

UNIVERSITY OF CALIFORNIA,  
IRVINE

When to swim with or against the tide? Preschoolers' conformity to social and eating behaviors

DISSERTATION

submitted in partial satisfaction of the requirements  
for the degree of

DOCTOR OF PHILOSOPHY

in Psychology and Social Behavior

by

Elizabeth Boeun Kim

Dissertation Committee:  
Professor Chuansheng Chen, Chair  
Associate Professor Angela Lukowski  
Associate Professor Belinda Campos

2018



## **DEDICATION**

To

my grandpa

Kang Moon Soo

for showing me the love of learning.

## TABLE OF CONTENTS

	Page
LIST OF FIGURES	v
LIST OF TABLES	vii
ACKNOWLEDGMENTS	viii
CURRICULUM VITAE	ix
ABSTRACT OF THE DISSERTATION	xvi
INTRODUCTION	1
CHAPTER I: LITERATURE REVIEW	5
Conformity domains	5
Moral and social-conventional judgments	7
Healthy eating behaviors	8
Anticonformity	10
Potential correlates of conformity and anticonformity	13
Child characteristics and activities	13
Parenting	18
Current Study	19
Research questions and hypotheses	20
CHAPTER II: Study 1: Conformity to other's moral and social-conventional judgments	24
Method	25
Results	31
Discussion	37
CHAPTER III: Study 2: Conformity to others' food choices	42
Method	43
Results	46
Discussion	50
CHAPTER IV: Study 3: Conformity to Others' Food Portion Selections	54
Method	55
Results	60
Discussion	71
CHAPTER V: Study 4: Conformity to Others' Food Taste Preferences	75
Method	77
Results	83
Discussion	90
CHAPTER VI: General Conclusions	92

REFERENCES 100

APPENDICES

- Appendix A: Study 1 Pretest trials 125
- Appendix B: Study 4 Thirst assessment 126
- Appendix C: Study 4 Pretest and posttest drinks 127
- Appendix D: Study 4 Manipulation 128

## LIST OF FIGURES

	Page	
Figure 1.	Possible responses to social conformity, simplified from model derived from Nyczka & Sznajd-Weron (2013)	11
Figure 2.	Study 1 conformity rates (and standard errors) by judgment domain (Moral, Social-conventional) measured by proportion of trials.	35
Figure 3.	Study 1 gender differences in conformity by domain	35
Figure 4.	Study 1 Anticonformity rates (and standard errors) by judgment domain (Moral, Social-conventional) measured by proportion of trials.	36
Figure 5.	Study 3 Mean kcal of high energy-density and low energy-density foods chosen by peer conditions.	62
Figure 6.	Study 3 Average change in participants' portion size based on high energy-density and low energy-density foods and peer conditions.	63
Figure 7a.	Study 3 Mean change in portion size selections based on high ED foods in Unhealthy Condition	65
Figure 7b.	Study 3 Mean change in portion size selections based on low ED foods in Unhealthy Condition	65
Figure 7c.	Study 3 Mean change in portion size selections based on high ED foods in Healthy Condition	66
Figure 7d.	Study 3 Mean change in portion size selections based on low ED foods in Healthy Condition	66
Figure 8a.	Study 3 Relationship between ToM diverse desires and conformity to low ED foods in Healthy condition using quadratic curve fit	68

Figure 8b.	Study 3 Relationship between child's independence and conformity to low ED foods in Healthy condition using quadratic curve fit	69
Figure 8c.	Study 3 Relationship between child's prosocial behavior and conformity to low ED foods in Healthy condition using quadratic curve fit.	69
Figure 8d.	Study 3 Relationship between child's prosocial behavior and conformity to low ED foods in Unhealthy condition using quadratic curve fit.	70
Figure 8e.	Study 3 Relationship between number of activities child participates in and conformity to high ED foods in Healthy condition using linear and quadratic curve fit.	71

## LIST OF TABLES

	Page
Table 1. Study 1 Means, standard deviations, and bivariate correlations of individual and parenting variables	33
Table 2. Study 2 Means, standard deviations, and bivariate correlations of variables	48
Table 3. Study 4 Means, standard deviations, and bivariate correlations of variables (all cases; $N = 72$ )	87
Table 4. Study 4 Means, standard deviations, and bivariate correlations of variables for children who chose the regular drink in pretest ( $N = 19$ )	88
Table 5. Study 4 Means, standard deviations, and bivariate correlations of variables for children who selected sweetened drink in pretest ( $N = 49$ )	89



## ACKNOWLEDGMENTS

Firstly, I would like to express my special appreciation and thanks to my advisor, Professor Chuansheng Chen, for his mentorship and patience throughout this program and across three countries. I thank Professor Chen for his unconditional dedication and tremendous support to my professional development and his help on this dissertation. I could not have wished for a more supportive, knowledgeable, and caring advisor and mentor for my Ph.D. study.

I also thank Professor Ellen Greenberger for her continued support of my personal and academic growth and development. I appreciate all her insightful feedback and contributions to my research as well as her encouragement and enthusiasm over the years.

I would like to thank my wonderful committee members for their valuable time, comments, support, and providing multiple perspectives: Professor Angie Lukowski for serving on both my advancement and dissertation committee, and Professor Belinda Campos for serving on my dissertation committee.

My sincere thanks also goes to my collaborator in Nanyang Technological University in Singapore, Professor Bobby Cheon, who provided me with an opportunity to join his team as a Ph.D. student researcher, and who provided access to research facilities and resources. This research would not have been possible without him.

I thank the many talented undergraduate research assistants for their assistance with stimuli preparation and data collection, as well as all participants for contributing their time. Financial support was provided by the Agency for Science, Technology, and Research (A\*STAR) Research Attachment Programme (ARAP) awarded to E.B. Kim, and Nanyang Technological University Nanyang Assistant Professorship (NAP) grant (M4081643) and Biomedical Science Institute Strategic Positioning Fund (SPF) grant (13-80048G-SICS Theme 1E: Nutritional Psychology) awarded to B. K. Cheon.

## CURRICULUM VITAE

Elizabeth B. Kim

### EDUCATION

- 2018 University of California, Irvine (UCI), Irvine, CA  
Ph.D. Psychology and Social Behavior  
*Major: Developmental Psychology, Minor: Social Psychology*  
*Dissertation: When to swim with or against the tide? Preschoolers' conformity to others' social and eating behaviors*
- 2012 U.S. Fulbright Student Program, Seoul, Korea  
Fulbright Researcher, Yonsei University
- 2010 Harvard University Graduate School of Education, Cambridge, MA  
Ed.M. Human Development and Psychology
- 2009 Wellesley College, Wellesley, MA  
B.A. English, Minor: Psychology

### GRANTS, HONORS, AND AWARDS

A*STAR Research Attachment Programme Award	2016/2017
Center for Asian Studies Grant, University of California, Irvine	2015
Graduate Student Mentoring Award, School of Social Ecology, UCI	2015
National Science Foundation East Asia & Pacific Summer Institutes Fellowship	2014
Singapore Children's Society Research Grant	2014
Honorable Mention, Ford Foundation Fellowship	2013
U.S. Fulbright Fellowship	2011
Barbara Scott Priekel '45 Endowed Fund, Wellesley College	2008
Elizabeth Luce Moore '24 Endowment Fund, Wellesley College	2007
First-Year Academic Distinction Honor, Wellesley College	2006

### RESEARCH INTERESTS

Social conformity and decision-making in preschoolers; Cross-cultural differences in social and moral development; Social eating and food choice/intake in early childhood; Parent socialization

### RESEARCH EXPERIENCE

Agency for Science, Technology and Research (A\*STAR) Research Attachment Programme, Singapore  
*Children's conformity to others' food preferences*     *PhD Student Fellow, Fall 2015- Fall 2017*  
*P.I. Dr. Bobby Cheon*

- Designed and conducted research exploring children’s ability to make health behavior choices and judgments (i.e. healthy food and taste preferences, food portion selection) under social pressure.

National Science Foundation East Asia & Pacific Summer Institutes Fellowship, Singapore

*Understanding Cultural Differences in Children’s Moral Conformity*

*P.I. Dr. Ching Wan*

*Research Fellow, Summer 2014*

- Designed and conducted research exploring how cultural norms impact children’s ability to make visual, moral, and social-conventional judgments under social pressure.

U.S. Fulbright Student Program, Seoul, Korea

*Cultural Differences in Children’s Conformity to Other*

*P.I. Dr. Hyun-Joo Song*

*Fulbright Researcher, Fall 2011–Summer 2012*

- Designed and conducted research extended from Harvard Study exploring the rate at which rural and urban South Korean preschoolers conform to the majority in making visual judgments, looking at the influence of: culture, setting, informants, and parenting

Harvard University Graduate School of Education, Cambridge, MA

*Children’s Deference to Others*

*PI: Dr. Paul Harris*

*Independent Research, Fall 2009–Present*

- Designed and executed research study examining the influence of settings and cross-cultural differences in preschoolers’ deference to others when making simple perceptual judgments; Recruited subjects, collected data, coded, filmed, data entry presented and published findings.

Harvard Medical School/Children’s Hospital Boston, Boston, MA

*Improving Quality of Care for Children with ADHD*

*PI: Dr. Eugenia Chan*

*Research Assistant II, Fall 2010–Spring 2011*

- Compared quality of care for Chinese-American, African-American, and European-American children with ADHD in the greater Boston area.
- Recruited and interviewed parents, medical providers, and teachers on cultural attitudes regarding ADHD; Conducted qualitative data analysis using NVivo 9 Software.

Harvard University/Children’s Hospital Boston, Boston, MA

*Dyslexia and ADHD & Music and Language on the Brain*

*PI: Dr. Nadine Gaab*

*Research Intern, Fall 2010*

- Assisted Dr. Gaab with study examining the relationship between ADHD & reading difficulties in children ages 8-12; Helped with basic steps of MRI analyses under supervision; prepared materials and subjects for pediatric imaging, scored psychological tests, data entry, and assisted in subject recruitment.

Massachusetts Institute of Technology, Cambridge, MA

*Imagination Toolbox Lab*

*PI: Dr. Eric Klopfer*

*Research Assistant, Spring 2007-Summer 2009*

- Assisted in creating Department of Homeland Security’s “Forest Fire” educational curriculum for elementary school children; Researched educational content (forest fires, epidemics, biological systems) and created competitive narratives and simulations.
- Collected and analyzed data from teacher workshops to test the effectiveness and success rate of StarLogo: The Next Generation (TNG) lesson plans; Produced research reports for workshops.

University of California at Irvine, Irvine, CA

*The Learning and Cognition Lab*

PI: Dr. Lindsey Richland

*Research Assistant, Summer 2008*

- Analyzed the teaching of mathematical concepts (permutation probabilities, operations with fractions, and eliminating misapplications of the assumption of linearity) from the Trends in International Mathematics and Science Study (TIMSS).
- Coded videos from the U.S. data and compared codes with other international data; Assisted with editing research analyses.

Wellesley College, Wellesley, MA

*Imaginary Companions of Preschool Children*

PI: Dr. Tracy R. Gleason

*Research Assistant, Fall 2006 & Spring 2008*

- Investigated the “Imaginary Companions Phenomenon” and how pretend friends influence the ways in which preschool children discuss and interact with peers and adults.
- Performed background research on how young children understand and consider social relationships; Transcribed parent and child interviews; read related scientific reports; observed children and their parents; filmed psychological assessments; performed administrative duties.

## **PUBLICATIONS**

Kim, E.B., Chen, C., Smetana, J.G., & Greenberger, E. (2016). Does children’s moral compass waver under social pressure? Using the conformity paradigm to test preschoolers’ moral and social-conventional judgments. *Journal of Experimental Child Psychology*, 150, 241–251.

Chang, E. S., Chen, C., & Kim, E. (2015). Have You Set Your Life Priorities Straight?: Intergenerational Differences in Life Goals among European and East Asian Americans College Students and their Mothers. *Journal of Comparative Family Studies*, 46(4).

Corriveau, K.H., Kim, E.B., Song, G. & Harris, P. (2013). Young children’s deference to a majority varies by culture and judgment setting. *Journal of Cognition & Culture*, 13, 367–381.

UNESCO Global Seminar on Education for Global Peace and Sustainable Development, Pohang, Korea, 3–4 July 2007. *Conference Report of the Task Force for Global Education on its Global Seminar: Pohang Session*. Seoul, Korea, 2007 [prepared by Elizabeth Kim].

## **SELECTED WORKS IN PROGRESS**

- Kim, E.B., Chen, C. & Cheon, B. “Children’s conformity to others’ healthy food choice judgments using the conformity paradigm: Looking at U.S. and Singaporean preschoolers,” *manuscript in submission*.
- Kim, E.B., Chen, C. & Cheon, B. “Using remote peers’ influence to promote healthy food choices among preschoolers,” *manuscript in submission*.
- Kim, E.B., Chen, C., & Wan, C. “Asian differences in early conformist behavior: Exploring visual conformity among preschoolers in U.S., South Korea, and Singapore,” *manuscript in preparation*.
- Kim, E.B., Chen, C., & Cheon, B. “When to be selfish or conformist: Examining prosocial conformity among preschoolers,” *manuscript in preparation*.

## **CONFERENCE PRESENTATIONS**

- Kim, E.B., Cheon, B., & Chen, C. (2017). *Preschoolers’ conformity to others’ food portion selections using a computerized portion selection task*. Research presentation for ICP International Symposium for 'The social and cognitive factors influencing food perception and behavior in young children', Lyon, France.
- Kim, E.B. (2014). *Swimming with or against the tide: Cultural differences in children’s conformity to moral judgments*. Research presentation for UCI Associated Graduate Students Symposium 2014, Irvine, CA.
- Kim, E.B., Song, H., Harris, P.L., & Corriveau, K.H. (2013). The influence of culture and parenting on children’s deference to others: Evidence from South Korea. In E.E. Chen (Chair), *Children’s Learning Across Different Cultural Contexts*. Paper Symposium for the Society for Research in Child Development Biennial Meeting 2013, Seattle, WA.
- Kim, E.B. (2012, June). *To Conform or not to Conform?: The influence of culture and parenting on South Korean preschoolers’ deference to others*. Research presentation given at the Korean-American Educational Commission’s Fulbright Forum, Seoul, Korea.
- Kim, E.B., Song, H., Harris, P.L., & Corriveau, K.H. (2012, April). *The influence of culture and parenting on children’s deference to others: Evidence from South Korean preschoolers’ visual judgments*. Paper presentation given at Asian Conference on Psychology & Behavioral Sciences 2012, Osaka, Japan.
- Kim, E.B. (2012, January). *Are children picky about whom they trust for new information?* Workshop presented at the 2nd Annual Consortium of Early Childhood Educators- Korea (CECECK), Seoul, Korea.

Kim, E.B. (2010, August). *Tackling Taboos: Demystifying learning disorders among Korean American youth*. Colloquium presented at the annual Korean American Youth Leaders Conference on Mental Health & Counseling 2010, Gaithersburg, MD.

Kim, E.B. (2008, April). *New York City: Visualizing urban ideals (looking at inner-city children)*. Symposium presented at the Wellesley College Ruhlman Conference 2008, Wellesley, MA.

## **POSTER PRESENTATIONS**

Chang, T., Ma, J., Serrato, D., Jennifer Ma, Daisy Serrato, Kim, E.B., & Chen, C. (2017, May). *A Cross Cultural Study on Relationship Between Parenting Style, Parental Maturity Demands, and Child Temperament*. Poster session at Association for Psychological Science Annual Convention 2017, Boston, MA.

Ma, J., Serrato, D., Chang, T., Kim, E.B., & Chen, C. (2017, May). *Relationship Between Socioeconomic Status and Conformity in Preschoolers*. Poster session at Association for Psychological Science Annual Convention 2017, Boston, MA.

Kim, E.B., Chen, C., & Cheon, B. (2017, April). *Preschoolers' conformity to remote peers' healthy food preferences*. Poster session at the Society for Research in Child Development Biennial Meeting 2017, Austin, TX.

Rombaoa, J., Etemad-Haary, T., Trucios, C., Kim, E.B., & Chen, C. (2016). *Children's Conformity to Others' Visual Judgment with a Brief Mindfulness Intervention*. Poster session presented at the UCI Undergraduate Research Symposium 2016, Irvine, CA.

Poulsen, J., Truong, N., Kim, E.B., & Chen, C. (2016). *Effects of Social Pressures on Preschoolers' Food Preference*. Poster session presented at the UCI Undergraduate Research Symposium 2016, Irvine, CA.

Islas, S., Husain, J., Lu, M., Soonthornyanakji, P., Kim, E.B., Chen, C. (2015, May). *Children's visual & moral judgments in response to peer pressure*. Poster session presented at the California Cognitive Science Conference 2015, Berkeley, CA.

Kim, E.B., Chen, C., Greenberger, E., Wan, C., & Kwak, K. (2015, March). *Preschoolers' conformity to others varies by judgment domain and culture*. Poster session presented at the Society for Research in Child Development Biennial Meeting 2015, Philadelphia, PA.

Kim, E.B., Song, G., Corriveau, K.H. & Harris, P.L. (2011, May). *Cultural differences in parenting styles influence children's deference to a consensus*. Poster session presented at the Association for Psychological Science Annual Convention 2011, Washington, DC.

Song, G., Kim, E.B., Corriveau, K.H. & Harris, P.L. (2011, May). *Children's level of deference varies by ethnicity and public v. private setting*. Poster session presented at the Association for Psychological Science Annual Convention 2011, Washington, DC.

Kim, E.B., Song, G., Corriveau, K.H., & Harris, P.L. (2011, March). *Cultural differences in children's deference to authority*. Poster session presented at the Society for Research in Child Development Biennial Meeting 2011, Montreal, Canada.

Kim, E.B. (2010, March). *Chinese-American and Caucasian American preschoolers' autonomy and group dependence in making simple perceptual judgments*. Poster session presented at the Harvard Graduate School of Education Student Research Conference 2010, Cambridge, MA.

### **GUEST LECTURE**

Kim, E.B. (2017, March). *Experiencing stereotypes and discrimination*. Guest Lecture at Nanyang Technological University Intergroup Relations course.

Kim, E.B. (2017, January). *Us versus Them: Intergroup perception and Categorization*. Guest Lecture at Nanyang Technological University Intergroup Relations course.

### **TEACHING EXPERIENCE**

Spring 2015	<i>Teaching Assistant, Psychology Fundamentals</i> University of California, Irvine
Winter 2014	<i>Teaching Assistant, Naturalistic Field Research</i> University of California, Irvine
Spring 2014	<i>Teaching Assistant, Infant Development</i> University of California, Irvine
Fall 2014/Winter 2013	<i>Teaching Assistant, Human Development in Cross-Cultural Perspective</i> University of California, Irvine
Fall 2013	<i>Teaching Assistant, Research Design</i> University of California, Irvine
Summer 2006	<i>English Program Coordinator/Teacher, Shanghai Museum</i> Shanghai, China

### **ADVISING AND MENTORING EXPERIENCE**

Honors Theses  
*Supervising mentor*

2016-2017	Daisy Serrato, UCI undergraduate
2015-2016	Jaymes Rombaoa, UCI undergraduate

Undergraduate Research Opportunity Program Project

*Supervising mentor*

2016-2017	Tiffany Chang, Jennifer Ma, Daisy Serrato, Project awarded \$900
2015-2016	Nhan Truong, Jenny Poulsen, Carolina Trucios. Project awarded \$800 Jaymes Rombaoa, Tara Etemad-Haary, Kimberly Ung. Project awarded \$800

2014–2015 Stephanie Islas, Jenan Husain, Melisa Lu, Pongsakorn Soonthornyanakji,  
*Children’s Conformity to Others*. Project awarded \$1300

## **LEADERSHIP AND COMMUNITY EXPERIENCE**

Ministry of Hearing Impaired (MHI) Enrichment Program, Singapore

*Mentor & Tutor, 2016*

- Mentored and tutored a college student who is hearing-impaired with school work, planning, writing, and language difficulties.

Judge Baker’s Children’s Center/ Manville School, Boston, MA

*Mentor, 2009–2011*

- Mentored a child with developmental disorders in a therapeutic day school; Organized and participated in cooking, art, and musical activities.
- Interacted with teachers, therapists, and clinical director to provide a holistic approach to the management of child's cognitive-behavioral problems.

Chinatown Afterschool Program (CHTNASP), Boston, MA

*Wellesley College Coordinator/ Counselor, 2005–2009*

- Planned and created student-run literacy activities for the only free after school program serving children of Boston’s Chinatown, a multiethnic, low socio-economic area.
- Tutored and mentored grades 2,3,5, and 6 on academics and social development. Organized field trips.
- Wrote grant proposal to constitute the group to provide official Wellesley College recognition and qualification to receive funding.
- Won “Outstanding Counselor Award” in 2006, 2007, and 2009.

## **PROFESSIONAL AFFILIATIONS**

2017

International Sapere Association (AISBL)

2013/2015/2016

Society for Research in Child Development (SRCDD)

2013/2015/2016

SRCDD Asian Caucus

2011/2017

Association for Psychological Science (APS)



## **ABSTRACT OF THE DISSERTATION**

When to swim with or against the tide? Preschoolers' conformity to social and eating behaviors and individual differences

By

Elizabeth B. Kim

Doctor of Philosophy in Psychology and Social Behavior

University of California, Irvine 2018

Professor Chuansheng Chen, Chair

Social norms play an important role in guiding individuals' behavior in society. By following social norms, individuals benefit from the knowledge a given society or culture has accumulated in its interactions with the natural world and management of social relations. While adherence to others' norms can encourage beneficial decisions, such as recycling (Schultz, 1999) and energy conservation (Schultz, Nolan, Cialdini, Goldstein, & Griskevicius, 2007), it can also lead individuals to make irrational decisions, such as making perceptually incorrect or potentially harmful judgments (Asch, 1956; Milgram, 1963; Zimbardo, 1973). Thus, it is important to explore conformity to group norms to better understand how social pressure might spur or maintain beneficial or maladaptive behavior. Past research has focused on adults with little attention given to conformist behavior in early childhood, social conformity across various domains, as well as alternative modes of conforming (anticonformity; Willis, 1963). Additionally, factors related to the act of conforming to peer groups have been underexplored. To extend basic research on early conformist behaviors and to allow for translational findings that might help promote positive growth for young children, two socially important behavior

domains (moral/social-conventional judgments, food eating behaviors) were chosen to investigate the effects of conformity among preschoolers.

In a series of four studies, this dissertation aimed to (1) examine the extent to which preschoolers conform and anticonform to peers' social norms in different domains (judgment about antisocial and unconventional behaviors in Study 1, healthy food preferences in Study 2, healthy and unhealthy food portions in Study 3, and actual food consumption in Study 4 (with drinks); and (2) examine whether maturity-related individual characteristics (age, inhibitory control, theory of mind) and activities and parenting practices facilitate conformity and/or anticonformity. Three-to-6 year olds from preschools in Singapore were tested in the four studies ( $N=58$  in Study 1;  $N=89$  in Study 2;  $N=75$  in Study 3;  $N=89$  in Study 4).

