youth) had participated in HR! It became clear to us that several of the youth were indeed enrolled in HR! However, we also learned that the program was not always presented with the same name or delivered in the same context. Some youth participated in HR! in afterschool clubs, some in classrooms as part of the Health Education Curriculum delivered at their schools, and some at summer camps. Thus, we were unable to simply ask the question of the youth, "Did you ever participate in HealthRocks! ?"

We therefore made the decision to ask the youth about their participation in any anti-smoking program and, after the first few years of the study, we also asked whether the young person had ever participated in an anti-smoking/health decision making program. In addition, we always asked about their smoking behaviors and attitudes. We present below the actual questions about smoking attitudes and behaviors for each of the grades, and then the results that emerged from our analyses of the responses of the participants.

In Grades 6, 7, and 8, we asked participants whether they had participated in ANY antismoking/anti-tobacco program. Scores for youth who had participated in any anti-smoking program were significantly different on these items:

ITEM/QUESTION	GRADE 6	GRADE 7	GRADE 8
DO YOU THINK YOU WILL BE SMOKING WHEN YOU'RE IN HIGH SCHOOL?	n.s.	.74 times less likely	.58 less times likely
DO YOU APPROVE OR DISAPPROVE OF PEOPLE YOUR AGE WHO SMOKE CIGARETTES?	n.s.	n.s.	n.s.
HOW MUCH PRESSURE DO YOU FEEL FROM YOUR FRIENDS AND SCHOOLMATES TO SMOKE CIGARETTES?	n.s.	n.s.	n.s.
HAVE YOU EVER TRIED CIGARETTES, EVEN 1 OR 2 PUFFS?	n.s.	Question not included	Question not included
DURING THE LAST 12 MONTHS HAVE YOU EVER SMOKED CIGARETTES?	Question not included	n.s.	.62 times less likely

n.s. – No significant differences

In Grades 9 through 12, we asked participants whether they had ever participated in an Anti-Smoking/Healthy Decision Making program. Scores for youth who had participated in any anti-smoking program were significantly different on these items:

ITEM/QUESTION	GRADE 9	GRADE 10	GRADE 11	GRADE 12
DO YOU SMOKE?	.38 times less likely	.40 times less likely	n.s.	n.s.
DO YOU THINK YOU WILL SMOKE IN THE FUTURE?	n.s.	.39 times less likely	n.s.	n.s.
DO YOU APPROVE OR DISAPPROVE OF PEOPLE WHO SMOKE CIGARETTES? (1 = STRONGLY DISAPPROVE, THROUGH 5 = STRONGLY APPROVE)	.23 points less likely to approve	.21 points less likely to approve	n.s.	.24 points less likely to approve
HOW MUCH PRESSURE DO YOU FEEL FROM YOUR FRIENDS AND SCHOOLMATES TO SMOKE CIGARETTES? (FROM 0 = NO PRESSURE, THROUGH 3 = A LOT.)	n.s.	n.s.	n.s.	n.s.

n.s. – No significant differences

About 4-H

4-H is a community of seven million young people around the world learning leadership, citizenship, and life skills. National 4-H Council is the private sector, non-profit partner of the Cooperative Extension System and 4-H National Headquarters located at the National Institute of Food and Agriculture (NIFA) within the United States Department of Agriculture (USDA). In the United States, 4-H programs are implemented by the 109 land-grant universities and Cooperative Extension through more than 3,000 local offices serving every county and parish in the country. Outside the United States, 4-H programs operate through independent, country-led organizations in more than 50 countries.

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