Results showed conformity effects across moral/social-conventional judgments and all three food eating behaviors, suggesting that peers (even ones that are not present) can change initial judgments and behavior in domains of social importance. Evidence for anticonformity was also found for moral/social-conventional judgments and healthy food preferences, demonstrating that some preschoolers tended to counter social pressure. Preschoolers' participation in extracurricular activities was found to be associated with moral conformity as well as conformity to peers' healthy food portion selections. Age and BMI were also linked to conformity in food/drink choice and portion selection behaviors, indicating that some inherent traits were likely to be associated with peer influence in eating behaviors. Although correlates of conformity were sporadic, all but one were consistent with the predicted direction that higher social cognitive maturity would be associated with higher conformity to healthy eating behaviors and lower conformity to moral transgressions. In sum, findings from these set of studies shed light on the complex interplay of prudence and trust that preschoolers place on peers in social learning, and

the association of various child characteristics and parenting with differentiated conformity to socially relevant norms. Some limitations include not measuring BMI for all food-related studies (due to time constraints) as well as not including follow-up questions as to why children did or did not agree with the group. Future research should examine conformity among young children in other health-related behaviors, in which peers may promote beneficial behavior.

## INTRODUCTION

Individuals often look to social norms to determine what to do and how to respond to social situations. According to the Focus Theory of Normative Conduct (Cialdini et al., 1990; Reno, Cialdini, & Kallgren, 1993), behavior is facilitated by two categories of norms: descriptive norms and injunctive norms. Descriptive norms refer to behaviors individuals in a group are actually doing, such as if one's friends are being loud and disruptive in the library, whereas injunctive norms are behaviors that individuals in a group think they ought to do in the context such as being quiet and reading in the library. The theory suggests that both norms only influence behavior when the individual's attention is drawn to or focused on the norm. Most studies that have looked at behavior change using descriptive norms have been conducted with adults (i.e. Burger et al., 2010; Cialdini et al., 2006). They have shown that descriptive norms have a significant influence over a wide range of behaviors from pro-environmental actions such as recycling (Schultz, 1999) to detrimental health behaviors, such as binge drinking (Neighbors, Oster-Aaland, Bergstrom, & Lewis, 2006).

Children also learn about descriptive social norms by observing, interpreting, and copying others' behaviors (e.g. Tomasello, Carpenter, Call, Behne, & Moll, 2005). As in adults, explicit social forces can influence children to override their autonomous beliefs and judgments to defer to group norms and behaviors, even when the group norm is incorrect, and even when the behaviors have no specific function. Indeed, descriptive social norms are increasingly identified as important in child development and cultural learning (Rakoczy & Schmidt, 2013; Turner, Nielson, & Collier-Baker, 2014) because they provide valuable social information on what kind of behavior is normal and expected, as well as what is approved or disapproved (Cialdini et al., 1990). Young children have a basic understanding of social norms and develop

an inclination to follow and respect them early in life. Children as young as 2-3 years-old recognize and uphold normative rules about property ownership (Rossano, Rakoczy, & Tomasello, 2011) and social games (Rakoczy, Warneken, & Tomasello, 2009; Walton, 1990). They also understand that norms determine how tools are used (Casler, Terziyan, & Greene, 2009). Young children have been shown to defer to group norms even when the norms are incorrect. For example, 3-5 year-olds conformed to group norms that conflicted with visual information (i.e. incorrect line length judgments, incorrect animal size judgments) even when they knew the correct answer (Corriveau & Harris, 2010; Corriveau, Kim, Song, & Harris, 2013; Haun & Tomasello, 2011). Other researchers have focused on children's naming of novel objects (Bernard, Harris, Terrier, & Clément, 2015; Jaswal, 2004) and perceived usage of a novel object (Bernard, Proust, & Clément, 2015). These findings suggest that group norms appear to have a strong influence on children's behavior as early as the preschool period. This evidence is important because it shows that social norms can be learned and guide behavior at a young age. Although these studies provide the basic foundation for our knowledge of children's tendencies to conform, they offer limited evidence about behaviors with practical real-life consequences. Furthermore, these studies have focused on conformity and excluded the possibility that some individuals may react to descriptive social norms by taking a more extreme position than before they were exposed to the norm (i.e., anticonformity). Finally, little research has been conducted to examine individual and parenting correlates of children's conformity.

To fill the above gaps in the literature, the present study used conformity tasks that involved viewing videos/images or being told about remote peers who demonstrated alternative behaviors/choices to test the extent to which preschoolers are sensitive to their peers in two domains of real-life significance. It extends previous research in three important ways. First, it

focused on two socially important behavior domains: moral judgments and food eating behaviors. This study hence should not only expand our understanding on early social-cognitive development across different domains, but also to allow for translational, informative findings that might help promote positive moral reasoning and healthy eating for young children.

Second, unlike previous research that focused only on conformity, this dissertation also recognizes that some children may demonstrate alternative modes of conforming such as anticonformity (Willis, 1963). More research is needed to explore young children's alternative decision-making processes to understand the normative framework of social conformity more comprehensively. Anticonformity, or incorrect answers that disagree with the majority response, has been understudied because conformity has traditionally been defined on the basis of compliance and independence (Asch, 1956; Jahoda, 1959). Consequently, conformity researchers have mostly ignored the diversity of responses to social pressure situations which was initially found in a limited number of studies with adults (Frager, 1970; Meade & Bernard, 1973; Willis & Hollander, 1964). As such, the current set of studies tested for effects of anticonformity which, if found, would reflect a more comprehensive picture of how children deal with social pressure situations that involve domains of significant importance. Research into anticonformity in real-life situations has a particular practical implication because anticonformity may offset any conformity effect when it is used as a group intervention. For example, with a healthy eating intervention, if an equal number of individuals conformed (i.e., switching from unhealthy eating to healthy eating) and anticonformed (i.e., switching from healthy eating to unhealthy eating), the intervention would not be a success.

Finally, I also explored factors that may account for individual differences in conformity/anticonformity, including child's independence, inhibitory control, and parenting

practices, all of which have been linked to children's ability to handle social conflicts (Chen, Fein, Killen, & Tam, 2001; Hart, Ladd, Burleson, 1990; Weiss, Dodge, Bates, & Pettit, 1992). Specifically, individual variables, inhibitory control and theory of mind (ToM), were measured using widely used tasks to see if children's conformity to remote peers can be accounted for by these variables. Parental surveys were used to measure environmental variables that may be predictive of conformist/anticonformist behavior.

# CHAPTER I

## LITERATURE REVIEW

In this chapter, I will review the existing research on early conformity, point out the gaps in the literature, describe how I plan to address these gaps through four studies, and provide hypotheses for the current research.

### **Young children's conformity in different domains**

Conformity has long been recognized as a powerful demonstration of how explicit social forces can influence individuals to override their autonomous beliefs and rational judgments to defer to group norms and behaviors, even when the group norm is incorrect, and even when the behaviors have no specific function (Cialdini & Goldstein, 2004). Asch (1956) best demonstrated this social phenomenon in a well-known series of visual judgment experiments. Using line tasks, adult participants were asked to make a line length judgment (identifying which line is equal to the standard line). In the presence of confederates who unanimously gave a wrong answer about line length judgments most of the time, participants agreed with the confederates on one third of the trials (Asch, 1956). The Asch paradigm has been used with subjects of various age ranges including adults, adolescents, and school-age children (e.g., Allen & Newton, 1972; Berndt, 1979; Bishop & Beckman, 1979; Costanzo & Shaw, 1966; Hamm & Hoving, 1969; Steinberg & Monahan, 2007; Walker & Andrade, 1996), but relatively few studies have included preschoolers.

Corriveau and Harris (2010) first used a modified Asch conformity paradigm, testing whether preschoolers' deference to the majority was a temporary or stable pattern of judgment. They found that both 3- and 4-year-olds, when asked to identify the longest line in a line length task after viewing informants indicating the incorrect big line (i.e. they pointed to one of the two



shorter lines), a sizeable minority (40%) agreed with the incorrect majority. Subsequent studies have replicated the above results (Corriveau et al., 2013; Corriveau et al., 2016).

Similarly, young children have also demonstrated sensitivity to group informants in matters of novel information or object functions. When faced with a conflict between prior knowledge of conventional names/information and atypical ways by which unfamiliar images are labeled, 3- and 4-year-olds tended to accept claims made by others (Bernard, Harris, Terrier, & Clément, 2015; Jaswal, 2004). Similar effects were found for 3 and 4-year-old children naming and categorizing unknown objects by their labels (Corriveau, Fusaro, & Harris, 2009). Two-and-3-year-old children will also prefer to follow a group consensus regarding novel object functions (Haun, Rekers, and Tomasello, 2012; Seston and Kelemen, 2014). These effects were also evident for 4-to-6-year-olds in situations where they accepted claims by an unreliable group consensus over an accurate dissenter (Bernard, Proust, & Clément, 2015).

The above studies showed that preschoolers tended to conform to group norms in several domains of line length judgments and novel object names (Corriveau & Harris, 2010; Corriveau, Kim, Song, & Harris, 2013), suggesting that young children are also sensitive to information provided by a group consensus, these studies were limited to the domain of perceptual judgment and epistemic information and action that appear to have little real-life consequences. When it comes to preschoolers' conformity for other types of decision-making that involve subjective or value-laden information in more complex social situations with practical implications, research is more limited (Einav, 2014). In one study conducted with American preschoolers, I found that conformity played a role in an area of real-life importance--moral and social conventional reasoning-- among American preschoolers, although I did find that there was less conformity in the more serious moral domain than the less serious social-conventional domain (Kim et al.,

2016). Another exception is the research on social modeling of eating behavior. Using live confederates, previous studies have demonstrated that children ranging from 1 to 10 years model their eating behaviors after others (Adnessi et al., 2005; Birch, 1980; Brody & Stoneman, 1981; Greenhalgh, Dowey, Horne, Low, Griffiths & Whitaker, 2009; Harper & Sanders, 1975; Hendy, 2002; Hendy & Raudenbush, 2000). Several studies have also used remote confederates to examine their influence on eating behaviors among children ranging from 5- to 12-year olds (Horne et al., 2004; Romero, Epstein, & Salvy, 2009; Sharps & Robinson, 2017).

To extend the above research, the current study used a modified Asch conformity paradigm (with remote confederates) to examine the extent to which children are willing to give up their moral prescriptions and personal preferences in eating to agree with peers in that social context.

#### *Moral and social-conventional judgments*

Study 1 is a replication of my previous study of American preschoolers (Kim et al., 2016) with a sample of Singaporean children. It used peers' morally and conventionally wrong judgments as social norms because of its relevance to this age group (3-5 years old) and the implications of its potential outcomes. Moral reasoning occurs as early as the preschool period and distinctions between different types of moral and social-conventional transgressions indicate a complex and vigilant understanding of what is acceptable and what is not according to moral and social rules. A large body of research from the social domain theory perspective (Smetana, 2006, 2012; Turiel, 1983, 1998, 2006) has shown that young children understand distinctions between judgments of right and wrong related to others' welfare, fairness, and rights (moral issues) and shared social norms in various social contexts (social conventions). By 2½ years old,

children are capable of judging moral transgressions as generally wrong (Smetana, 1981). Three-year-old children have shown to interpret social-conventional transgressions as wrong only if rules or authority figures say so, compared to moral transgressions which they view as more deserving of punishment and wrong regardless of moral rules or what authorities say (Smetana et al., 2012). As mentioned earlier, my previous study (Kim et al., 2016) found that American preschoolers showed conformity to peers in both moral and social-conventional judgments, but the extent of conformity was greater for social-conventional judgment than moral judgment, just as predicted by the social domain theory. Study 1 of this dissertation extended the above research to Singaporean children but also included an exploration of anticonformity and the correlates of conformity/anticonformity (see below).

### *Healthy food choice behaviors*

Studies 2-4 used the domain of peers' healthy food preferences because of its social significance to this age group (3-5 years old) as well as its implications for health benefits should peer influence be used as an intervention. By promoting healthy eating behaviors, these social norms will serve as a relevant platform from which to predict positive, healthy behavior. An important and universal positive social norm in society is food choice. Individuals are expected to eat healthy foods and avoid unhealthy food in their diets. This is a particularly significant norm in early childhood—a developmental period in which poor vegetable and fruit intake is common (Birch, 1980; Birch, 1990; Brody & Stoneman, 1981; Hendy, 2002; Hendy & Raudenbush, 2000).

Similar to young children's moral prescriptivity, young children also have a natural inclination towards certain foods. Preschoolers are very stubborn eaters with genetic

predispositions to prefer foods that are sweet and salty and reject those that are sour and bitter (Birch, 1999). Eating preferred foods is a major source of pleasure and these early preferences for high sweet, high sodium, and high caloric foods are at odds with the healthy choices promoted by adults (Anliker, Bartoshuk, Ferris, & Hooks, 1991; Rosenstein & Oster, 1988; Steiner, 1979).

Although, as mentioned above, previous studies have demonstrated that children model their eating behaviors after others (Addessi et al., 2005; Birch, 1980; Brody & Stoneman, 1981; Greenhalgh et al., 2009; Harper & Sanders, 1975; Hendy, 2002; Hendy & Raudenbush, 2000; Horne et al., 2004; Romero, Epstein, & Salvy, 2009; Sharps & Robinson, 2017), it remains unknown whether a conformity paradigm using brief and acute exposure to remote peers may sufficiently change initial preferences of preschoolers. Understanding preschoolers' social conformity to others' food choices is essential because small behavioral changes are easier to achieve and can have significant impact on body weight regulation and ultimately, overall health (Hill, Wyatt, Reed, & Peters, 2003). The prevalence of preschool children's overweight and obesity has seen a relative increase worldwide of 31% between 2000-2010 with a relative increase of 36% predicted for 2010-2020 (de Onis, Blossner, Borghi, 2010). With its fast-paced economic transformation since its independence in 1965, Singapore has also seen the rise in chronic and degenerative diseases (linked with more affluent lifestyles), including obesity which has steadily increased to 10.8% for 18-69 year-olds in 2013 with 40.1% of the population being overweight (Foo, Vijaya, Sloan, & Ling, 2013). If effective for inducing conformity to healthier eating behavior, remote models may be efficient and practically useful for interventions.

In addition to food choice, eating behaviors should be studied in terms of portion selections, because the latter allows for a more sensitive measurement of behavior and has been

shown to be an important predictor of actual food consumption. Adults typically consume most of the food they apportion themselves (Robinson, Thomas, Aveyard, & Higgs, 2014; Wasink & Cheney, 2005) and portion size is also a predictor of energy intake for children aged 2-5 years-old (McConahy, Smiciklas-Wright, Mitchell, Picciano, 2004).

Finally, investigating conformity in actual drink consumption behavior would allow for the ultimate test of actual behavioral change through social pressure. Drink consumption is considered highly relevant to several important health issues, such as weight gain and obesity. To find conformity effects in this particular eating behavior would be key to developing conformity-based interventions that would have a direct impact on children's health. Consumption of sweetened drinks has been found to suppress food intake for 2-5 year-olds, possibly inhibiting absorption of proper variety of nutrients that are important for healthy development (Birch, McPhee, & Sullivan, 1988). Moreover, sugar-sweetened beverages have been found to more than double the chances of 2.5- to 4.5-year-old children becoming overweight when consumed between meals (Dubois, Farmer, Girard, & Peterson, 2007). Should remote peers in this experiment effectively promote behavior change in the choosing and consumption of less sweet drinks through positive social pressure, the results would provide meaningful evidence that can be used support healthy eating.

By testing to what extent young children conform to social norms promoted by peer groups when making healthy food choices (Study 2), food portion choices (Study 3), and food consumptions (Study 4), the current study not only broadens our understanding of to what extent social norms influence preschoolers' behaviors, but also is particularly informative for health education and interventions that promote healthy eating in early childhood.

### **Anticonformity**

Although most conformity research has framed the options as either to conform to not to conform when faced with social pressure, individuals actually have alternatives within the choice of “not to conforming”. Hollander and Willis (1967) differentiated between independence (sticking with one’s original judgment) and anticonformity (going against both the group consensus and one’s original judgment). As Frager (1970) clarified, *conformity* happens when the participant’s answer conflicts with his or her private judgment to agree with the group consensus, *independence* happens when one is not affected by social pressure (i.e., sticking with one’s original judgment), and *anticonformity* is an incorrect answer that disagrees with the majority response. Anticonformity has been proposed as a third mode of response in addition to conformity and independence in the so-called diamond model (Willis, 1963), which was further formalized into a four-mode model when uniformity (i.e., agreeing with the majority’s response during both pre- and post-test; See Figure 1) was added (Nail, Levy, & MacDonald, 2000).

		<u>Posttest</u>	
<u>Pretest</u>		Disagreement	Agreement
Disagreement		INDEPENDENCE	CONFORMITY
Agreement		ANTICONFORMITY	UNIFORMITY

**Figure 1.** Possible responses to social conformity, simplified from model derived from Nyczka & Sznajd-Weron (2013). Reprinted by permission from Copyright Clearance Center: Springer Nature Journal of Statistical Physics Nyczka, P. & Sznajd-Weron, K. (2013). Anticonformity or

independence?— insights from statistical physics. *Journal of Statistical Physics* 151(1-2), 174-202, 2013.

Anticonformity has received very little attention because conformity has been traditionally explored on the unidimensional (to conform or not to conform) model (Asch, 1956; Hodges, 2014; Jahoda, 1959). Thus far, only a limited number of studies have explored anticonformity, though not all of them have used traditional Asch tasks (Frager, 1970; Meade & Bernard, 1973; Willis & Hollander, 1964). One study using Asch tasks found that over a third of Japanese adults demonstrated anticonformity (33.6%; Frager, 1970), however, another study with Japanese adults showed no indication of anticonformity, citing uniqueness in cultural attitudes (anti-outgroup sentiments) at the time of Frager's original study in Japan (Williams & Sogon, 1984). Cultural differences were also found with anticonformity being higher among U.S. adults compared to Chinese adults (Meade & Bernard, 1973). Finally, a theoretical paper has attempted to examine different types of social influence using statistical physics ( $q$ -voter model), separating two types of nonconformity (anticonformity and independence) and finding that these two types of conformity can manifest at the societal level, but not at a universal level (Nyczka & Sznajd-Weron, 2013).

In sum, there has not been a study of anticonformity among children. In addition to its theoretical significance, understanding anticonformity is also important when conformity paradigm is used to effect behavior change because the existence of anticonformity may reduce or even negate any conformity effect. In other words, to capture variability in conformist behavior (including both conformity and anticonformity) in early childhood and whether this behavioral pattern is significant would allow for better insight into the dynamics of conformity in

social situations, and would help to develop effective conformity-based interventions (i.e. promoting health behaviors) for children. Studies 1-3 of the current dissertation included an examination of anticonformity on children in the domains of moral judgment and eating behaviors.

### **Potential correlates of conformity and anticonformity**

There have been very few attempts to explore individual differences in conformity, with the exception of findings on age and culture. For example, younger children are more likely to conform than older children on visual judgment tasks (Corriveau and Harris, 2010; Corriveau et al., 2013; Seston & Kelemen, 2014; Walker & Andrade, 1996) as well as on moral judgment tasks (Kim et al., 2016), demonstrating developmental changes in susceptibility to social pressure. Previous research has also suggested that conformity to others may be a function of membership to a cultural group. For example, Asian adults (Bond & Smith, 1996) as well as Asian American children (Corriveau & Harris, 2010), especially those of first-generation status (Corriveau et al., 2013), have been found to conform more to the group compared to their White counterparts. The present dissertation aimed to investigate whether preschoolers' conformity to others across the different domains was associated with several child characteristics and activities, as well as parenting practices.

#### *Child characteristics and activities*

Child characteristics that are most likely to be associated with conformity/anticonformity would be those related to cognitive and social maturity, which helps children to determine when to swim with or against the flow. As mentioned above, older age (which is a proxy of maturity)



was linked to less conformity to group's incorrect response. I expected that child characteristics indicating cognitive and social maturity as well as relevant parenting practices should be associated with less conformity and more anticonformity with moral and social conventional transgressions. In contrast, in terms of positive influence on eating behaviors, I expected that cognitive and social maturity would be associated with more conformity and less anticonformity with healthy food choices, portions, and consumption.

In addition to age, the present study investigated how three potential factors related to cognitive and social maturity (inhibitory control, ToM, and extracurricular activities) would be associated with differentiated rates of conformity.

***Inhibitory control.*** Inhibitory control is one of the three core executive functioning skills that consists of being able to control one's attention, behaviors, thoughts, and emotions to overcome distractions and strong habitual impulses to do what is correct or needed (Diamond, 2013). The ability to use inhibitory control (to inhibit an impulsive behavioral or emotional response) to enact a subdominant response under situational demands (i.e. social pressure) is an important skill required for the development of self-regulation (Eisenberg & Spinrad, 2004; Kochanska, Murray, & Harlan, 2000; Rothbart & Bates, 1998). Having the discipline to stay on task despite distractions and temptations has been linked with better social competence (Spinrad et al., 2007), lower behavior problems, and more successful interpersonal functioning (Eisenberg Fabes, Guthrie, & Reiser, 2002). This skill is expected to be necessary for the resisting of temptations to successfully follow the group for the appropriate behaviors, which could predict lower conformity to the group's negative norms and higher conformity to positive norms.

In a pilot study ( $N=65$ ), I tested whether children's inhibitory control had an association with children's rate of conformity to others' unconventional moral and social judgments. To assess the role of children's inhibitory control on their conformity to the group consensus, I measured child's temperament through parental reports (The Very Short Form of the Children's Behavior Questionnaire; Putnam & Rothbart, 2006). Pearson correlations were computed to look at the associations between conformity in different domains and children's temperament scores. A significant negative association was found between parent-rated child's inhibitory control and the child's tendency to conform to others' moral judgments,  $r(65) = -.27, p = .031$ . As expected, the more inhibitory control the parents reported that their child had, the less likely the child conformed to the group majority's unconventional moral judgments.

Inhibitory control (or its opposite, impulsivity, Eisenberg et al., 2009) has also been linked to eating behaviors. For example, impulsivity (or reactive control) has been found to moderate modeling of others' food intake (Hermans et al., 2013; Honkanen et al., 2012; Jansen et al., 2009; Jasinska et al., 2012), although the results were not straightforward, with both low-impulsive and high-impulsive individuals adjusting their food intake to that of their peers (Cruwys, Bevelander, & Hermans, 2015; Hermans et al., 2013; Salmon et al., 2014). While it seems likely that those with high impulsivity (or low inhibitory control) are susceptible to social influence, another possibility is that lower impulsivity (or high inhibitory control) may also make it easier to control personal urges and conform to others' behaviors in order to achieve more deliberate goals of affiliation, such as gaining social approval or stable in-group uniformity (Boyd & Richerson, 2009). From the available evidence, the more feasible explanation for the potential role of inhibitory control in conformity to positive and negative norms is that it would allow for the control of distractions and external temptations so that the differentiation of

conformity might be achieved: that is, more conformity for positive norms and less conformity to negative norms.

***Theory of mind.*** ToM is the ability of children to take into consideration others' perspectives, including feelings, intentions, and beliefs, as well as the ability to be aware that they or others have false beliefs (Astington, 1993; Scullin & Bonner, 2006). Previous research has found associations between children's ToM and normative reasoning (i.e., the reasoning of whether or not to adopt or agree with certain norms) (Block-Lerner, Adair, Plumb, Rhatigan, & Orsillo, 2007). More extensively studied is the association between ToM and suggestibility, which involves yielding to misleading information for social reasons (e.g. compliance) and shifting one's response after mild, negative feedback. Although suggestibility research involves a pressured interview by the experimenter as opposed to a group majority, its effects are similar to that of conformity in that it still deals with the conflict of conforming to the norms provided or remaining autonomous. A review of the studies on suggestibility and ToM revealed that, with the exception of a few studies, suggestibility decreases as ToM increases for preschoolers (Bruck & Melnyk, 2004). For example, Welch-Ross and colleagues (1997) found that preschoolers who performed better at ToM tasks were less likely to accept misinformation about a story they heard, suggesting that children's ability of perspective-taking may buffer against the acceptance of misinformation. Evidence from studies on memory conformity (how other people's reports can affect memory) also reveal the requirement for the ability to adequately process the information presented by the other person in order to resist assenting to a false event (Thomsen & Berntsen, 2005; Wright et al., 2000). Furthermore, children who fail false belief tasks tend to be more susceptible to misinformation by others (Bright-Paul, Jarrold, & Writh, 2008). Even when

examining neural processes in adults, evidence shows that for in-group conformity (using an Asch paradigm) greater activity was found in a region bordering the pSTS, an area often linked with the cognitive capacity of perspective taking, or ToM (Stallen, Smidts & Sanfey, 2013). It would seem likely that ToM can be theoretically linked to decreased suggestibility in that a child with developed ToM can understand that others can have a false belief and thus resist the suggestions of the questioner (Scullin & Bonner, 2006).

A few studies also demonstrate that suggestibility may be positively associated with ToM. For example, positive correlations between suggestibility and ToM were found when it involved older preschoolers (6 year olds) and more familiar interviewers (Templeton & Wilcox, 2000; Welch-Ross, 1999). These findings demonstrate that increased perspective-taking (or higher ToM) allows for selective conformity. The skill for understanding others' conceptions of beliefs and knowledge can help young children consider social consequences and what others' intentions are, which are crucial in peer pressure situations when blind conformity to others can lead to negative outcomes.

***Extracurricular activities.*** Most studies on extracurricular activities have been conducted with adolescents with robust findings on the association between participation in organized activities and academic success, leadership, and popularity (Mahoney & Cairns, 1997). Some research suggests that young children can also benefit from participating in extracurricular activities. For example, consistent involvement in extracurricular activities has been linked to high reading and math achievement during kindergarten and first grade (National Institute of Child Healthy and Human Development [NICHD] Early Child Care Research Network, 2004). Moderate participation in the first grade has also been linked to high levels of social, behavioral,

and academic competence in later years (Petit, Laird, Bates, & Dodge, 1997). During middle childhood, positive effects can also be found in academic achievement and emotional adjustment (McHale, Crouter, & Tucker, 2001; Posner & Vandell, 1999).

Among the features of afterschool activity contexts that promote positive development (Eccles & Gootman, 2002) are *positive norms* and *support for efficacy and mattering*. Afterschool program activities that provide a context of positive social norms make sure that expectations and practice of socially appropriate behavior are maintained, and that values and morals are encouraged. Afterschool activities that support self-efficacy and mattering allow for fostering of autonomy, and appreciation of individual expression and opinions. This context also focuses on encouraging and empowering children to accept challenging responsibilities and practice deliberate behavior to make a difference (Mahoney, Larson, Eccles, & Lord, 2005). Afterschool activities were included in this study to explore as a variable potentially linked to conformity because of its ability to provide practice for young children to better deal with social conflicts when faced with group pressure situations. Therefore, it seems that participation in extracurricular activities may be linked to higher social maturity, and hence less conformity to negative norms and more conformity to positive norms.

### *Parenting practices*

Individual differences in children's cognitive and social maturity can result from differential parenting practices. Parents vary on the level of control and expectation they place on children's behaviors. Low level of parental authority over their children may lead children to becoming more dependent on the social norms of peer groups (Bronfenbrenner, 1970). Parents who have high maturity demands had more independent children (Baumrind, 1978). Robust

evidence shows that parenting approaches are also associated with children's prosocial behavior (Hastings, Utendale, & Sullivan, 2007). Thus, in all 4 studies, I sought to investigate the associations between parenting expectations for their children's mature behavior (i.e., independent and prosocial behaviors) and children's rate of conformity to others. More mature children (with high expectations by parents on their independent and prosocial behavior) may be more likely to resist social pressure to peers' negative norms and to conform to their positive norms.

In the context of food, I also examined eating-related parenting practices in Studies 2-4. In particular, I focused on examining parents' restriction of food, teaching nutrition, pressure to eat, and food environment. Additionally, past research suggests that parents' nutritional knowledge and concern for disease prevention are likely to positively impact the diets of children, such as increasing fruit intake (Gibson, Wardle, & Watts, 1998). Availability and exposure to healthy foods, such as fruits, have also been found to be important predictors of children's food consumption patterns (Birch, 1990; Birch & Fisher, 1998; Krebs-Smith et al., 1995). Thus, teaching nutrition and food environment were included as parenting variables to explore in relation to conformity and anticonformity to peers' food choice (Study 2), food portion selection (Study 3), and food taste behaviors (Study 4).

## **The Current Study**

### *Study site*

Data for this dissertation were collected from preschool children in Singapore. Singapore is an Asian country influenced by both Eastern and Western heritage. Traditional eastern cultural practices related to Confucianism are emphasized, though intermingled with modern society

including Western popular culture. The diverse cultures of Singapore include Chinese, Malay, and Indian ethnic groups. Conformity has been studied cross-culturally among adults both in Asch-type replication studies (done just in non-American cultures) as well as in comparison studies (comparing samples from different cultural groups), and have shown generally that adults from East Asian, collectivistic countries show higher levels of conformist behavior than adults in Western, individualistic countries (Bond & Smith, 1996; Huang & Harris, 1973; Fiske et al., 1998; Kim & Markus, 1999). With the exception of a few studies (Hanayama & Mori, 2011; Mori, Ito-Koyama, Arai, & Hanayama, 2014; Sun & Yu, 2016; Zhang, Zhang, Mu, & Liu, 2017), the majority of research on preschoolers' conformity to others as reviewed above has been done in Western countries (Bishop & Beckman, 1971; Cohen, Bornstein, & Sherman, 1973; Corriveau & Harris, 2010; Corriveau et al., 2013; Costanzo & Shaw, 1966; Hamm & Hoving, 1969; Haun & Tomaello, 2011; Hermann et al., 2013; Iscoe, Williams, & Harvey, 1963; Kim et al., 2016; McGuigan & Robertson, 2015; Morgan, Laland, & Harris, 2015; Seston & Kelemen, 2013; Walker & Andrade, 1996). To date, cross-cultural research on young children's conformity has focused exclusively on Asian immigrant groups living in the United States and on visual judgments. The current study explores whether children's conformist behavior generalize across different cultural groups outside of the U.S.

### Research questions and hypotheses

This dissertation asks two main research questions:

1. To what extent do preschoolers demonstrate conformity and anticonformity to peers' social norms in domains of moral/social judgments and eating behaviors?
2. Is cognitive and social maturity (child characteristics and activities) as well as related

parenting practices associated with preschoolers' conformity and anticonformity to peers' social norms in domains of moral/social judgments and eating behaviors?

To address these two research questions, 4 studies were designed to extend basic conformity research with preschoolers to consequential behaviors in real life domains. I expected to find evidence of conformity and anticonformity in all the domains as detailed below. It should be noted that the rates of conformity and anticonformity were not directly compared across domains for both theoretical and practical reasons. Theoretically, my main interest was to see whether the conformity and anticonformity effects exist in domains of social significance for potential interventions. Practically, it would be impossible to compare measurements of morality which was based on acceptability of moral and social-conventional transgressions with measurements of food portions for example (20-500kcal).

*Hypothesis 1.* First, following previous findings on American preschoolers' susceptibility to their peers' social and moral judgments (Kim et al., 2016), Singaporean preschoolers were expected to show a significant rate of conformity to peers' unconventional moral and social norms, such that preschoolers would change their moral/social judgments after group pressure across the judgment domains. If children are susceptible to peers' unconventional moral/social judgments, then this would suggest that young children's moral prescriptions are flexible when faced with peer pressure. If preschoolers do not conform to peers negative social norms at a significant rate, then that would indicate that they are resilient and autonomous in their perceptions of moral issues (Study 1- moral and social conformity).

Similarly, I expected a significant rate of conformity to peers' norms on eating behaviors, such that there would be significant change in preschoolers' healthy eating behaviors: For food choices (Study 1), change from unhealthy food choices (high calorie snacks) to healthier choices



(fruits, vegetables); for food portion selection (Study 2), change from initial food portion selections of healthy and unhealthy foods to peers' portions of those same foods; for drink consumption (Study 3), change in drink consumption in direction of peers' drink choice. This hypothesis was derived from the evidence from peer-modeling as well as from results from conformity studies and intervention studies with children's eating behavior, as reviewed earlier.

*Hypothesis 2.* I expected a significant rate of anticonformity to peers' positive and negative norms. This prediction was derived from evidence that children are vigilant and "dialogical partners" in their social interactions, choosing alternatives to commitment and convergence with others for complex reasons (Hodges, 2014). For moral and social judgments, I suspected that some children would show anticonformity by moving from initially indicating acceptance of moral/social transgressions to indicating their disapproval of those transgressions (or go from slight to strong disapproval of those transgressions) after experimental manipulation of peers' approval of the transgressions (Study 1). For food choices (Study 2), I expected to find that some children may change from initial healthy food choices to unhealthy choices after peers made healthy food choices. Similarly, I also expected to find anticonformity effects on preschoolers' healthy/unhealthy food portion choices (Study 3). Anticonformity was not examined in Study 4 because of two special design features of this study. First, the peer pressure manipulation was designed to be consistently opposite of the participants' choice (e.g., if participant picks A, the peers pick B; if the participant picks B, the peers pick A). With only two drinks as options, participants could either conform or stay independent (there is no possibility of anticonformity or uniformity). Second, to examine drink consumption, we could not allow for free consumption before social pressure manipulation (which would have filled the child's stomach and prevented us from examining peer influence on posttest drink consumption), so we

could not establish the baseline of how much of their preferred drink would have been consumed in order to determine how much *less* of the same drink they would have consumed after the manipulation.

*Hypothesis 3.* I expected that higher maturity levels (i.e., older age, better inhibitory control, better ToM) and associated activities (i.e., participation in extracurricular activities) and parenting practices (i.e., parental responsiveness, expectations) would be related to less conformity to moral and social-conventional transgressions and more conformity to healthy eating behaviors. The opposite direction is expected for anticonformity. In terms of food-related parenting practices, teaching of nutrition and monitoring of their child's food environment were expected to be positively related to conformity to healthy food choice and portions.

## CHAPTER II

### STUDY 1: MORAL AND SOCIAL-CONVENTIONAL CONFORMITY/ANTICONFORMITY AND ITS CORRELATES

Study 1 tested the three hypotheses regarding preschoolers' conformity to others in the moral and social-conventional judgment domain. Study 1 was an experimental pre-posttest design that utilized within-participants factors (moral and social-conventional peer norms). In a pilot study ( $N=117$ ), I explored whether 2-5 year olds in Singapore displayed conformity to others' unconventional moral and social judgments. To test whether there was a conformity effect to negative peer norms (peers always endorsed physically/psychologically harmful and unconventional behaviors), I conducted a series of paired-samples  $t$ -tests to test the values of conformity (mean proportions of trials on which children conformed with an arcsin transformation) against zero (i.e., not alterable or no evidence of conformity) and to compare types of judgments across three domains (moral, social-conventional, visual). These  $t$ -tests showed that children's conformity scores to peers' negative norms were significantly different from pretest to post test,  $t$ 's = from 5.98 to 7.38,  $p$ 's < .001, showing significant conformity. To examine domain differences, paired  $t$ -tests were used instead of repeated measures ANOVA to retain maximum number of participants because different judgment types had different number of missing cases due to pretest screening. Results revealed significant differences between visual and moral judgments,  $t(101) = -2.27$ ,  $p = .025$ , and visual and social-conventional judgments,  $t(85) = -2.17$ ,  $p = .033$ , with preschoolers conforming to their peers' judgments more often on moral and social-conventional transgressions than on inaccurate visual judgments. As such, it would seem that unconventional moral and social norms play a direct and powerful role in preschoolers' decisions to agree to maladaptive judgments. The pilot test provided promising

findings that suggested that the conformity paradigm can be applied to a population outside of the U.S. with significant effects. Study 1 was conducted using similar methods with added tasks measuring inhibitory control and ToM, and supplementary parent surveys.

## **Methods**

### **Participants**

Participants were 58 4- and 5-year-old preschoolers ( $M = 4.8$  years,  $SD = .54$ ; range = 4.02–5.93; 24 girls) from preschools and daycare centers in Singapore. Demographic information on the children was provided by parents. Forty-seven children were identified as Chinese Singaporean, 1 as Indian Singaporean, 3 as “Other,” and 2 not indicated. English is the common language and the medium of instruction in Singapore schools. Therefore, the study was conducted in English. Participants were recruited through telephone calls to principals of local preschools and daycare centers/community centers to see if they were willing to allow their children to participate in this study. Study information and consent processes were described to them briefly via phone-call and followed by an email with appropriate parent consent form, letter of invitation to principal, parent survey, and information sheet. Once the principal agreed to participate, the experimenter distributed forms to parents to be signed and collected before experimentation began. Informed consent was obtained from the parent/guardian of the participant before the testing session.

### **Materials**

*Moral and social-conventional judgment*

The eight 8.5 x 11 colored drawings that children viewed on a laptop computer depicted familiar moral and social-conventional transgressions (Smetana, 2012). The moral transgressions included hitting another child, shoving another child, teasing another child, and calling another child names. The social-conventional transgressions were: taking out a toy during snack time, wearing a bathing suit to day care, standing during story time, and a boy wearing nail polish.

The film clips showed a series of still shots of four moral transgressions and four social-conventional transgressions. Then, the film featured two peer child informants (either all male or all female) and the same sets of moral/social-conventional transgressions images that were used in the first video portion. The interviewer in the film (not present) asks for each image, “Is it okay or not okay for the child to [moral/social-conventional transgression]? If you think it’s okay to [moral/social-conventional transgression], then raise your hand.” Both children in the video then raise their hands (See Appendix A). Finally, the film shows the two informants with their hands by their sides. While previous visual conformity studies with preschoolers typically used three adult or child informants to make up the majority group, my previous study for moral, social-convention, and visual conformity showed that 2 peer informants were enough to elicit conformity (Kim et al., 2016). Therefore, two peer informants were used in the current study. These materials for the moral and social-conventional judgment task have been used before and have shown to be effective in measuring conformity to negative peer influence (Kim et al., 2016).

### *Inhibitory Control Measures*

To measure child’s inhibitory control, this study used a Day Night task (Gerstadt, Hong, and Diamond, 1994) which has been used before in Singapore (Qu, Finestone, Qin, & Reena,

2012) and a Less is More task (Carlson, Davis, & Leach, 2005) which has been used before in Singapore (Qu, Audrey, Jun, & Qun, 2013). The Day Night Task is a Stroop-like task in which children were first asked about the associations between the sun and the day, and between the moon and the night. They were then introduced to a silly game in which the rules involved saying the opposite word of what is commonly associated with the picture shown (“day” for a picture of moon and stars, “night” for a picture of a yellow sun). Children participated in 6 practice trials of which they had to get at least 2 trials correct consecutively in order to move on to the test trials. The total time for children to complete the 16 test trials was timed and recorded as the total response latency. The stimuli were displayed on a laptop screen in individual slides. Responses indicating the opposite association word were scored as 1, whereas responses that indicated the association word were scored as 0. The correct responses over a session were calculated as percentage correct. The Less is More task (Carlson et al., 2005) is a reverse-reward contingency task in which children are asked to point to a smaller portion of treats in order to get the bigger portion. The participant was first asked to choose between two different kinds of uniformly-colored treats that are presented to them (i.e. jellybeans vs. chocolate chips). After the child chose the treats of their choice, they were asked which array they preferred (presented with a five-treat array and a two-treat array). Next, a puppet was introduced to the child as “Chris,” a naughty monkey that likes to get all the treats for himself. The experimenter placed a clear cup next to child and another next to Chris so the child could see the accumulation of treats for self and other. The rules of the game were introduced: every time the child points to a tray, Chris gets the treats in that tray (they go into Chris’ cup) and the child gets the treats in the other tray (they go into child’s cup). After a practice trial and a verbal rule check on who receives the treats when the child picks a tray, the child then received 16 test trials. After 8 trials, the experimenter gave a

verbal rule reminder and the child and experimenter switch seats to control for side biases. The child's responses were scored as the proportion of trials on which the child chose the smaller amount of treat (optimal choice).

### *Theory of Mind Measure*

To measure child's ToM, this study used five ToM tasks based on Wellman and Liu (2004) involving diverse desires, diverse beliefs, false beliefs (content, location), and belief – emotion (used before in Singapore; Qu & Shen, 2013). Because of the length of the conformity task interviews, knowledge access task and understanding of real-apparent emotions were not used (found to develop at older ages than the sample in this study; Smetana et al., 2012). In the Diverse Desires task, children were shown pictures of a carrot and a cookie and were told that toy figure (Mr. Jones) wants to eat a snack. The child was asked which snack he or she likes best (*own desire question*). Then, the child was told that Mr. Jones actually prefers the opposite choice. Finally the child is told that “Mr. Jones can only choose one snack, which one will he choose? The carrot or cookie (*target question*)?” The Diverse Beliefs task involved helping a toy figure (Linda) find her cat based on a picture with bushes and a garage. Child was asked where he or she thinks the cat is (*own-belief question*) and told that Linda thinks the opposite. Child was asked where Linda looks for her cat (*target question*). The child must answer the *target question* opposite of the response to the *own-desire question* to be scored as correct for both tasks. Contents False Belief task required the child to make a choice between what he or she thinks is inside a plaster box. Inside, there was actually an unexpected object (i.e. a cat figurine). Child was asked what he or she thinks a toy figure (Peter) who has not seen the box will think is inside (*target question*) and then was asked to remember if Peter had actually seen

inside the box (*memory question*). Child must answer the target question as “plasters” and answer “no” to the memory question to be scored as correct. In the belief-emotion task, the child saw a toy figure (Teddy) and was asked what Teddy thinks is inside a biscuit box. Teddy was made to say, “Good, because I love biscuits. Biscuits are my favorite snack. Now I’ll go play” then is removed from the child’s sight. The biscuit box was then revealed to the child as actually being filled with rocks. Then the child is asked what Teddy’s favorite snack is. The figure is then brought back and the child is told that Teddy has never seen inside the box and it’s snack time for him. Child’s correct identification of Teddy’s feeling when he gets the box (happy) and Teddy’s feeling after he looks in the box (sad) were measured.

#### *Parent questionnaires*

*Parenting practices.* To examine the influence of parenting practices on children’s conforming/autonomous behaviors, a survey was distributed to the parents. Two subscales were used from the Maturity Demands Scale (21 items; Greenberger & Goldberg, 1989) to explore parental expectations for their children’s mature behavior in independence and prosocial behavior. All items were rated using a seven-point Likert-type scale; responses ranged from ‘never’ (1) to ‘always’ (7). Parents’ expectations for their child’s independence was a mean score of 9 items, parents’ expectations for their child’s prosocial behavior was a mean score of 8 items, and there were 5 filler items which were not scored. The internal consistency of items on the two subscales of independence and prosocial behaviors was Cronbach  $\alpha = 0.68$  and  $0.75$ , respectively.

*Extracurricular activities.* Information about child’s extracurricular activities was also collected and calculated as the total number of activities that child participated in (range: 0-3).



*Demographics.* Parents provided the following demographic information: primary caretaker (parents, grandparents, domestic helper), primary occupation (job title and description), parent and child ethnicity (racial and cultural heritage; generation status if immigrant), educational attainment (years of schooling completed from elementary to post college), and religion.

## **Procedure**

The structure of the study was in the form of short 15- min video clips presented on laptops, followed by interviews during which children were asked to answer basic judgment questions. Children received a total of 16 trials: 4 pretest trials and 4 test trials for each of the norms: moral and social-conventional judgment. All children participated in tasks for the two domains; order of the scenarios was varied systematically across subjects. A camcorder recorded the experiment to capture the child's judgments. The experimenter was introduced to the child as another "visiting teacher" and asked if he/she wanted to play a game: "Hi, my name is \_\_\_\_\_. What's your name? Do you want to play a game with me where I show you some pictures and ask you some questions about them?" After getting child's verbal consent, experiment began.

First, children viewed a series of short moral and social-conventional scenarios in which the moral or social-conventional "correctness" of the behavior of the majority will vary. To introduce the task, the experimenter pointed to the first moral scenario and asked, "See this picture? Is it ok or not ok for the child to [moral or social-conventional act]?" Children were invited to respond as either "okay" or "not okay". If children responded, "not okay," they were further questioned "Is it a little bit bad or very bad?"

To introduce the manipulation (i.e., peer pressure) and test trials, the experimenter pointed to a still frame of the two peer informants and say, "Ok, well now I'm going to show

you some boys/girls who are also going to be shown some pictures and asked if they think something is ok or not ok. After that, I'm going to ask you whether you think something is okay or not okay. Let's watch." The film featuring the two peer informants was presented: A voice in the film asked the same pretest questions, but asked the informants in the video to raise their hands if they think it is okay to [behavior]. The informants simultaneously always raised their hands. After showing the film, the experimenter will ask the participant: "Oh look. These two little boys/girls think that it is okay to [moral/social-conventional transgression]. What do you think? Is it okay or not okay for a child to [moral/social-conventional transgression]?" For each trial/scenario, participant's responses were scored as 0 = "Okay," 1 = "Not okay-Little bad," and 2 = "Not Okay-Very bad." The numbers of "Okay" responses across the four trials for each domain were the raw rates of conformity. Due to skewed distribution, these rates were arcsin transformed for parametric data analysis.

Tasks were administered in a fixed order with conformity tasks coming before the behavioral tasks (inhibitory control, ToM). This order was set to maximize children's interest and to minimize bias related to behavioral tasks (since inhibitory control tasks and ToM tasks may enhance self-control and perspective-taking) before the conformity tasks. Duration of whole procedure took ~20-25 min.

## **Results**

### *Moral and social-conventional conformity and anticonformity*

Children's conformity scores were calculated according to procedures of previous studies (Corriveau & Harris, 2010; Corriveau et al., 2013; Haun & Tomasello, 2011; Kim et al., 2013; Kim et al., 2016). Children's pretest responses were compared to their posttest responses after

the conformity manipulation (i.e., viewing a given video) to produce the conformity score. The dependent variable was computed as mean proportion of trials on which children conformed (with an arcsin transformation) out of the 4 trials. Children's anticonformity scores were computed as mean proportion of trials on which children anticonformed (went from "okay" in pretest to "not okay" in posttest; or "little bad" in pretest to "very bad" in posttest) out of the 4 trials.

*Screening.* For conformity analyses, participants who do not pass the screening test for a given norm— responded "okay" to do a given moral or social-conventional transgression during the pre-test – were excluded from further analysis in that judgment domain since there was no room left for conformity. Five children missed all the pre-test trials in both domains and they were excluded from analyses involving mean frequency of conformed trials. For anticonformity analyses, all trials of all children were included.

**Table 1***Study 1 Means, standard deviations, and bivariate correlations of individual and parenting variables*

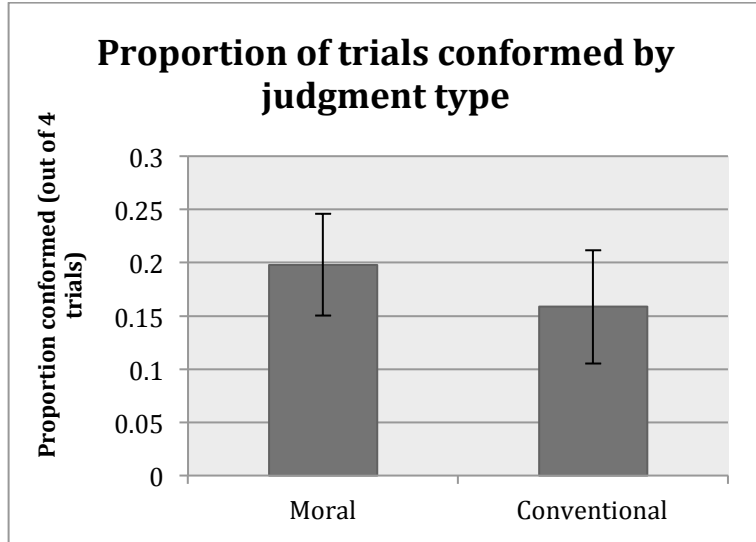
Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11
1. Moral conformity rate	.20	.32	–										
2. Social-conventional conformity rate	.16	.34	.48**	–									
3. Moral anticonformity rate	.10	.15	-.10	.22	–								
4. Social-conventional anticonformity rate	.08	.15	-.22	-.15	.12	–							
5. Age	58.41	6.42	.18	.03	.25	.02	–						
6. ToM tasks passed	2.35	.97	-.07	.19	.12	-.21	.11	–					
7. Inhibitory control- Less is more	.47	.32	.08	-.01	.09	.16	.42**	.10	–				
8. Inhibitory control- Day-night	.64	.40	.08	-.06	-.05	.15	.18	.14	.39**	–			
9. Extracurricular activities	.56	.77	-.38*	-.06	-.10	.26	-.06	-.23	-.01	.05	–		
10. Independence	5.01	.74	.01	-.14	-.03	.16	.13	-.03	.07	.22	.02	–	
11. Prosocial behavior	5.03	.82	.17	-.15	-.20	.16	-.03	.16	-.02	.30*	.00	.72***	–

Note. Age is by months; Parenting variables were rated using a seven-point Likert-type scale; responses ranged from 'never' (1) to 'always' (7).

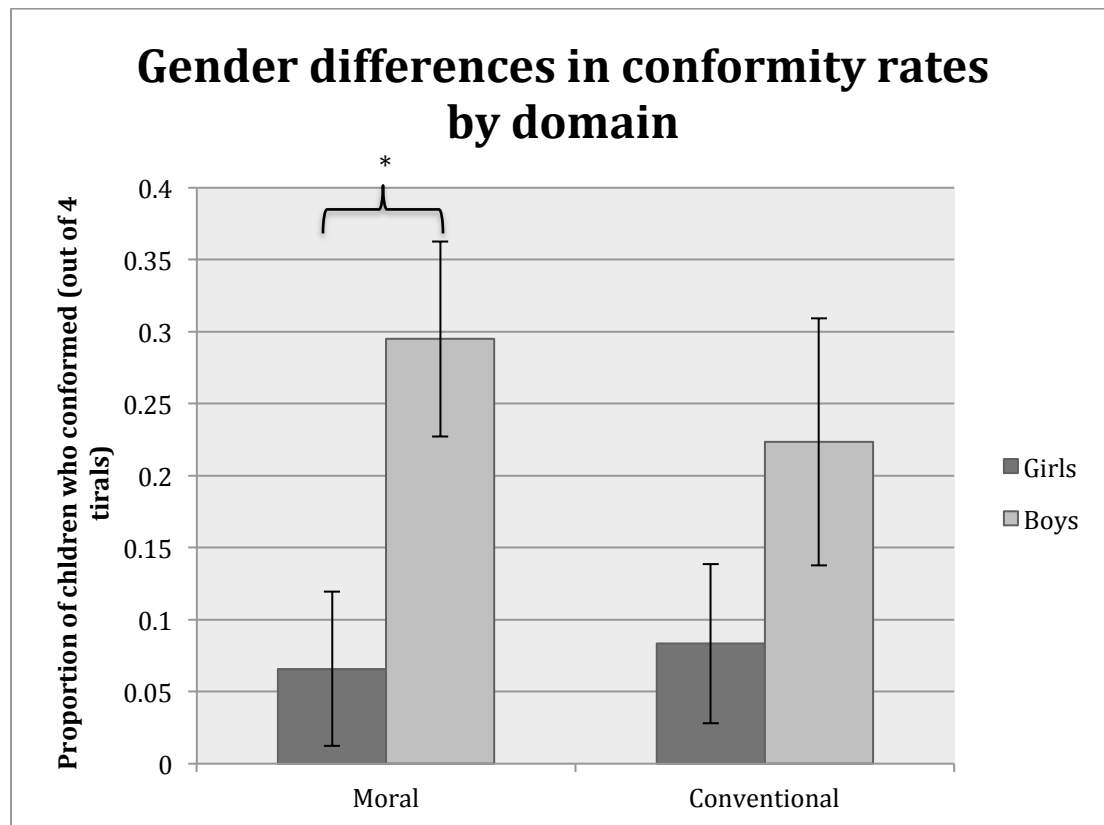
†  $p < .10$  \* $p < .05$  \*\* $p < .01$  \*\*\*  $p < .001$

*Research question 1: Conformity and anticonformity to peers' immoral and unconventional social judgments*

Table 1 shows the descriptive statistics of the main variables in Study 1 as well as their intercorrelations. Conformity effects were found for both moral and social-conventional transgressions as indicated by a series of one-sample *t*-tests which tested the conformity scores against zero (i.e. no change in opinion [after excluding the prescreened trials], and thus no conformity) for each judgment type. Conformity rate to others' moral judgments was significant,  $t(44) = 4.31, p < .001$ , as well as conformity rate to others' social-conventional judgments,  $t(40) = 3.05, p = .004$ . Children conformed 19.81% of trials for moral judgments (arcsin-transformed score was .649) and 15.85% of trials for social-conventional judgments (arcsin-transformed score was .511) with no significant domain differences (conducted by paired-samples *t*-test,  $p > .50$ ; See Figure 2). An independent-samples *t*-test was run to look at gender differences in conformity instead of repeated measures ANOVA to retain maximum number of participants because different judgment types had different number of missing cases due to pretest screening. Results revealed that boys conformed at higher rates than girls on moral judgments,  $t(42.93) = -2.73, p = .009$  (See Figure 3).

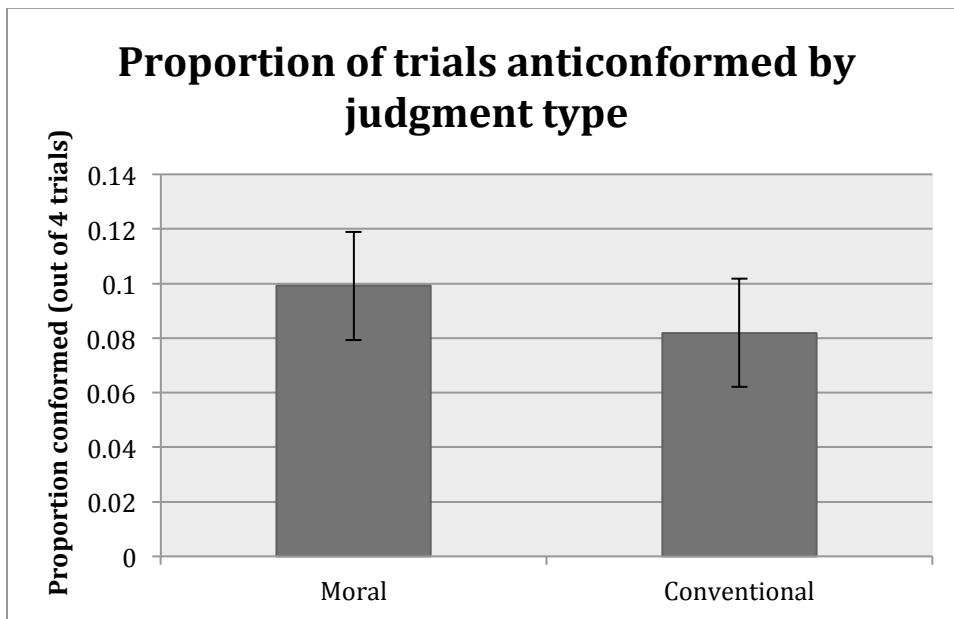


**Figure 2.** Study 1 conformity rates (and standard errors) by judgment domain (Moral, Social-conventional) measured by proportion of trials.



**Figure 3.** Study 1 Gender differences in conformity by domain

Anticonformity effects were also found for both moral and social-conventional transgressions as indicated by a series of one-sample *t*-tests which tested the anticonformity scores against zero (i.e. no change in opinion) for each judgment type. Anticonformity rate to others' moral judgments was significant,  $t(57) = 5.11, p < .001$ , as well conformity rate to others' social-conventional judgments,  $t(57) = 4.13, p < .001$ . Children anticonformed 9.91% of trials for moral judgments and 8.19% of trials for social-conventional judgments with no significant judgment domain differences (conducted by paired-samples *t*-test,  $p > .50$ ; See Figure 4). An independent-samples *t*-test revealed no gender differences in anticonformity.



**Figure 4.** Study 1 Anticonformity rates (and standard errors) by judgment domain (Moral, Social-conventional) measured by proportion of trials.

*Research question 2: Correlates of conformity and anticonformity*

*Child characteristics and activities.* To determine whether any child characteristics were correlated with conformity, Pearson correlations were run between: child's age, inhibitory

control (Less is More task, Day-night task), ToM (total tasks passed score) variables and mean proportion of trials in which children conformed (with an arcsin transformation)/anticonformed for the visual and moral domains. No significant correlates were found using the mean proportion of trials conformed/anticonformed dependent variables (see Table 1).

To explore associations between children's involvement with activities and their level of conformity, Pearson correlations were run between the number of activities and mean proportion of trials in which children conformed (with an arcsin transformation). As shown in Table 1, a negative correlation was found for conformity rate in moral judgments and number of extracurricular activities children participated in ( $r = -0.376, p = 0.022$ ), such that the more extracurricular activities a child participated in, the less they conformed to peers' immoral judgments.

*Parenting practices.* To examine whether parenting variables (expectations of child's independence and prosocial behavior) were correlated with mean proportion of trials in which children conformed (with an arcsin transformation) for the social-conventional and moral judgment domains, Pearson correlations were conducted. No associations between parenting variables and conformity were found. Furthermore, no associations were found between parenting variables and anticonformity.

### **Discussion for Study 1**

Consistent with Hypothesis 1 based on the pilot study and previous studies (Kim et al., 2016), I found evidence of significant conformity to others' unconventional moral and social conventional judgments. In other words, when faced with a conflict between what is morally/socially right and negative norms espoused by peers, some preschoolers are indeed



sensitive to social pressure. These findings support the generalizability of negative (remote) peer influence among children in this age group to a non-Western sample.

Although not a focus of the current study, two findings in this sample were different from those of the American children (Kim et al., 2016). First, Kim et al. (2016) found that the extent to which children altered their judgments under social pressure differed by domain (higher in social conventional judgments than in moral judgments). In this study, however, no judgment domain differences were found, suggesting that perhaps, for Singaporean preschoolers, moral and social-conventional transgressions hold the same weight. One possible explanation may come from Singapore's unique cultural environment. Moral education and citizenship are the primary focus of preschool education in Singapore, with expectations for children by the end of early childhood to understand right from wrong, be willing to share, and love all members of their community. Moreover, in Singapore, moral education is considered essential for both the maintenance of the society as well as the child's personal well-being and development (Ling-Yin, 2006). When moral education is formalized, the line between moral and social-conventional issues may become blurred because the emphasis is on "good" vs. "bad" behaviors whether they originate from intrinsic moral principles or from societal consensus. Without a clear demarcation between moral and social-conventional issues, preschoolers in the current study showed a similar level of flexibility in "going with the flow" for both moral and social-conventional judgments. This speculation of formalized moral education having a strong influence on blurring moral and social-conventional issues should be tested in future research with children from other countries practicing formal moral education (e.g., China).

Second, while no gender differences were found in the prior U.S. sample (Kim et al., 2016), gender differences were found in Singapore sample with boys conforming at higher rates

than girls to others' immoral judgments. One possible explanation for this finding is that in this culture, girls may be more reluctant to express agreement with immoral judgment because particular emphasis may be placed on girls to avoid being involved in immoral and unconventional behaviors. In a collectivistic society, boys may be more vulnerable to following social norms than girls. Black and Hispanic children have been speculated to feel greater pressure to conform to group norms, including gender norms (although possibly due to self-generated feelings of minority status; Corby, Hodges, & Perry, 2007). The extent to which these gender norms are internalized in a healthy or maladaptive way might depend on what type of gender norms are adopted. For example, intrinsic self-limiting gender beliefs (e.g. a boy who defines maleness in terms of aggression) and felt pressure for gender conformity may promote unhealthy adaptation for children (including externalizing problems for boys; Corby et al., 2007). Existing studies show inconsistent and few gender differences in early moral and conventional judgments (Smetana, 2006), with some speculation that different types of parental responses (i.e. assertive parental control; Smetana, 1989) to daughters' and sons' moral transgressions might lead to moral understanding developing more slowly for boys than girls (Smetana, 2012).

Consistent with Hypothesis 2, anticonformity effects were found for children's moral and social-conventional judgments, suggesting that when faced with negative social pressure by peers, some preschoolers can also respond in alternative nonconforming ways that are systematic. The anticonformity effects were roughly about half the size of the conformity effects. These children might be demonstrating a higher degree of individuality. The term "backlash effect" has been introduced by Meade and Barnard (1973) to describe the possibility that the participants under overwhelming social pressure may feel further compelled or convinced of the correctness of their judgment. Furthermore, Rotter (1966) proposed that negative reactions may

occur when subjects believe an attempt has been made to manipulate their behavior. Although the latter is less likely to occur among this age group, evidence from Study 1 suggests that anticonformity may be some sort of emotional response to social pressure that may be less reliant on social approval and autonomy. In future studies, it would be valuable for researchers to include interview questions asking children why they did not agree with group or stick to their autonomous decision. Perhaps, instead of focusing on conformity only, anticonformity paradigm can be used for interventions as well, perhaps for children of particular characteristics (see below).

In terms of correlates of conformity/anticonformity (Hypothesis 3), several findings are noteworthy. First, most of the potential correlates were not significant, suggesting that at this age individual and parenting characteristics may not have highly stable relations with children's conformity. Second, of the significant effects, the most notable was the finding that the greater number of extracurricular activities children participated in, the less likely they were to conform to peers' atypical moral judgments. Children involved in out-of-school extracurricular activities may have broader perspectives/social environments that could help promote resistance to conformity. There is robust support from both researchers and youth policy advocates that participation in extracurricular activities (i.e. sports, arts, school clubs) can provide valuable opportunities for individual growth and development (Eccles & Gootman, 2002; Larson, 2000). Involvement with these activities facilitates membership in a prosocial peer group for adolescents as well as access to supportive adults outside the classroom (Eccles & Barber, 1999; Mahoney et al., 2005; McLaughlin, 2000). Among features of positive developmental settings that have been identified as desirable for organizations that work with adolescents are *positive social norms* and *support for autonomy* (NRIC & IOM, 2002). Although most of the past

research on extracurricular activities has been focused on adolescence, a moderate level of participation in extracurricular activities in the first grade has been linked to high levels of social competence several years later (Petit et al., 1997). My study extended such earlier research to a different domain with a younger age group.

Finally, it is worth discussing why parents' expectations for independent behavior were not associated with children's conformity or anticonformity. Many reasons may exist (e.g., measurement issues, stability of individual differences, etc.). One plausible explanation is that young children spend much time interacting with peers at school, so their tendencies to conform or to anticonform in term of moral and social-conventional issues are more likely to be influenced by peer interaction opportunities (e.g., via extracurricular activities), whereas parent-child interactions may focus on conformity in other domains (e.g., food, see later studies).

In sum, Study 1 yielded results that supported previous conformity effects in similar moral and social norms, showed that it occurred in a non-U.S. sample, demonstrated significant anticonformity behavior, and linked a social maturity-related variable to conformity. These results provide a more complex picture about early conformist/anticonformist behaviors in moral and social conventional judgments. Study 2 tested whether these effects and associations may also be found in another real-life domain with healthy food choice judgments.

## CHAPTER III

### STUDY 2: HEALTHY FOOD CHOICE CONFORMITY/ANTICONFORMITY AND ITS CORRELATES

Study 2 tested the extent to which preschoolers displayed conformity and anticonformity to peers' healthy food choices (i.e. vegetables and fruits). It was expected that both conformity (*Hypothesis 1*) and anticonformity (*Hypothesis 2*) effects would be found in this domain in support of the key role of peers as a potential positive influence on children's health behaviors.

Food choice represents a judgment domain that is even more subjective than moral and social-conventional judgment, and yet, there may be an adapted trust in others for learning or conformity to food preferences of others even in early childhood. Adaptive advantages of relying on others' eating behaviors as guides for what is safe/nutritious to eat and avoiding toxins has been recognized as an evolutionary adaptive advantage compared to trial-and-error learning (Higgs, 2015). Understanding preschoolers' social conformity to others' food choices is also important given that children's early food preferences predict food consumption patterns later in life (Skinner et al., 2002), and because even minor changes in dietary choices can have a major impact on health benefits (Hill et al., 2003).

Finally, it was expected that cognitive and social maturity factors (child characteristics and activities and parenting variables) would be associated with conformity and/or anticonformity (*Hypothesis 3*). It should be noted that inhibitory control and ToM were not measured in this study due to time constraints, but other measures were all the same as Study 1. Study 2 was an experimental, within-subjects design with the dependent variables being child's conformity and anticonformity to others' food choice judgments. Like Study 1, the structure of

the study was in the form of interviews and video clips, where children were asked about their food choices before and after the manipulation (seeing peers on video make healthy food choices). Children's decision to change their initial pretest food preference (palatable yet unhealthy snack) to match the healthy food preferences (fruits and vegetables) chosen by the remote peers was measured as conformity. Children's decision to change their initial pretest food preference of a healthy food (fruits, vegetables) choice to an unhealthy food choice (not expressed by the remote peers and not initially selected by children) was measured as anticonformity. To explore potential predictors of children's tendency to conform, this study also collected information on parenting data as well as children's regular eating behavior.

## **Methods**

### **Participants**

Eighty-nine 3-6 year old Singaporean children ( $M = 5;1$  [year;months], range = 3;1–6;9, 54 girls) from local neighborhood preschools that did not participate in the Study 1 participated in this study. Fifty-six Singaporean children were of Chinese descent, 25 children were identified as being of Malay descent, 4 were of Indian descent, and 4 were identified as "Other". Four subjects were dropped due to disinterest in continuing participation. English is the common language and the medium of instruction in Singapore schools. Same recruitment procedures were used as Study 1. Informed consent was obtained from the parent /guardian of the participant before the testing session.

### **Materials**

#### *Hunger status assessment*

Participants completed baseline measures of hunger, which was used as a control variable in analyses. Participants' hunger status was measured on a 3-point scale using images of three child figures with varying levels of hunger: (1) an empty stomach, (2) a half empty/full stomach, and (3) a full stomach (Fisher & Birch, 2002). Participants were told about how much food each child figure (gender-matched to the child's gender) had eaten and how full or hungry each was. Participants' responses (i.e. hungry, half-full, or full) were recorded to indicate their hunger status.

### *Healthy Food choice*

Four pictures of food pairs (16 x 21cm still frames) depicted 8 different types of foods (i.e. healthy, unhealthy). The four healthy vs. unhealthy food combinations are as follows: Apple vs. Chocolate; Broccoli vs. Potato chips; Cheetos vs. Banana; Cookie vs. Carrots. The video created for this experiment was presented on a laptop in same form as the series of Moral, Social-conventional, and visual judgments. The film features two peer child informants (either both male or both female). The two informants (gender-matched to the participant). An experimenter's voice asks two little boys/girls (gender-matched to the participant): "See this picture? Here are some [Food 1], and here are some [Food 2]. Which one would you rather eat if you could only eat one? If you pick the [healthy food], raise your hand." The two little boys/girls simultaneously raise their hands. The experimenter's voice in the video then asks, "If you pick the [unhealthy food], raise your hand." The little boys/girls do not raise their hands.

### *Parent questionnaires*

*Parenting practices.* To examine the influence of parental expectations for their children's mature behavior, the same subscales of independence and prosocial behavior from the Maturity Demands Scale (Greenberger & Goldberg, 1989) were distributed (for details, see the previous study); The internal consistency of items on these two subscales for the new participants were Cronbach  $\alpha = 0.61$  and  $0.77$ , respectively. To measure the influence of parenting practices and environmental factors on children's regular eating behaviors, parents were also asked to fill out 4 subscales from the Child Feeding Practices Questionnaire (15 items; Musher-Eizenman et al., 2007). Subscales used include parents' pressure for their child to eat (Cronbach  $\alpha = .73$ ), child's eating environment (Cronbach  $\alpha = .50$ ), parents' restriction for health (Cronbach  $\alpha = .51$ ), and parents' teaching about nutrition (Cronbach  $\alpha = .78$ ). Given that these scales were developed in the U.S. and applied to a Singaporean population, certain items may have not worked. So the following items were removed in order to refine the scales (final Cronbach  $\alpha$ 's provided above): *I keep a lot of sweets (candy, ice cream, cake, pies, pastries) in my house; I have to be sure that my child does not eat too much of his/her favorite foods; I tell my child what to eat and what not to eat without explanation.* All items were rated using a five-point Likert-type scale; responses ranged from 'disagree' (1) to 'agree' (5).

*Extracurricular activities.* Information about child's extracurricular activities was also collected (See previous study for details).

*Demographic information.* The same short survey as Study 1 asked parents about: child's primary caretaker, occupation, ethnicity, education, and religion (See previous study for details).

## **Procedures**



First, the participants' body mass index (BMI) was measured by obtaining the child's height and weight using a scale and a measuring tape affixed to a wall. Participants were then asked about their hunger status using the hunger status assessment, followed by 4 pretest trials, manipulation, and 4 posttest trials. In the pretest trials, children were independently asked which food they preferred to eat for 4 healthy-unhealthy food pairs (i.e. apple-chocolate, banana-cookie, broccoli-cheese puffs, carrots-chips). In 4 posttest trials, children were asked the same questions again after having viewed a video with gender-matched peers making unanimous, healthy food choices from the same healthy-unhealthy food pairs (i.e. apple, banana, broccoli, carrots). Conformity was measured by children's shifts in preference from unhealthy (at pretest) to healthy food choices in posttest agreement with the "healthy" peer groups' judgments. Anticonformity was measured by children's shifts in preference from healthy food choices at pretest to unhealthy food choices at posttest. Duration of whole procedure took around ~20-30 min.

## **Results**

### *Food choice conformity and anticonformity*

Consistent with analyses from Study 1 and past studies of preschoolers' conformity (Corriveau & Harris, 2010; Corriveau et al., 2013; Kim et al., 2016), the dependent variable, conformity, was calculated by mean proportions of trials on which children conformed (*overall conformity to peers' choices for all foods, conformity to peers' fruit choices, and conformity to peers' vegetable choices*). To be counted as conforming in the food choice task, the children had to have changed their initial preference to the same healthy food choice as their peers after

viewing the video of the peers' choices. Due to skewed distribution, these rates were arcsin transformed for parametric data analysis. Anticonformity was calculated by mean proportions of trials on which children changed their preference from healthy food choices at pretest to unhealthy food choices at posttest.

*Screening.* Participants who chose healthy food choice for all 4 pretest trials (leaving no room for conformity to healthy foods in posttest trials) were excluded from further analyses that involved the conformity dependent variable ( $N = 20$ ). For the anticonformity dependent variable, all data were included.

*Research question 1: Conformity and anticonformity to peers' healthy food choices*

One-sample t-tests were used to look at whether conformity to peers' positive social norms was significantly different from zero. Preschoolers' overall conformity to others' healthy food preferences was significant,  $t(68) = 5.75, p < .001$ , indicating that posttest food choices significantly differed (in the direction of conforming to the peers' choice) from pretest food choices. The mean conformity rate was .29 (arcsin-transformed score was .901; See Table 2). When tested separately, children's posttest choices significantly differed from their pretest choices for fruits,  $t(43) = 3.52, p = .001$ , and vegetables,  $t(59) = 5.33, p < .001$  as well. The mean conformity rates were .18 for fruits and .32 for vegetables. A paired-samples t-test showed no significant differences between conformity to peers' vegetable and fruit food choices ( $p = .624$ ).

**Table 2***Study 2 Means, standard deviations, and bivariate correlations of variables*

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Overall conformity rate	.29	.42	–										
2. Fruit conformity rate	.18	.34	.94***	–									
3. Vegetable conformity rate	.31	.46	.93***	.60***	–								
4. Overall anticonformity rate	.08	.16	.51***	.52***	.58***	–							
5. Age	59.10	12.02	.23	-.04	.34**	.21**	–						
6. BMI	15.17	2.58	-.30*	-.12	-.30*	.01	-.12	–					
7. Hunger status	.41	0.50	.04	-.11	.07	.01	.11	.07	–				
8. Parental restriction for health	3.94	0.94	-.12	-.12	-.23 <sup>†</sup>	-.12	.13	.24*	.03	–			
9. Parental pressure to eat	3.47	0.99	-.01	-.11	-.05	-.04	.17	-.15	-.14	.09	–		
10. Child's food environment	4.37	0.70	-.04	.06	-.07	.01	-.16	.02	-.06	-.08	-.35**	–	
11. Parental teaching about nutrition	3.91	0.89	-.15	-.25	-.14	-.15	-.01	-.03	-.14	.10	.15	.12	–

Note. Age is by months; Body Mass Index (BMI); Hunger status was coded: 0=hungry, 1=half-full, 2= full; To save space, detailed data for the following variables were omitted because they were not found to be associated with any other variables: independence, prosocial behavior, and extracurricular activities.

<sup>†</sup> $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

A one-sample t-test was also used to test for anticonformity effect. Results revealed that children's change in response from healthy food choices to unhealthy food choices was significant,  $t(87) = 101.57, p < .001$ . The mean conformity rate was .084. However, the anticonformity rate was too low allow for meaningful further analysis by healthy food type (fruits, vegetables).

*Research question 2: Correlates of conformity and anticonformity*

*Child characteristics and activities.* To test for whether there were any significant associations between child characteristics and activities with conformity/anticonformity to peers' healthy food choices, Pearson correlations were run. Because inhibitory control and ToM were not measured in this study, analyses were conducted to see if other individual variables such as age, BMI, and hunger status were significantly associated with conformity and anticonformity. As seen in Table 2, age was significantly positively related to conformity to others' vegetable choices,  $r = .34, p = .014$ , indicating that older children were more likely to conform to peers' vegetable food choices than younger children. BMI was significantly negatively related to overall food conformity,  $r = -.30, p = .013$ , and conforming to others' vegetable preferences,  $r = -.29, p = .025$ , but not for conforming to others' fruit preferences. Children with larger BMIs were less likely to conform to the overall healthy choices and vegetable preferences of the remote peers. All three significant correlations remained significant after controlling for hunger status.

*Parenting practices.* All 89 parent surveys were returned. The items from each subscale of the Child Feeding Practices Questionnaire (CFPQ) were averaged to create a composite score for each subscale. For any missing items, the subscale was computed without that item. To test for whether there were any significant links between parenting variables (expectations for child's independence and prosocial behavior, pressure for their child to eat, child's eating environment, parents' restriction for health, and parents' teaching about nutrition) with conformity/anticonformity to healthy food choices, Pearson correlations were run. No parenting variables were found to be associated with conformity and anticonformity, with the exception of a marginally significant correlation between parental restriction for health and conformity to peers' vegetable choices,  $r = -.23$ ,  $p = .099$ . This finding showed that more restrictive parents had children who conformed less to peers' healthy vegetable choices. Additionally, partial correlation coefficients were run to test the relationship between conformity and parenting practices, controlling for hunger status, and the marginally significant association remained.

### **Discussion for Study 2**

Study 2 showed that conformity to healthy food choice exists among preschoolers. Although children tend to prefer high-energy-dense foods over low-energy dense foods (Bevelander, Engles, Anshutz, & Wansink, 2013), peer influence seems to also guide these preferences, even in early childhood (ages 3 to 6). The current findings suggest that influences of peers on food preference by children's weight status may occur at even younger ages than previously observed (8 year-olds; Bevelander, Anschutz, & Engels, 2012). Results also indicate that although the anticonformity rate was low, it was still significant, suggesting that although

children may be influenced by positive peer pressure, they are also capable of making alternative unhealthy choices in what appears to be defiance.

Overall, the above results demonstrated the effectiveness of using videos of remote peers to promote healthy food choices. Although absolute rates of conformity were not high (overall conformed trials was 28.50%, fruit conformed trials was 18.18%, and vegetable conformed trials was 31.67%), the significant change in food choice from an initially desired unhealthy food option to a healthy food option was elicited by a relatively minimal and brief exposure to two remote peers selecting healthy options on 4 trials. Additionally, the video footage of remote peers' choices can be better translated into more efficient means of intervention for the future (images and videos are easier to distribute and apply in curricula than live confederates). Targeting the promotion of choosing and consuming vegetables and fruit must be studied more carefully to maximize health benefits and to prevent diseases such as obesity, diabetes, and their comorbidities (Hu et al., 2000; Joshipura et al., 2001; World Cancer Research Fund, 1997).

In terms of correlates of conformity/anticonformity (Hypothesis 3), no significant associations between extracurricular activities with conformity/anticonformity were found in Study 2. In contrast, age and BMI were identified as significant correlates to conformity. Children with higher BMI conformed less to their peers' healthy food choices than children with lower BMI. Higher BMI may have been a result of these kids' more "stubbornness" when it comes to food preference. Age was positively correlated to conformity for vegetable choices, with younger preschoolers conforming at lower rates than older children. This finding is consistent with my hypothesis that maturity would be associated with higher conformity in positive behaviors such as eating healthy. In contrast, when peers are pushing for deviant behaviors in a neutral domain as the visual judgment (Corriveau & Harris, 2010; Corriveau et al.,

2013; Walker & Andrade, 1996) or deviant behaviors in moral domains (Kim et al., 2016; Smetana & Braeges, 1990; Smetana et al., 2012), negative correlations with age have been found.

Finally, parental restriction for food was negatively correlated with conformity to healthy food choice (though marginally), such that the more restrictive that parents reported to be about exposure and availability of unhealthy foods, the less likely their children conformed to remote peers' vegetable choices. Parents' monitoring of the availability and exposure of healthy foods (i.e. vegetables) to their children has already been established to be an important determinant of children's food intake (Birch, 1990; Birch & Fisher, 1998; Krebs-Smith et al., 2005). This finding also supports existing research on the association between parents' restrictive control of their child's autonomy in eating and preschoolers' excessive eating/poor self-regulation of energy intake (Faith et al., 2004). This interpretation is consistent with research showing that parental control of feeding practices can have unintended effects on children, such as overeating (Fisher et al, 2002). For example, parents using foods as reward for good behavior for young children which may unintentionally promote the preference for high ED, palatable foods that are often unhealthy (Birch, Zimmerman, & Hind, 1980). Parents might also reward children for eating healthy, low ED foods (i.e. vegetables), causing children to dislike and avoid those foods (Birch et al., 1982). Given this tendency, it is possible that regardless of the intention to restrict and curb their child's exposure to unhealthy foods, parents that practice overly restrictive feeding may detrimentally impact their child's health when it concerns conforming to peers' healthy food choices. No association was found between parental pressure to eat and conformity, suggesting that unlike parental restriction, parental pressure may not undermine conformity to peers, or broadly interfere with social learning of eating behaviors. No association between children's

conformity to others' food choices and teaching of nutrition was found. It is plausible that parents may not be the only bearer for teaching of nutrition, since children may still receive info about nutrition from other caregivers, teachers, and media.

Another possibility for the reason for the moderate association as well as lack of other correlational evidence for Hypothesis 3 might be due to the forced choice between two foods which may not have been sensitive enough to capture individual differences in conformity/anticonformity based on parenting practices. To address this possibility, the next study looked at conformity/anticonformity to children's food portion selection which allowed for more sensitive experimental measurement as well as providing important real life implications for predicting actual food consumption patterns.



## CHAPTER IV

### STUDY 3: FOOD PORTION SELECTIONS CONFORMITY/ ANTICONFORMITY AND ITS CORRELATES

It is commonly known that in addition to food preferences, consumption patterns are acquired during early childhood (Cooke & Wardle, 2005; Skinner et al., 2002). Childhood eating habits in terms of quantity as well as types of foods are highly predictive of those in adulthood (Cusatis et al., 2002; Kelder et al., 1994; Mikkilä et al., 2005; Singer et al., 1995) and deeply connected to social factors, making it imperative to examine how children deal with peer influence when making food portion selections. Previous studies suggest that for 4- to 6-years-old children, exposure to larger food portions promoted greater food intake (Fisher, Rolls, & Birch, 2003; Rolls, Engell, & Birch, 2000), which is a well-known contributor to obesity and metabolic diseases (Hill & Peters, 1998; McConahy et al., 2002). Given that portion size is a strong determinant of subsequent energy intake, it is essential to understand how social and food factors – such as food type, peer behavior, parenting, and child’s environment – influence how children navigate peer influence when making these decisions around portion size and food intake. Study 3 explored whether preschoolers changed their food portion selections based on exposure to remote peers’ food portion selections and whether parental feeding styles, extracurricular activities, and individual characteristics were associated with children’s conformity to others’ food portion selections.

Moreover, past research on children’s modeling of others’ food intake have predominantly looked at and found peer influence on consumption of unfamiliar, low energy dense (ED) foods such as novel vegetables and fruits (Birch, 1980; Hendy, 2002; Hendy &

Raudenbush, 2000). Examining both high and low energy dense food types would allow a test of whether peer influence can be used to also promote smaller portions of high ED foods, instead of only focusing on encouraging greater intake of low ED (and potentially healthier) foods (Bevelander, Anshutz, & Engels, 2012; Cruwys et al., 2015). Study 3 tested whether young children change their food portion selections after having seen remote peers choose 1) larger amounts of low ED foods and smaller amounts of high ED foods or 2) choose larger amounts of high ED foods and smaller amounts of low ED foods.

Based on Study 2 findings, it was expected that both conformity (*Hypothesis 1*) and anticonformity (*Hypothesis 2*) effects would be found in this study. Study 3 explored whether cognitive and social maturity factors (child characteristics and activities, parenting) would be associated with the effect of social conformity/anticonformity in children's food portion selections (*Hypothesis 3*).

## **Methods**

### **Participants**

A group of new subjects who did not participate in previous studies was from diverse local neighborhood preschools in Singapore. The sample included 75 3-6-year-old children ( $M = 5;1$  [year;months], range = 3;9–6;7, 33 girls). Fifty-one Singaporean children were of Chinese descent, 10 children were identified as being of Malay descent, 8 were identified as “Other,” and 6 children's ethnic identities were not indicated in parent surveys. Same recruitment procedures were used as described for Study 1. Informed consent was obtained from the parent /guardian of the participant before the testing session.

## **Materials**

### *Hunger status assessment*

Participants completed the same baseline measure of hunger as in Study 2 (Fisher & Birch, 2002). For more details, refer to Study 2.

### *Food portion selection task (PST)*

Healthy and unhealthy foods were selected from a list of 61 candidate common Singaporean foods ranked by the food energy density (kcal/100g) of commonly eaten foods by Singaporeans that were set up as a PST computer task similar to ones used in previous work (Brunstrom & Rogers, 2009; Brunstrom, Shakeshaft, & Scott-Samuel, 2008; Wilkinson et al., 2012). Three low energy foods ( $M = 102$  kcal/100g; range: 54-154 kcal) were selected from the lower end of the energy density list (tomato pasta, fruit salad, *vegetarian Eefu noodle*) and 3 high energy foods ( $M = 428.74$  kcal/100g; range: 228-550 kcal) were selected from the higher end of the energy-density list (potato chips, French fries, and M&Ms).

The PST was a computer program designed to show high-resolution images of foods served on the same dinner plate with user-controlled portion sizes that were controlled by the left and right arrow on the computer keyboard. Participants were presented the six different food items in a randomized order for both the pretest and test trials, and were allowed to increase or decrease the portion size displayed in equicaloric steps ranging from (20 to 500 kcal) in (20 kcal) or (40 kcal) increments by pressing the arrows. Past research using computerized PSTs with adults show that it can reliably predict actual self-served and consumed portions for a given food presented in the task (Forde, Almiron-Roig, & Brunstrom, 2015; Wilkinson et al., 2012). Pilot testing ( $N = 11$ ) showed that some children this age (20-

40%) had trouble labeling foods precisely (e.g., labeling French fries as chips or labeling them as fish sticks). To minimize confusion (chips with potato chips, another item included in the test) and to ensure that children use the correct labels, follow-up verbal corrections were used for foods that were not immediately recognizable by children in this age range, so they knew what foods the pictures represented. For the manipulation, an 8 x 11 in poster featuring 3 girls/boys whose ethnicities were representative of the Singaporean culture (Chinese, Malay, Indian) and whose gender was matched to the participant was shown with each child's portion displayed below each child's photo.

In the practice trial, children were presented with a slide show similar to the format of the food portion selection task (PST) in which the left and right keyboard buttons correlated with increasing or decreasing the portion of items on the plate presented. The practice trial had a plate of blue circles. Children were guided, "See this plate? There are little circles on the plate. Well in this game when you press this button [point to right arrow → ] you get to add more circles onto your plate. When you press this button [point to left arrow ← ], you get to take away circles from your plate. Let's try! Press this button and see what happens." Participants were asked to familiarize themselves with the right arrow button until the plate was full of circles (maximum) and also invited to press the left arrow button to minimize amount of blue circles.

After the practice trial, children were introduced to the real game: "So in this game you will see some foods. Choose how much you want to eat by pressing the buttons. You can add or take away food from your plate just like how you did with the circles." Participants were asked to select their desired portion of each food item from the randomized series of six food portion images. After personal selection of the six food portions, the manipulation occurred (See Figure - ): "Ok, well now I am going to show you some little boys/girls who also chose how much food

they want to eat. Let's see.” The participant was presented with a picture of three gender-matched kids with 3 plates of food. While pointing to each child's face and food, the experimenter said, “Oh look! This boy/girl chose this much [food], this boy/girl chose this much [food] and this *boy/girl* chose this much [food].” The participant was then informed the reason for why the food portion selection task had to be repeated for the test trials, “Oh no, the computer forgot how much food you picked last time. Let's try again.” Computer button instructions were reminded once again and the participant was asked to choose how much food he/she wanted to eat.

#### *Inhibitory control and theory of mind measures*

To measure child's inhibitory control, this study used the same Day Night task (Gerstadt et al., 1994) and a Less is more task (Carlson et al., 2005) used in the previous studies (for details, see Study 1). To measure child's ToM, this study used the same five ToM tasks used in the previous studies based on Wellman and Liu (2004) involving diverse desires, diverse beliefs, false beliefs (content, location), and belief–emotion (for details, see Study 1).

#### *Parent questionnaires*

*Parenting practices.* The same 2 subscales were used from the Maturity Demands Scale (Greenberger & Goldberg, 1989) to explore parental expectations for their children's mature behavior in independence and prosocial behavior (for details, see Study 1); The internal consistencies of items on these two subscales for this new sample were Cronbach  $\alpha = 0.81$  and  $0.83$ , respectively. To measure the influence of parenting practices and environmental factors on children's regular eating behaviors, the same subscales from Child Feeding Practices

Questionnaire (15 items; Musher-Eizenman et al., 2007) were distributed (for details, see Study 2). Subscales used include child's eating environment (Cronbach  $\alpha = .68$ ), parents' restriction for health (Cronbach  $\alpha = .54$ ), and parents' teaching about nutrition (Cronbach  $\alpha = .80$ ). Parents' pressure for their child to eat was not included because only scales with reliability above .50 were considered for further analyses. The following 4 items were removed in order to refine the scales (final Cronbach  $\alpha$ 's provided above): *Most of the food I keep in the house is healthy; My child should always eat all of the food on his/her plate; If I did not guide or regulate my child's eating, he/she would eat too many junk foods; I tell my child what to eat and what not to eat without explanation.* All items were rated using a five-point Likert-type scale; responses ranged from 'disagree' (1) to 'agree' (5).

*Extracurricular activities.* Information about child's extracurricular activities was also collected (See Study 1 for details).

*Demographic information.* The same short survey as Study 1 asked parents about: child's primary caretaker, occupation, ethnicity, education, and religion (See Study 1 for details).

## **Procedures**

Study 3 was an experimental, 2 x 2 design with the independent variables being food type (low vs. high ED) and condition (peers' choosing healthy foods vs. unhealthy foods), and the dependent variables being child's conformity and anticonformity to others' food portion selection. Conformity was measured as children's decision to change their initial food portion selections in degree towards remote peers' portion selections in the test trials. Anticonformity would be the change away from initial selections in the direction opposite of the peers'

selections. Each participant was asked to select a food portion for low and high-energy dense food types. Participants were randomly assigned to either the healthy condition or the unhealthy condition, in which they either viewed peers making healthy or unhealthy food portion selections. In initial screening, children were asked to identify the food images presented (which would be presented later for portion selection). If they mistakenly identified the food, they were immediately corrected. First, participants completed baseline measures of hunger, which was used as a control variable in analyses. Next, each child was randomly assigned to one of the two experimental conditions. Participants in the ‘unhealthy’ condition completed a practice trial, pretest portion selection trials, inhibitory control tasks, theory of mind tasks, manipulation with peers showing preferences for large portions of high ED foods and small portions of low ED foods, and test portion selection trials. Participants in the ‘healthy’ condition followed the same order, but received a manipulation with peers showing preferences for small portions of high ED foods and large portions of high ED foods, followed by test portion selection trials. For each trial, participants were asked to choose how much food he/she wanted to eat. Participants received a total of 12 trials: 6 pretest trials and 6 test trials for each of the 2 conditions: healthy peers and unhealthy peers. A camcorder recorded the experiment to capture the child’s responses for verbal questions. Duration of whole procedure took ~20-30 min.

## **Results**

### *Food portion selection conformity and anticonformity*

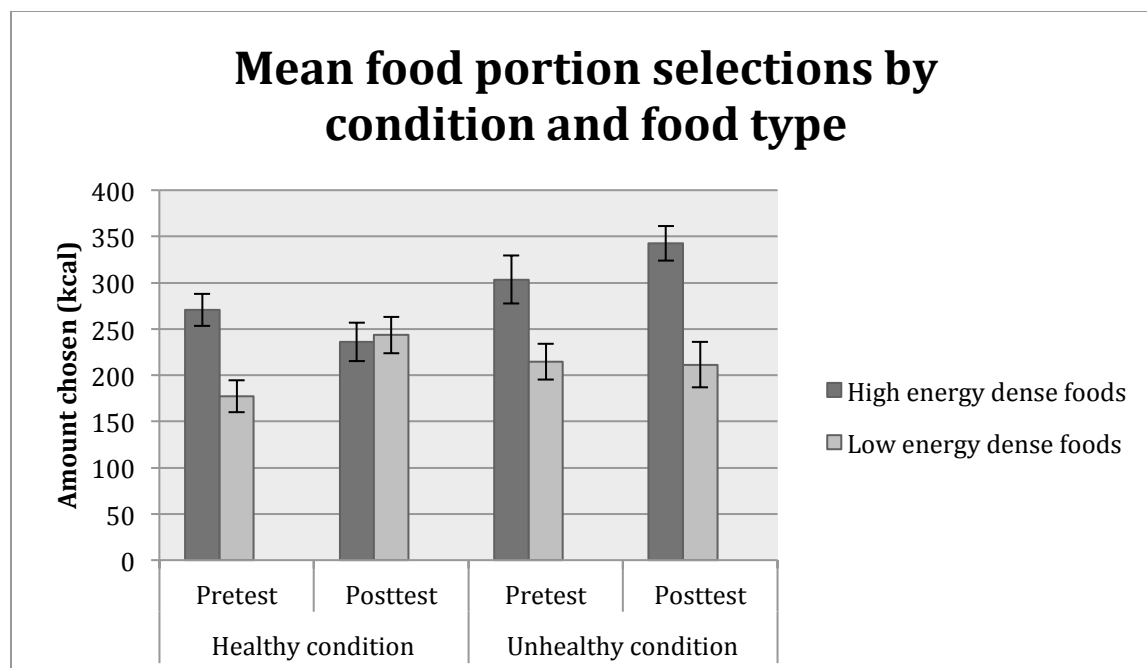
Two conformity/anticonformity indices were created by calculating the participants' average change in portion size (kcal) from pretest trial to test trial for all 6 foods: *Average conformity to high ED foods*, and *Average conformity to low ED foods*. Positive values indicate conformity and negative values indicate anticonformity. Zeros indicate independence.

Because this was a between-subjects design, I first looked at whether there were significant differences in pre-manipulation variables between the two conditions. Pearson Chi-Square tests revealed that the two conditions did not differ in terms of gender composition and baseline hunger status ( $p > .20$ ). There were no differences in children's pretest portion selections between peer conditions, with the exception of potato chips portions (healthy peers condition: 215.2 kcal, unhealthy peers condition: 293.4kcal,  $t(60.19) = 2.49$ ,  $p = .016$ ). Thus, randomization to each condition was successful for gender, initial hunger status, and all baseline food items except potato chips.

*Research question 1: Conformity and anticonformity to peers' food portion selections*

Figure 5 shows the means of portion selections by type of foods, condition, and pre/post-test. Results showed that during the pre-test, both groups selected more high ED foods than Low ED foods. After the manipulation, however, children in the healthy condition choose equal amounts of high and low ED foods (by increasing low ED foods and decreasing high ED foods). The opposite pattern was found for the unhealthy condition. To make it easy to examine the above observations statistically, I created a difference (or change between pretest and posttest values; See Figure 5).

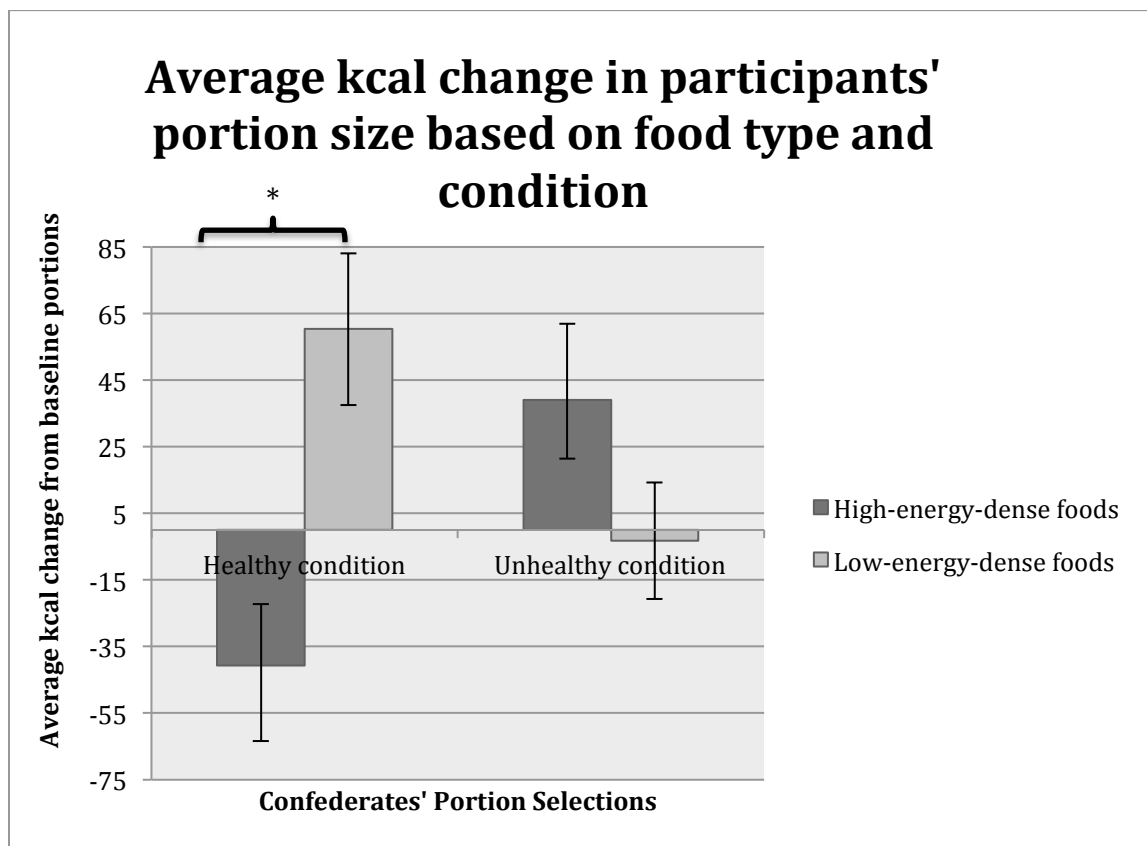




**Figure 5 .** Mean kcal of high ED and low ED foods chosen by peer conditions. Values are mean number of kcals of each food by condition, with standard errors represented by vertical bars. Note. Healthy condition: remote peers chose large portions of low ED foods and small portions of high ED foods; Unhealthy condition: remote peers chose large portions high ED foods and small portions of low ED foods

The change scores were analyzed using 2 (condition: healthy or unhealthy) x 2 (food type: high energy or low energy) repeated measures ANOVA. Results showed a food type by condition interaction,  $F(1, 468.65) = 16.111, p < .001$  (See Figure 6). This interaction indicates that in the unhealthy condition (peers choosing large portions of high ED foods/small portions of low ED foods), participants showed a marginal change in conformity to portions of high ED foods,  $M = 38.99$  kcal ( $SD = 131.37$  kcal),  $t(32) = 1.71, p = .098$ , but not for conformity to portions of low ED foods,  $M = -3.23$  kcal ( $SD = 100.86$  kcal),  $t(32) = -.184, p = .855$ . However, in the healthy condition (peers choosing large portions of low ED foods and small portions of high ED foods), participants showed conformity to peers' portions by increasing their portion sizes of low ED food by an average of 60.33 kcal ( $SD = 146.04$  kcal),  $t(40) = 2.65, p = .012$ , and

also showed conformity for high ED foods by decreasing their portion sizes by an average of 40.65 kcal ( $SD = 117.49$  kcal),  $t(40) = -2.22, p = .032$ ). There were no significant main effects of peer condition or food type ( $p > .10$ ). Participants' average conformity to low ED foods was significantly greater than their average conformity to high ED foods only in the healthy peers condition,  $t(40) = 5.05, p < .001$ .



**Figure 6.** Average change in participants' portion size based on high ED and low ED foods and peer conditions.

*Note.* Healthy condition = peers choose large portions of low ED foods and small portions of high ED foods, Unhealthy condition = peers choose large portions of high ED foods and small portions of low ED foods.

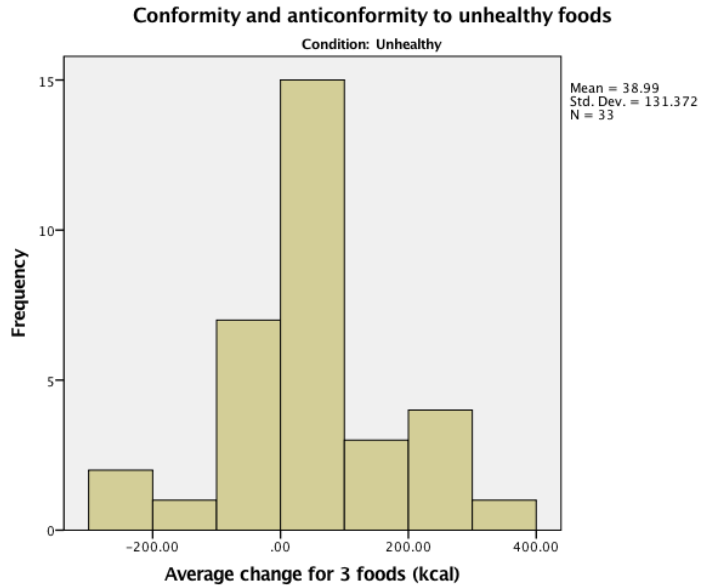
To examine individual differences that led to the above overall findings as well as the extent of conformity vs. anticonformity, Figure 7a-d shows the histograms of the dependent

variables (*change in portion size to high ED foods*, and *change in portion size to low ED foods*) for each condition (healthy, unhealthy) producing a total of 4 variables. Positive values represented conforming towards the peers' portion selections relative to the baseline (conformity), negative values represented deviation from the baseline away from the peers' portions selections (anticonformity), and zero represented no change (independence). These Figures show strong evidence of both conformity and anticonformity.

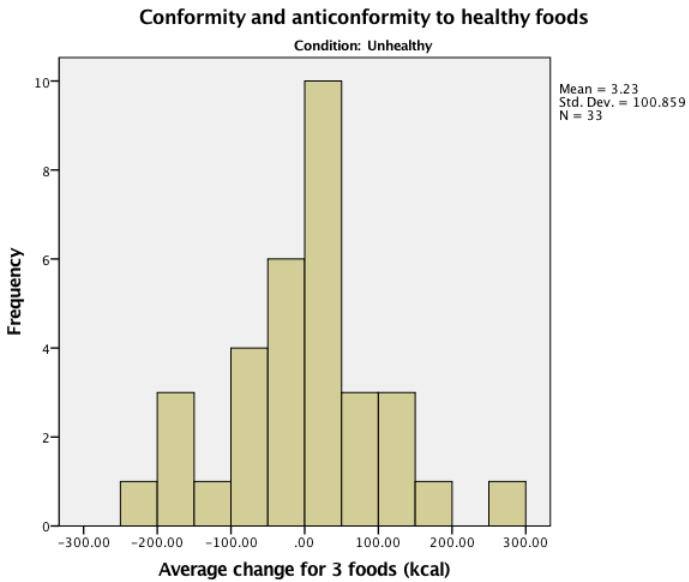
One-sample t-tests were used to look at whether conformity to peers' food portions was significantly different from zero (independence) for each condition. When examining the mean change values (from pretest to post test food portion selections), I found that children who were in the unhealthy condition, marginally changed their portion of high ED foods towards peers' portion selections by an average of 39 kcal from their initial baseline portions,  $t(32) = 1.71, p = .098$ , and changed their low ED foods by an average of 3.23 kcal towards peers' portions from their initial baseline portions (though not significantly;  $p > .10$ ). Children in the healthy condition changed their portions of high ED foods from initial baseline portions towards that of the peers' portions by an average of 37.33 kcal,  $t(39) = 2.02, p = .051$  and significantly changed their portion of low ED foods from initial baseline portions in direction of peers' portions by an average of 65 kcal,  $t(39) = 2.84, p = .007$ . Please note that the above mean values are shown in Figure 6 although the negative change for the high ED foods in the healthy condition represents conformity, so it was reversed for conformity analysis and when examining correlates of conformity. Similarly, the negative change for the low ED foods in the unhealthy condition (non significant above) represents conformity,

**Figure 7.** Mean change in portion size selections based (a), high ED foods in Unhealthy Condition (b), low ED foods in Unhealthy Condition (c) high ED foods in Healthy Condition (d), low ED foods in Healthy Condition. Positive numbers indicate conformity and negative numbers indicate anticonformity.

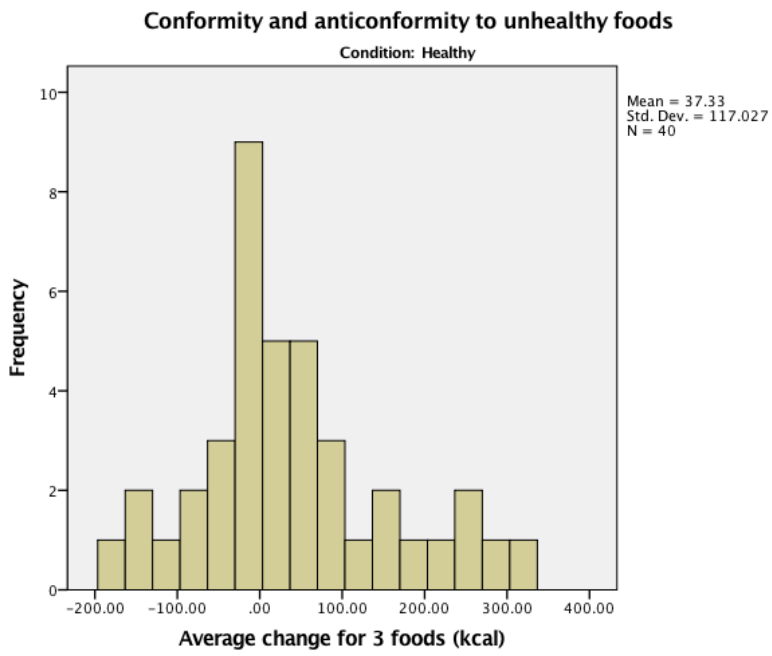
a.



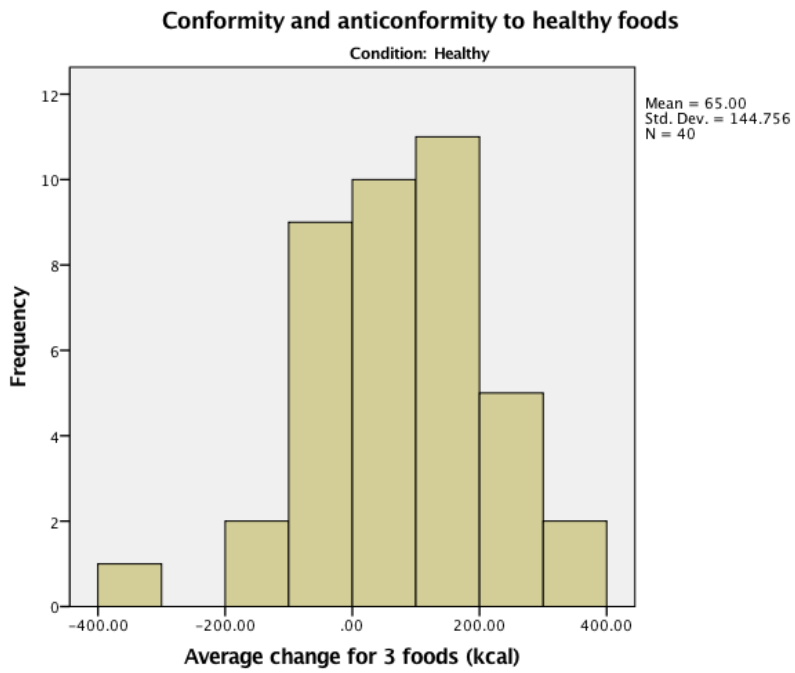
b.



c.



d.

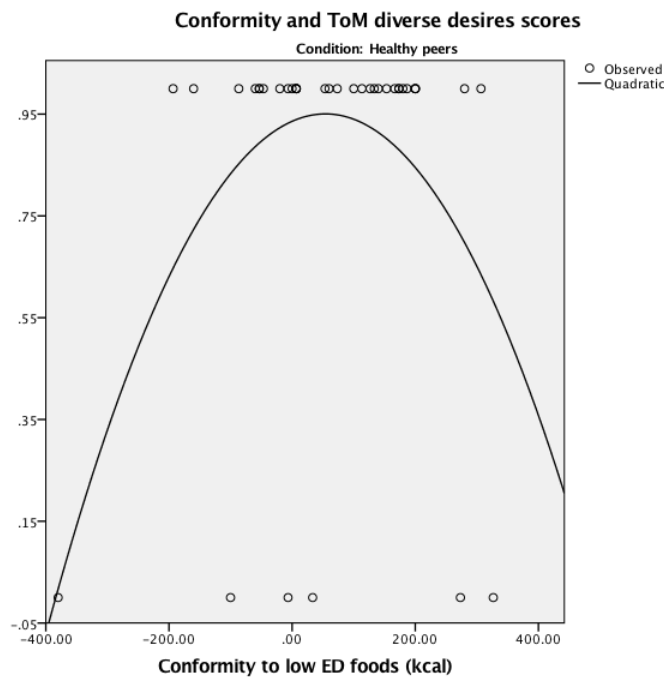


*Research question 2: Correlates of conformity and anticonformity*

*Child characteristics and activities.* To test whether there were any significant associations between child characteristics and activities and conformity to peers' food portion preferences, Pearson correlations were run by condition. For children in the unhealthy condition, a marginally significant positive correlation was found between number of activities child participated in and average change in portion size to low ED foods,  $r = .54, p = .089$ . The more activities that children participated in, the more they changed their initial portion sizes of low ED foods towards peers' smaller portions of low ED foods. In the healthy condition, the number of activities children participated in and average change in portion size to high ED foods were marginally correlated,  $r = -.48, p = .051$ , such that the more activities that children participated in, the more they moved from their initial baseline portions of high ED foods in opposite direction of peers' smaller portions of those foods.

In the unhealthy condition, a marginally significant positive correlation was also found between inhibitory control (as measured by the Less is more task) and average change in portion size to high ED foods,  $r = .33, p = .058$ , such that children with higher scores of inhibitory control conformed more to peers' larger portions of high ED foods. Similarly, children with higher scores of inhibitory control (as measured by Day night task) conformed to peers' smaller portions of low ED foods as well (though marginally),  $r = .31, p = .091$ . In the healthy condition, children's ToM belief emotion score was marginally positively correlated with conformity to low ED foods,  $r = .31, p = .056$ , and marginally negatively correlated with and high ED foods,  $r = -.30, p = .067$ , so that children who scored higher on ToM belief emotion chose larger portions of low ED foods from their baseline amount and went in opposite direction of peers' smaller portions of low ED foods.

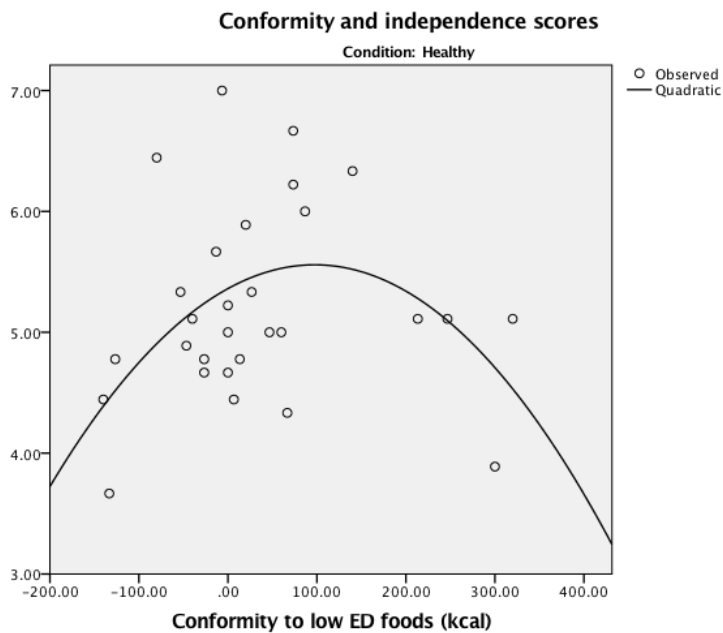
Ordinary Least Squares (OLS) regression analysis was run to explore whether any of the child characteristics and activities and extracurricular variables were predictive curvilinearly of conforming/anticonforming behavior. This analysis was conducted for the two conditions separately. Figure 8a-d depicts quadratic lines. In the healthy condition, ToM (as measured by ‘diverse desires’ task) was a significant predictor of conformity to low ED foods,  $B_2 = -4.952 \times 10^{-6}$  (quadratic component),  $p = .015$  (See Figure 8a).



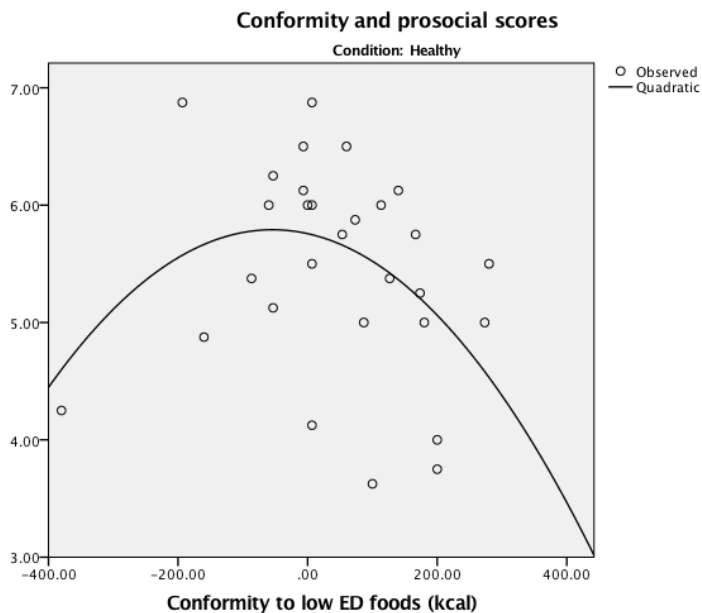
**Figure 8a.** Relationship between ToM diverse desires (y-axis) and conformity to low ED foods in Healthy condition using quadratic curve fit.

In the healthy condition, child’s maturity as measured by independent behavior was a significant predictor of conformity to high ED foods,  $B_2 = -2.073 \times 10^{-5}$  (quadratic component),  $p = .055$  (See Figure 8b). In the healthy condition, prosocial behavior was also a significant predictor of conformity to high ED foods,  $B_2 = -1.909 \times 10^{-5}$  (quadratic component),  $p = .051$  (See Figure 8c). In the healthy condition, prosocial behavior was also a marginally significant

predictor of conformity to low ED foods,  $B_2 = -1.125 \times 10^{-5}$  (quadratic component),  $p = .068$  (See Figure 8d).

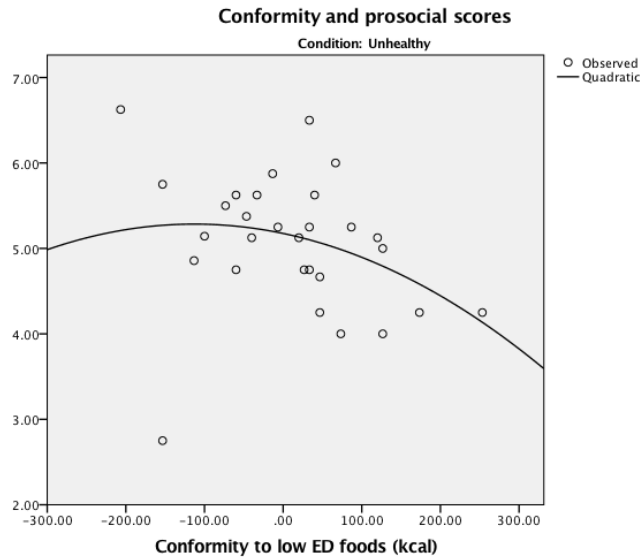


**Figure 8b.** Relationship between child's independence (y-axis) and conformity to low ED foods in Healthy condition using quadratic curve fit.



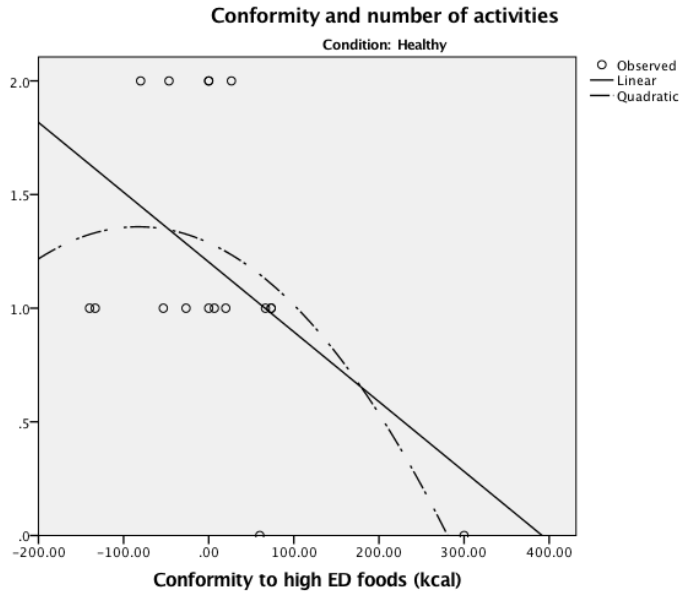
**Figure 8c.** Relationship between child's prosocial behavior (y-axis) and conformity to low ED foods in Healthy condition using quadratic curve fit.





**Figure 8d.** Relationship between child's prosocial behavior and conformity to low ED foods in Unhealthy condition using quadratic curve fit.

In the unhealthy condition, the number of activities was also a marginally significant predictor of conformity to low ED foods,  $B_1 = .006$  (linear component),  $p = .089$ . In the healthy condition, the number of activities was also a marginally significant predictor of conformity to high ED foods,  $B_1 = -.003$  (linear component),  $p = .051$ , and  $B_2 = -1.028 \times 10^{-5}$  (quadratic component),  $p = .077$ . (See Figure 8e).



**Figure 8e.** Relationship between number of activities child participates in and conformity to high ED foods in Healthy condition using linear and quadratic curve fit.

*Parenting practices.* Of 75 parents’ surveys distributed, 54 parent surveys were returned. Because conformity and anticonformity as well as independence are continuously distributed in this study as mentioned earlier, Ordinary Least Squares (OLS) regression analysis was run to explore whether any of the parenting and extracurricular variables were predictive linearly or curvilinearly of conforming/anticonforming behavior. This analysis was conducted for the two conditions separately. No significant predictors were found.

### Discussion for Study 3

Study 3 examined whether preschool age children conformed to the social influence of remote peers’ food portion selection patterns and whether this effect differed by type of food (high vs. low energy density) or type of peer behavior (healthy vs. unhealthy). Support was

found for Hypothesis 1, in that conformity effects in children's food portion selections existed for both food types (high ED, low ED) only in the healthy peer influence condition. This interaction found between food type and confederate type indicates that type of food as well as type of peer influence provides important insight on how children look to others to provide meaningful information about how much to eat.

Participants' apparent resistance to unhealthy peers that selected large portions of high ED foods and small portions of low ED foods supports research suggesting that children at this age may already know what is healthy/unhealthy for them. Kindergarten-age children have been found to prefer and identify foods higher in fat and sugar as "not good for you" (Murphy et al., 1995). Furthermore, 3-5-year-olds were found to better identify healthy and unhealthy food choices after a brief intervention on healthy lifestyle (Wiseman, Harris, & Lee, 2016), suggesting that children this age are capable of learning what is healthy or unhealthy for them. Therefore, it is plausible that knowledge on food nutrition or negative connotations surrounding promotion of unhealthy food groups may guide young children to resist conforming to others' unhealthy food portions of high ED foods. Future studies should continue to explore children's understanding of nutritional values of foods, particularly for how it influences children's eating behavior under social pressure.

Evidence for Hypothesis 2 was supported by the anticonformity effect finding that when children are faced with peers that demonstrate healthy eating behavior (larger portions of low ED foods and smaller portions of high ED foods), many of them will change their food portions in the reverse direction of their healthy peers. This suggests that there is a possibility that positive peer influence in the form of having remote peers' demonstrate healthy food portion selections may backfire for some children. Future efforts on intervention based on using social pressure

should consider food type when developing effective ways to promote healthy food portion selections.

In terms of correlates of conformity and anticonformity, a number of correlates were found: the number of activities (in both the unhealthy (marginally) and healthy peers condition); ToM (diverse desires, belief-emotion), inhibitory control (as measured by Day night task), independence, and prosocial behaviors. For all these maturity-related variables (regardless condition and type of foods), a clear pattern of association showed: children who either conformed or anticonformed showed lower levels of maturity than children who were independent (near zero in conformity). These results are inconsistent with my nuanced hypothesis that cognitive and social maturity would be associated with conformity with positive behaviors (in this study, low ED foods) and anticonformity with negative behaviors (high ED foods). Instead, they suggest that when it comes to food portion selection, staying independent requires higher level of maturity than changing one's initial choices in any direction

One limitation of Study 3 was that children's body mass index (BMI) was not collected or measured. Some studies have shown that body weight of participants moderated the degree of peer modeling, with normal-weight children more likely to restrict their eating in no-eating norm condition compared to overweight children, who were more likely to overeat in the high norm condition compared to normal-weight children. However, these effects did not persist overtime (Bevelander et al., 2012). It should be noted, however, that Study 3 participants were randomly assigned into the different conditions, so that unmeasured individual differences (i.e. BMI) would be randomly distributed across conditions. Nevertheless, BMI would be an important variable to measure when exploring whether conformity effects are moderated by body weight of the participant. In sum, the findings of Study 3 show that conformity effects are evident in

another health behavior with consequences that impact food intake and weight gain. Given that portion size is a strong determinant of subsequent energy intake, it would be reasonable to expect that intake would match portion selection patterns after social influence. However, this speculation requires further investigation in the context of young children. The next study tested whether children's behavior would change in their actual drink consumption.

## CHAPTER V

### STUDY 4: DRINK CHOICE AND CONSUMPTION

#### CONFORMITY/ANTICONFORMITY AND ITS CORRELATES

Study 4 tested the extent to which preschoolers displayed conformity by actually changing drink taste preferences and consumption levels under social pressure. Preschoolers' conformity to peers' drink taste preference was tested using the same experimental design as Studies 1-3 with an added ad libitum procedure. Taste preference conformity was measured as change in response from pretest to posttest of drink taste preferences. A behavioral conformity variable was created to measure the relative amounts of consumption between two drinks (sweetened, not sweetened). It would be valuable to explore peer influence on drink consumption behavior for several reasons. First, although other foods could be used, beverages provide a paradigm that is experimentally easier to manipulate (sweetness) and to measure (the amounts; mL). Second, this study focuses on actual behavior change and drinking is an everyday behavior. Third, drinking consumption has important health implications. Children who preferred higher levels of sucrose in water tended to prefer higher concentrations of salt in broth, which subsequently indicated their preference for higher dietary intake of sodium and higher concentrations of salt and sugar in snacks in general (Mennella, Finkbeiner, Lipchock, Hwang, & Reed, 2014). These recent research findings reflect what researchers have speculated about the intake of sugar-sweetened beverages and its likelihood to increase overall energy intake related to weight gain and obesity (Mattes, 1996).

Study 4 was an experimental pre-posttest design for drink preference, followed by an ad libitum drink intake measurement. Children's decision to change their initial pretest drink preference (between two drinks of different sweetness level) to match that of those chosen by the

remote peers (always opposite choice) was measured as drink taste preference conformity (dependent variable). Children's consumption conformity was assessed as either they did not drink any of the drink that peers preferred (consumption conformity = 0 [none]), or they drank some of that drink but not as much as their own preferred drink (consumption conformity = 1 [weak]), or they drank peers' preferred drink more than their own preferred drink (consumption conformity = 2 [strong]). To explore potential predictors of children's tendency to conform, this study also collected information on inhibitory control, theory of mind, extracurricular activities, and parenting practices.

I predicted that the extent to which preschoolers displayed conformity to peers' drink taste preferences would be significant for both preference and consumption conformity (*Hypothesis 1*). This hypothesis was based on findings from Studies 2 and 3 above as well as robust research on peer modeling of food choice (Bevelander et al., 2012; Greenhalgh et al., 2009; Hendy, 2002; Staiano, Marker, Frelief, Hsia, & Martin, 2016). Anticonformity was not tested in this study since peers always chose the opposite drink choice of the participants, which would leave participants with only two choices (to conform or to stay independent). In other words, participants could not opt for anticonformity (to pick a third drink) or uniformity (to pick a drink the peers would have picked). As mentioned earlier, anticonformity also could not be assessed for drink consumption because no baseline amount for own preferred drink could be established lest children filled their stomach during pretest.

Finally, it was expected that cognitive and social maturity factors (child characteristics and activities, parenting) would be associated with the effect of conformity to peers' drink taste preference and consumption in that older age, better inhibitory control, better ToM, and associated activities and parenting practices would be related to more conformity to healthy

drink selection (non-sweetened) and consumption levels and less conformity to unhealthy drink selection (sweetened) and consumption levels (*Hypothesis 3*).

## **Methods**

### **Participants**

Seventy-five 3-to-6 year old preschoolers from preschools and daycare centers in Singapore who did not participate in previous studies were tested ( $M = 4.6$  years,  $SD = .67$ ; range = 3.3–5.8; 30 girls). Fifty-three children were identified as Chinese Singaporean, 2 as Indian Singaporean, 4 Chinese Nationals, and 2 as “Other.” Participants were recruited using the same procedure as Study 1. Testing began after parental consent was received. Participants were pre-screened for any food allergies and those indicated by parents to have any food allergies were not tested.

### **Materials**

#### *Hunger assessment*

Participants’ hunger status was measured on a 3-point scale using the same three child images with varying levels of hunger as those used in Study 2: (1) an empty stomach, (2) a half empty/full stomach, and (3) a full stomach (Fisher & Birch, 2002; See Study 2 for details).

#### *Thirst assessment*

Children were asked about their thirst using images of three cups of water, (1) slightly filled cup (2) half-filled cup, and (3) a nearly full cup (See Appendix B): “Do you see these three cups of water? I want you to think about how thirsty you are and how much water you need to



drink. Think about how thirsty you feel right now. How much water do you need to drink? A little bit, this much, or a lot? [Pointed to each cup while referring to liquid amount]” Child’s response for thirst status was coded as 0 = not very thirsty (cup 1), 1 = somewhat thirsty (cup 2), 2 = very thirsty (cup 3).

#### *Sweet taste assessment*

To assess the participant’s knowledge of sweet taste, two images were shown of a chocolate and broccoli. The experimenter asked for each food a recognition question (“What is this food called?”) and an exposure question (“Have you tried it before?”). Participants who did not recognize the food correctly were corrected. Child’s response for which food was sweeter (sweet assessment question) was coded as 1= correct, 0 = incorrect.

#### *Consumption conformity task*

Four pairs of drinks were prepared for this procedure, 2 drinks per trial (pretest trial, posttest trial). Each pair consisted of two 8 oz. Styrofoam cups presented with cloudy-colored (not entirely opaque or clear) plastic lids (that minimized detection of color difference in both drinks) with inserted white straws. One cup was labeled with a black 1.7 x 1.7cm square (“black square” drink) and the other was labeled with a white 1.7 x 1.7cm square (“white square” drink; See Appendix C). In a pilot test ( $N = 10$ ), children were asked to taste and indicate preference between two drinks that were readily available in stores: local standard chocolate-flavored milk formula (8g sugar per 100mL) vs. the reduced-sugar version (5.9g sugar per 100mL). Only half of the participants ( $N = 5$ ) correctly indicated which drink was sweeter after tasting, suggesting that participants may not be detecting differences that were needed to make the drinks distinct

from each other. Thus, two drinks with differing sugar concentrations (5.9%, 11.8%) were prepared by adding superfine sugar to original chocolate milk formula.

During the experiment, each pair of cups presented to the participants was randomized as to whether the “black square” cup or “white square” cup contained the standard chocolate-flavored milk with its original 5.9g sugar content (per 100 mL) formula or the same drink with an additional 5.9g sugar added to its original sugar content (11.8g sugar/100mL). The order of whether the “black square” cup or “white square” cup was placed on left or right when presented to the child was also randomized for both trials.

The social pressure manipulation included a 30 x 45cm white board with pictures of the “white square” drink or “black square” drink placed on top of the board in the same left/right position as presented to the child in the post test (See Appendix D). A black marker line divided the two pictures of drinks with three orange magnets that were pre-placed on the board under the drink (opposite of what the participant indicated as the preferred taste drink). These three magnets were explained to participants to be markers of other children’s drink of choice.

#### *Inhibitory control and theory of mind measures*

To measure child’s inhibitory control, this study used the same Day Night task (Gerstadt et al., 1994) and a Less is More task (Carlson et al., 2005) used in the previous studies (for details, see Study 1). To measure child’s ToM, this study used the same five ToM tasks used in the previous studies based on Wellman and Liu (2004) involving diverse desires, diverse beliefs, false beliefs (content, location), and belief-emotion (for details, see Study 1).

#### *Parent questionnaires*

*Parenting practices.* The same 2 subscales were used from the Maturity Demands Scale (Greenberger & Goldberg, 1989) to explore parental expectations for their children's mature behavior in independence and prosocial behavior (for details, see Study 1); The internal consistencies of items on these two subscales for this new sample were Cronbach  $\alpha = 0.75$  and  $0.79$ , respectively. To measure the influence of parents' feeding practices and conformity, the same subscales from Child Feeding Practices Questionnaire (15 items; Musher-Eizenman et al., 2007) were distributed (for details, see Study 2). Subscales included parents' pressure for their child to eat (Cronbach  $\alpha = .69$ ), child's eating environment (Cronbach  $\alpha = .51$ ), and parents' teaching about nutrition (Cronbach  $\alpha = .77$ ). Parents' restriction for health was not included because only scales with reliability above  $.50$  were considered for further analyses. The following 2 items were removed in order to refine the current subscales (final Cronbach  $\alpha$ 's provided above): "*My child should always eat all of the food on his/her plate,*" "*I tell my child what to eat and what not to eat without explanation.*" All items were rated using a five-point Likert-type scale; responses ranged from 'disagree' (1) to 'agree' (5).

*Extracurricular activities.* Information about child's extracurricular activities was also collected (See Study 1 for details).

*Demographic information.* The same short survey as Study 1 asked parents about: child's primary caretaker, occupation, ethnicity, education, and religion (See Study 1 for details).

## **Procedure**

The order of the study was: BMI measurement, hunger and thirst assessment (order counterbalanced), sweet taste assessment, pretest trial, theory of mind tasks (4 total

counterbalanced), manipulation, posttest trial, an ad libitum measurement, and finally inhibitory control tasks (2 total counterbalanced). This order was set to maximize children's interest and to minimize bias related to behavioral tasks (that may unintentionally enhance self-control and perspective-taking) before the conformity tasks.

After getting the child's verbal assent, participants' BMI was measured by obtaining the child's height and weight (for details, see Study 2). Participants completed baseline measures of thirst, which was used as a control variable in analyses, followed by the sweetness assessment task. In the pretest trial, the two drinks were presented in front of the participant, "These are two kinds of [name of the chocolate-flavored milk brand] drinks. Have you tried [name of the chocolate-flavored milk brand] before? Do you like it? I am going to let you try two kinds of [name of the chocolate-flavored milk brand] drinks. I want you to think about which one you like more. At the end I will ask you which one you like more. Here is one drink, can you try it?" Selected drinks were brought nearer to the participant in a counterbalanced order so that the participant was able to taste each drink twice. Finally, the participant was asked to indicate which drink they liked more (with the option to try the drinks again as many more times as they wanted) and why they liked their selected drink more. Both drinks were then measured by an assistant using a scale by grams, aside from the experimenter and child.

The pretest was followed by the ToM tasks, which were followed by the social pressure manipulation and the posttest. Although it would have been ideal to put all maturity measures after the social pressure manipulation (as argued in Study 1), the ToM tasks were administered between the pretest and posttest for the following reasons. First, I did not want children to continuously drink (pretest, posttest, and ad libitum) lest they were getting full.

Second, due to the limited attention of preschoolers and the large number of tests and behavior measures, I did not want to add additional filler tasks. Finally, the ToM tasks showed the least amount of impact on conformity in the previous studies, so ToM tasks were chosen over inhibitory control tasks to break out the drinking session.

The ToM tasks' materials and procedures were identical to the ones used in Studies 1 and 3. The participant was presented with the manipulation board and told, "*I forgot to ask you last time to help me with this activity. See this board, all the kids that played this tasting game before you put a circle on the board to show which drink they liked more. [Pointing to the magnets placed below the opposite drink of the drink that the participant chose] Oh look, all the kids liked the black/white square drink more. Can you please try the drinks again and put a circle on the board to show which one you like more?*" Selected drinks were brought nearer to the child in a counterbalanced order so that the participant was able to taste each drink again twice. Finally, the participant was asked to indicate which drink they liked more with the option to try the drinks again as many times as they wanted, followed by the question of why they liked their selected drink more. The participant was then told, "Oh, the sticker is falling off the cup. Let me fix it." In the meantime, both drinks were then measured by an assistant using a scale by grams, then refilled to the original 100ml amount each. Next, we exited the room/space by saying that we forgot something in the other room and that we will go retrieve it. The participant was invited to drink as much of the drinks as they wanted while we were gone. The experimenter and assistant left the room/space for 1 min and returned. Both drinks were taken away and ad libitum measurement for amount consumed was taken.

The test trial was then followed by the inhibitory control tasks. The inhibitory control tasks (Less is More, Day-Night task) materials and procedures were identical to the ones used in Studies 1 and 3; order was randomized. Duration of whole procedure took ~20-30 min.

## **Results**

### *Drink taste preference conformity and consumption conformity*

Two dependent variables were created: drink preference conformity (conformed from personal drink choice to peers' drink choice) and consumption conformity (relative amounts of peers' and own preferred drink consumed by the participants). As described earlier, children's consumption conformity was assessed as either they did not drink any of the drink that peers preferred (consumption conformity = 0 [none]), or they drank some of that drink but not as much as their own preferred drink (consumption conformity = 1 [weak]), or they drank peers' preferred drink more than their own preferred drink (consumption conformity = 2 [strong]).

### *Research question 1: Conformity to peers' drink taste preferences and consumption*

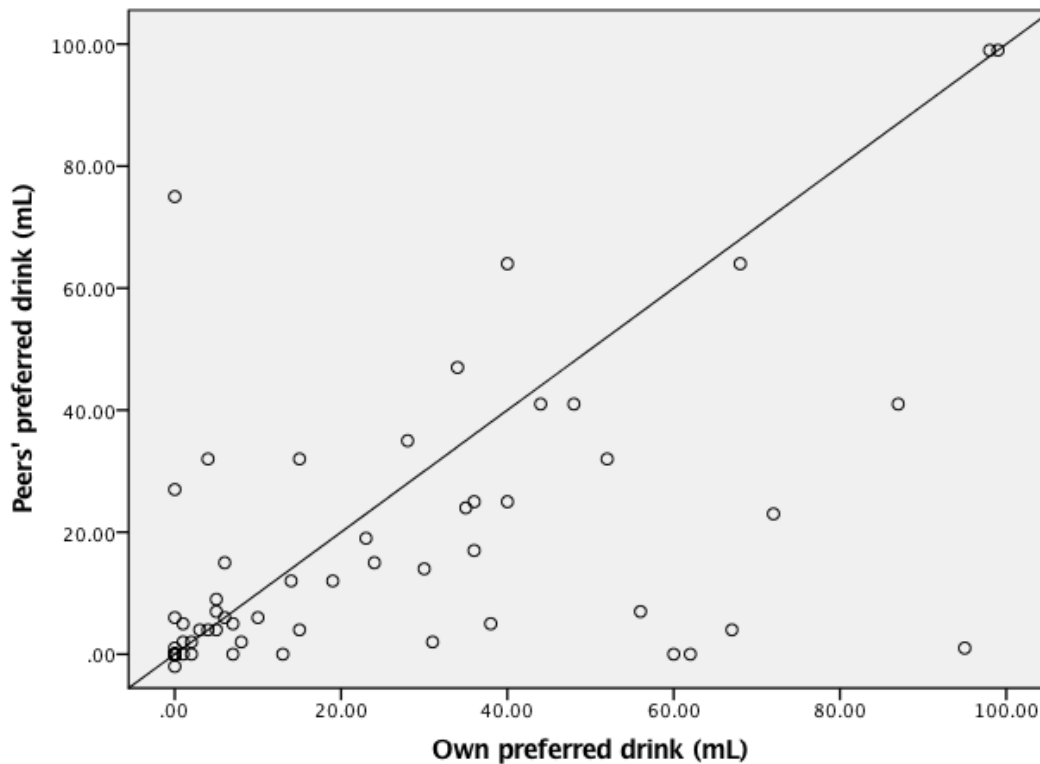
Two dependent variables were created: drink preference conformity (conformed from personal drink choice to peers' drink choice) and consumption conformity (relative amounts of peers' and own preferred drink consumed by the participants). As described earlier, the values for drink preference conformity were 0 (no conformity) and 1 (conformity), and the values for consumption conformity were 0 (no conformity), 1 (weak conformity), and 2 (strong conformity).

In terms of preference conformity, the average proportion of children who conformed was .172. To test Hypothesis 1 and determine whether this proportion was significantly higher

than 1% (a very low value to calculate statistics because 0 is not allowed to calculate z statistics for proportions), z-tests were run. Results showed that children conformed at a significant rate to others' drink taste preferences,  $z = 13.02, p < .001$ . Children's drink preference conformity was not associated with their initial preferred drink,  $\chi^2(1, N = 64) = .007, p = .932$

In terms of consumption conformity, Figure 9 shows the amounts of the two drinks consumed against each other. Above the diagonal line are children who drank more of the peers' preferred drink than the drink they originally preferred (i.e., strong conformity). Below the diagonal are children who drank more of their own preferred drink than the peers' preferred drink (i.e., weak conformity). Among the previous group of children, some did not drink any of the peers' preferred drink (thus no conformity). The percentages of children belonging to three levels of consumption conformity were 29.2% (no conformity), 46.2% (weak conformity), and 24.6% (strong conformity). Consistent with Hypothesis 1, the percentage of children who showed some evidence of conformity ( $24.6\% + 46.2\% = 70.8\%$ ) was clearly significantly higher than 1%,  $z = 56.56, p < .001$ . The percentage of children showing strong conformity (24.6%) was also significantly higher than 1%,  $z = 19.12, p < .001$ . Children's consumption conformity was not associated with their initial preferred drink,  $\chi^2(2, N = 65) = 2.93, p = .310$ . In other words, preschoolers who preferred sweetened or non-sweetened drinks at pretest did not differ in their consumption conformity.

### Comparing peers' vs. personal drink consumption



**Figure 9.** Participants' drink consumption of their preferred drink vs. peers' preferred drink

#### *Research question 2: Correlates of conformity*

*Child characteristics and activities.* To test whether there were any significant associations between child characteristics and activities and conformity to peers' drink preferences and consumption conformity (amount consumed relative to peers' preferred drink), Pearson correlations were run. Age was found to be a significant correlate of conformity to peers' non-sweetened drink preferences,  $r = .296, p = .051$ , such that older preschoolers were more likely to conform than younger preschoolers (See Table 3). Preschoolers' ToM diverse beliefs score was marginally negatively correlated with conformity to peers' non-sweetened



drink preferences,  $r = -.21, p = .095$ , so that the higher preschoolers scored on diverse beliefs, the less they conformed to healthier drink choices. Finally, preschoolers' thirst level was negatively correlated with their conformity to peers' sweetened drink preferences,  $r = -.303, p = .051$ , such that the more thirsty preschoolers were the less they conformed to sweetened drinks. Age and ToM diverse beliefs correlations remained significant (and marginally significant) after controlling for thirst status.

When the data were split between preschoolers' initial drink preference at pretest, a significant correlation was found for ToM belief emotion task and consumption conformity,  $r = -.469, p = .05$  for preschoolers who preferred non-sweetened drink at pretest (See Table 4). These preschoolers' thirst levels also had a negative correlation with conformity to peers' preferred sweetened drink,  $r = -.51, p = .031$ . As seen in Table 5, for preschoolers who preferred sweetened drink at pretest, age and number of activities were found to be positively correlated with conformity to peers' preferred non-sweetened drink,  $r = .296, p = .051$  (for age) and  $r = .265, p = .082$  (for activities). These preschoolers also had a marginally significant positive correlation between ToM false belief content task and consumption conformity,  $r = .25, p = .097$ . All correlations found in the split data analyses remained significant (and marginally significant) after controlling for thirst status, with the exception of a marginal negative correlation found for preschoolers who preferred sweetened drink at pretest between ToM diverse beliefs task and conformity to peers' non-sweetened drink,  $r = -.253, p = .094$  (which was found after controlling for thirst). No child's independence, prosocial behavior, or inhibitory control variables were found to be associated with any of the conformity variables.

**Table 3***Study 4 Means, standard deviations, and bivariate correlations of variables (all cases; N = 72)*

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1. Drink taste preference conformity rate overall	.17	.38	–									
2. Drink taste preference conformity rate to regular drink amount	.06	.24	.57***	–								
3. Consumption conformity	.95	.74	-.08	-.07	–							
4. Age	56.33	6.73	.03	.26*	.02	–						
5. BMI	15.21	1.84	-.01	-.06	-.08	-.18	–					
6. ToM- Diverse beliefs	.64	.48	-.00	-.21†	-.14	-.09	-.03	–				
7. ToM- False belief content	.15	.36	-.02	.14	-.15	.32***	-.09	.05	–			
8. ToM- Belief emotion	.64	.48	.17	.19	-.17	.18	-.01	.21	.20	–		
9. Thirst status	2.44	0.73	-.19	.10	.07	.01	.04	.18	-.07	-.03	–	
10. Extracurricular activities	.86	.97	-.03	.12	.12	-.05	-.02	-.00	.14	.02	-.18	–

Note. Drink taste preference conformity rate is from sweetened drink to not sweetened drink (pretest to posttest); Consumption conformity amount is 0 = no conformity, 1 = weak conformity, 2 = strong conformity (in mL); Age is by months; Body Mass Index (BMI); Thirst status is 0 = very thirsty, 1 = little thirsty, 2 = not very thirsty. To save space, detailed data for the following variables were omitted because they were not found to be associated with any other variables: independence, prosocial behavior, inhibitory control tasks, and parenting variables.

†  $p < .10$  \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

**Table 4**

*Study 4 Means, standard deviations, and bivariate correlations of variables for children who chose the regular drink in pretest (N = 19)*

Variable	M	SD	1	2	3	4	5	6	7	8	9
1. Drink taste preference conformity rate overall	.21	.41	–								
2. Consumption conformity amount	1.16	.76	-.32	–							
3. Age	55.20	8.04	-.10	.03	–						
4. BMI	15.21	1.84	.06	.17	-.20	–					
5. ToM- Diverse beliefs	.68	.48	.24	-.31	-.28	.16	–				
6. ToM- False belief content	.06	.24	.15	-.07	.21	-.10	-.34	–			
7. ToM- Belief emotion	.50	.51	.20	-.47*	-.08	.28	.47*	-.24	–		
8. Thirst status	2.32	0.79	-.51*	.30	.10	-.11	.14	-.14	-.25	–	
9. Extracurricular activities	.79	.92	.15	-.19	.05	-.16	-.16	-.23	.31	-.06	–

Note. Drink taste preference conformity rate is from sweetened drink to not sweetened drink (pretest to posttest); Consumption conformity amount is 0 = no conformity, 1 = weak conformity, 2 = strong conformity (in mL); Age is by months; Body Mass Index (BMI); Thirst status is 0 = very thirsty, 1 = little thirsty, 2 = not very thirsty. To save space, detailed data for the following variables were omitted because they were not found to be associated with any other variables:

\* $p < .10$  \*\* $p < .05$  \*\*\* $p < .01$  \*\*\*\* $p < .001$

**Table 5**  
*Study 4 Means, standard deviations, and bivariate correlations of variables for children who selected sweetened drink in pretest*  
*(N = 49)*

Variable	M	SD	1	2	3	4	5	6	7	8	9
1. Drink taste preference conformity rate overall	.21	.41	—								
2. Consumption conformity amount	.87	.72	-.05	—							
3. Age	55.20	8.04	.30 <sup>†</sup>	.05	—						
4. BMI	15.21	1.84	-.07	-.18	-.20	—					
5. ToM- Diverse beliefs	.51	.27	-.23	-.09	-.01	-.08	—				
6. ToM- False belief content	.66	.40	.11	.25 <sup>†</sup>	.33*	-.09	.12	—			
7. ToM- Belief emotion	.86	.97	.22	-.05	.28 <sup>†</sup>	-.10	.10	.28 <sup>†</sup>	—		
8. Thirst status	2.44	.73	.10	.01	-.15	.08	.19	-.11	.02	—	
9. Extracurricular activities	5.12	.75	-.14	.27 <sup>†</sup>	-.10	.01	.07	.26 <sup>†</sup>	-.07	-.28	—

Note. Drink taste preference conformity rate is from sweetened drink to not sweetened drink (pretest to posttest); Consumption conformity amount is 0 = no conformity, 1 = weak conformity, 2 = strong conformity (in mL); Age is by months; Body Mass Index (BMI); Thirst status is 0 = very thirsty, 1 = little thirsty, 2 = not very thirsty. To save space, detailed data for the following variables were omitted because they were not found to be associated with any other variables: independence, prosocial behavior, inhibitory control tasks, and parenting variables.  
<sup>†</sup>  $p < .10$  \* $p < .05$  \*\* $p < .01$  \*\*\*  $p < .001$

*Parenting practices.* Of 75 parents' surveys distributed, 72 parent surveys were returned. To test whether there were any significant associations between parenting practices and conformity to peers' drink preferences and behavioral conformity, Pearson correlations were run. No significant associations were found. Additionally, partial correlation coefficients were computed, controlling thirst status, and there were no significant findings.

#### **Discussion for Study 4**

Study 4 examined whether preschool age children conformed to remote peers' drink taste preferences and consumption and whether this effect was related to preschoolers' cognitive and social maturity. Overall support was found for Hypothesis 1, which demonstrated conformity effects in children's drink preferences and actual drink consumption. Results build upon Studies 2 and 3, demonstrating that children's sensitivity to non-present peers in eating behavior extends beyond simple drink taste preference changes and actually defies children's innate, sensory preferences for sweet and salty tastes (Cowart, 1981). This pattern is similar to preschoolers' deference to others when it comes to visual sensory judgments.

Consistent with Study 2 findings and Hypothesis 3, age appeared to be positively related to conformity. Compared to younger preschoolers, older preschoolers were more likely to trust their peers when it came to actually choosing healthier, non-sweetened drinks endorsed by peers. This was found to be particularly true for preschoolers who preferred sweetened drinks at baseline, which is a promising finding, considering that a brief intervention using peer influence might be effective for this select type of preschoolers to choose less sweet food and drink options. ToM diverse belief was also marginally correlated with conformity to peers' non-sweetened drink preference, suggesting that preschoolers that had a stronger understanding that

others' could have different beliefs than their own, could be less likely to prefer peers' non-sweetened drink choice. These findings on age and ToM diverse beliefs also remained when controlling for child's thirst status, suggesting that these associations were strong despite any physiological states.

Similarly, preschoolers who chose sweetened drink at baseline, the more they participated in extracurricular activities, the more they consumed more of the peers' preferred non-sweetened drink. This was also true when controlling for child's thirst status, demonstrating that despite physiological constraints such as thirst, extracurricular activities seem to increase affiliation with peers, such that when peers prefer non-sweetened drinks, preschoolers will consume more of peers' preferred drinks. These findings support Hypothesis 3 and provide evidence for the positive effects of social interaction on a healthy behavior that may be provided through opportunities of extracurricular activities.

No parenting variables were found to be associated with conformity overall, indicating that conformist tendencies were independent of perspective-taking skills and outside parental influence. In sum, preschoolers rely on peer consensus when it comes to actual behavioral change. Results have important implications on children's health as the consumption of sugar-sweetened beverages may be a significant contributor to the epidemic overweight and obesity (Duffey & Popkin, 2007). On a practical level, age, ToM, and extracurricular activities will be important factors to consider for targeting children with certain initial preferences for sweetened as well as non-sweetened drinks.

## CHAPTER VI

### GENERAL CONCLUSIONS

Conformity has long been recognized by social psychologists as one of the most important and obvious forms of social influence (Cialdini & Goldstein, 2004). Children's patterns of conformity occur during a formative stage of their social-cognitive development, primarily the preschool years, making it all the more essential to be looking at normative functioning in early childhood. Examining preschoolers' sensitivity to social pressure when making decisions based on peers' negative (i.e., morally wrong or conventionally inappropriate behaviors) and positive (i.e., healthy food choices) norms were particularly important in addressing contemporary concerns of helping children resist peer pressure to maladaptive behaviors.

While initial research on conformity (Asch, 1956) is often perceived as being a psychological phenomenon and a dramatic demonstration of group influence, Asch was more concerned with how factors embedded in societal values and cultural practices help individuals resist social pressure (Bond & Smith, 1996). Theoretically, learning how to deal with the social conflict of conforming to peers' positive and negative norms is vital in early childhood because conformity is critical for human development, including the promotion of in-group uniformity (Deutsch & Gerard, 1955; Turner, 1991), obtaining of new knowledge (Laland, 2004), and transmission of social conventions (Boyd & Richerson, 1985; Henrich, 2001). These theoretical explanations emphasize why the powerful effect of a group influence on copying behavior may be fundamental to social learning and the continuation of cultural norms. Identifying and testing the underlying mechanisms of conformity would be important because of the possibility of

improving these mechanisms through intervention and thus changing rates of conformity towards more beneficial behaviors such as in health.

Despite the fact that social norms are a powerful influence over individuals' daily lives and can motivate individuals to do both beneficial and harmful things, depending on the situation, the question of how social norms operate in guiding everyday behavior of preschoolers both beneficially and harmfully has received limited theoretical and empirical attention. Consequently, this set of studies included in my dissertation extended previous research by using a conformity paradigm (peer pressure situation) to test to what extent these norms have an impact on young children's behaviors in real-life domains. Three main findings were produced. As predicted by the hypotheses, I found evidence of preschoolers' conformist behavior across various domains of significant importance, also evidence of anticonformist behavior, and associations between selected cognitive and social maturity variables and differentiated conformity.

Consistent with past research (Kim et al., 2016), children demonstrated conformity to peers' immoral and unconventional social judgments, even outside of Western populations. However, several cultural differences emerged among judgment type for social and moral group norms. While conformity to moral and social-conventional transgressions was significantly different for U.S. children, no difference was found in the current study, suggesting that perhaps these two types of judgment norms carry the same weight for Singaporean children. This finding may be unique to this specific population given that evidence of young children's moral distinction between moral transgressions (as more generalizably wrong) and social-conventional transgressions has been found in other Asian samples (i.e. Killen & Sueyoshi, 1995; Kim & Turiel, 1996; Laupa & Tse, 2005; Smetana et al., 2012; Yau & Smetana, 2003). Singapore is



considered a “tight” culture with strict enforcement of rules and regulations while the U.S. is seen as a relatively “loose” culture with more permissive and lax attitudes towards deviant social norms (Gelfand, Raver, Nishii, Leslie, Lun, Lim... & Yamaguchi, 2011). Singapore’s strong emphasis on low tolerance for deviation from socially appropriate behaviors may explain why adherence to social-conventional rules may be comparable to moral prescriptivity. Another unique finding was that boys were more likely to conform to immoral judgments than girls in the Singapore sample, a gender difference which has not been found before. This finding may attest to the different expectations for gender roles found in more collectivistic cultures where men may feel added pressure to follow the group norms (Corby et al., 2007).

Preschoolers were also susceptible to social pressure to conform to eating behaviors. Remote peers’ selection of healthy food choices over unhealthy food choices was enough to elicit conformity, showing that peers can also play a significant role in providing positive healthy influence to young children. The rate of conformity to peers’ healthy food choices was comparable to conformity rates to remote peers’ inaccurate visual judgments (Corriveau et al., 2013; Corriveau & Harris, 2010) as well as negative social norms observed in other domains (Kim et al., 2016) including those found in Study 1. While food choice is much more subjective than a visual or moral judgment, it seems to be similarly susceptible to social pressure. Conformity effects were also found in children’s food portion selections, however, only with healthy peers, indicating that when exploring conformist behavior in the food domain, peer type matters. Findings may eventually be used to inform food related public policy, by allowing companies to promote healthy foods by peers, but not unhealthy foods by peers. Finally, I found evidence of actual behavioral change when I found significant conformity effect in Study 4 on

children's conformity to peers' drink consumption, demonstrating that these behaviors could be modified for a select minority of preschoolers.

Most significant, however, are the anticonformity tendencies found in moral/social-conventional and food choice judgments. As predicted by Hypothesis 2, I found anticonformity effects for all three studies that allowed for an examination of anticonformity. Anticonformity was discovered decades ago but has been mostly ignored by recent studies. Future research needs to consider anticonformity in order to understand children's decision making process when faced with social pressure. Motivation for anticonformity is poorly understood. It can range from simple rebellion against the social pressure to purposeful "teasing". Evidence of children demonstrating a fine dance of commitment to and divergence from others has been found in children as young as their first year when they begin to oppose caretakers' directives or actions in a way that resembles teasing (Reddy, 1991). Teasing is an essential part of the child-caretaker relationship because it brings closeness within members of the same group (Hodges, 2014). In terms of practical implications, the existence of anticonformity would affect the usefulness of any intervention programs that rely on conformity. The good news is that anticonformity was usually smaller than conformity effect, so conformity effect would not be completely offset by anticonformity. The bad news is that results showed that the magnitude of anticonformity was sizable (about half of conformity or more in the food portions study), so it would significantly reduce the effects of conformity intervention programs. Future studies should look into not only the motivations behind anticonformity, but also find ways to reduce them (or to utilize them as in "reverse psychology").

As hypothesized, several cognitive and social maturity variables were found to be correlated with conformity and anticonformity. However, findings for correlates were not

consistent across the four studies. One possible reason is that each behavior may have required different skills to deal with decision-making under pressure. Some patterns of associations that emerged include the link between extracurricular activities and conformity. For instance, for moral judgments, the more extracurricular activities preschoolers participated in, the less likely they were to conform to moral transgressions (Study 1). This makes sense given that after-school programs provide opportunities to learn about social relationships, including problem solving and conflict resolution, and responsible decision-making. Furthermore, after-school programs improve children's social and emotional learning skills through self-awareness and self-management, such as self-control and self-efficacy (Durlak, Weissberg, & Pachan, 2010). Also, the more activities that preschoolers participated in, the less they conformed to choosing larger portions of unhealthy (high ED) foods promoted by unhealthy peers (Study 3). Furthermore, number of extracurricular activities was also associated with greater conformity to peers' preference for non-sweetened drinks to the extent that preschoolers actually consumed more of peers' preferred non-sweetened drinks (Study 4). These findings provide evidence that extracurricular activities create opportunities for social interaction with peers that can be beneficial in dealing with social pressure in real-life situations. Future research should also consider exploring other social factors such as sibling size, which may also provide preschoolers with opportunities for social interactions with similar-aged siblings at home.

Another pattern was that older preschoolers were more likely to conform to peers' healthy food choices (Study 2) as well as to peers' preferred non-sweetened drinks (Study 4), suggesting that some inherent traits were likely to affect peer influence in eating behaviors. These findings indicate that as children get older, they may have a greater grasp of how to deal with social pressure situations in which they are faced with positive peer influence. The age

results are not consistent with past conformity studies in the visual (Corriveau & Harris, 2010; Corriveau et al., 2013; Walker & Andrade, 1996) and moral domain (Kim et al., 2016; Smetana & Braeges, 1990; Smetana et al., 2012), indicating that the food domain may be a unique domain in which over time children become less autonomous and stubborn about their food preferences. A possible explanation for this developmental trend is the changing role of peers. Existing research shows that despite findings on how teacher modeling and parent involvement have been shown to increase children's vegetable intake (Harper & Sanders, 1975; Hendy & Raudenbush, 2000; Wardle, Cooke, Gibson, Sapochnik, Sheiham, & Lawson, 2003) children trust peer models more than adults when selecting or sampling foods (Duncker, 1938; Frazier, Gelman, Kaciroti, Russell, & Lumeng, 2012; Hendy & Raudenbush, 2000). Perhaps children develop trust in peers during this preschool period even for foods they have strong aversion to, such as vegetables. As a child moves into adolescence, adolescents have more opportunities than young children or adults to interact with peers, and consequently, peers exert a stronger influence (Laursen & Collins, 2009). It should be noted, however, that age was not associated with food portion selection. Thus, these speculations may not be generalizable to all types of eating behavior and also should be considered with caution.

For food portion selection, the more full children were at start of the experiment, the less likely they conformed to peers' larger portions of unhealthy, high ED foods (Study 3), and the more thirsty children were at the start of the experiment, the less they conformed to peers' preferred sweetened drinks (Study 4). These findings indicate that physiological states as well as individual variables like BMI were related to the tendencies for children to conform to peers' eating behaviors or not. Overall, we find that further research is needed to further explore each behavior in its own uniqueness of demonstrating individual differences of conforming to peers'

behaviors under social pressure. Cognitive and social maturity may also extend to other types of skillsets for children that may be useful for conflict situations. For example, the other executive functioning skills (or top-down mental processes) of working memory and cognitive flexibility may also be worth examining.

In sum, findings from these set of studies shed light on the complex interplay of prudence and trust that preschoolers place on peers in social learning, and the association of various child characteristics and parenting with differentiated conformity to socially relevant norms.

Limitations include not having enough data to look at type and quality of extracurricular activities more closely, which would be valuable in identifying what types of extracurricular activities and duration would be needed to help children better deal with social pressure situations to different behaviors. Furthermore, BMI was not measured in Study 3 food portion selection. Future research need to address such shortcomings.

Third, to examine drink consumption, free consumption could not be allowed before social pressure manipulation which limited us from examining peer influence on posttest drink consumption (due to concerns for children's fullness). To follow the conformity pre-post test paradigm, future studies may consider taking measurement of consumption levels at baseline of how much of their preferred drink of food would have been consumed to calculate how much *less* of the same drink they would have consumed after the manipulation. This may be achievable either by using smaller portions of food/drinks as to avoid child from becoming too full before the post test trials or conducting the study across two days so children can eat or drink as much as they want the baseline. In addition, future research needs to address the longevity issue of conformity intervention. Some conformity effects have been shown to last no longer than 3 days (Huang, Kendrick, & Yu, 2014). One possibility to increase duration of conformity effect might

be to use repeated sessions of remote peers. Furthermore, researchers should consider examining conformity to food choices among older children (i.e. adolescents) in future studies, to determine when peer influence might outweigh personal preferences when it comes to healthy compliance behavior (Krasnegor et al., 1992). It would also be valuable to investigate whether the age-related findings from this study was due to increasing confidence in others' food choices (group affiliation) or because of lessening willingness to resist social pressure (deference to the group) or both.

## References

- Addessi, E., Galloway, A. T., Visalberghi, E., & Birch, L. L. (2005). Specific social influences on the acceptance of novel foods in 2–5-year-old children. *Appetite*, *45*(3), 264-271. <https://doi.org/10.1016/j.appet.2005.07.007>
- Allen, V.L., & Newton, D. (1972). Development of conformity and independence. *Journal of Personality and Social Psychology*, *22*, 18-30.
- Anliker, J. A., Bartoshuk, L., Ferris, A. M., & Hooks, L. D. (1991). Children's food preferences and genetic sensitivity to the bitter taste of 6-n-propylthiouracil (PROP). *The American journal of clinical nutrition*, *54*(2), 316-320.
- Asch, S. E. (1956). Studies of independence and conformity: A minority of one against a unanimous majority. *Psychological Monographs*, *70*, 1-70. <http://dx.doi.org/10.1037/h0093718>
- Astington, J. W. (1993). *The child's discovery of the mind* (Vol. 31). Harvard University Press.
- Baumrind, D. (1978). Parental disciplinary patterns and social competence in children. *Youth & Society*, *9*(3), 239-267. <https://doi.org/10.1177/0044118X7800900302>
- Bernard, S., Harris, P., Terrier, N., & Clément, F. (2015). Children weigh the number of informants and perceptual uncertainty when identifying objects. *Journal of Experimental Child Psychology*, *136*, 70-81. <https://doi.org/10.1016/j.jecp.2015.03.009>
- Bernard, S., Proust, J., & Clément, F. (2015). Four-to Six-Year-Old Children's Sensitivity to Reliability Versus Consensus in the Endorsement of Object Labels. *Child Development*, *86*(4), 1112-1124. doi:10.1111/cdev.12366
- Berndt, T. J. (1979). Developmental changes in conformity to peers and parents. *Developmental Psychology*, *15*, 608–616. <http://dx.doi.org/10.1037/0012-1649.15.6.608>

- Birch, L. L. (1980). Effects of peer models' food choices and eating behaviors on preschoolers' food preferences. *Child Development*, 489-496. doi: 10.2307/1129283
- Birch, L. L. (1990). The control of food intake by young children: The role of learning.
- Birch, L. L. (1999). Development of food preferences. *Annual Review of Nutrition*, 19(1), 41-62. <https://doi.org/10.1146/annurev.nutr.19.1.41>
- Birch, L. L., McPhee, L., & Sullivan, S. (1989). Children's food intake following drinks sweetened with sucrose or aspartame: time course effects. *Physiology & Behavior*, 45(2), 387-395. [https://doi.org/10.1016/0031-9384\(89\)90145-5](https://doi.org/10.1016/0031-9384(89)90145-5)
- Birch, L. L., Zimmerman, S. I., & Hind, H. (1980). The influence of social-affective context on the formation of children's food preferences. *Child Development*, 856-861. doi: 10.2307/1129474
- Bishop, B. R., & Beckman, L. (1971). Developmental conformity. *Developmental Psychology*, 5(3), 536.
- Bond, R. & Smith, P.B. (1996). Culture and conformity: A meta-analysis of studies using Asch's (1952b, 1956) line judgment task. *Psychological Bulletin*, 119, 111-137. doi: 10.1037/h0031673
- Block-Lerner, J., Adair, C., Plumb, J. C., Rhatigan, D. L., & Orsillo, S. M. (2007). The case for mindfulness-based approaches in the cultivation of empathy: Does nonjudgmental, present moment awareness increase capacity for perspective-taking and empathic concern?. *Journal of Marital and Family Therapy*, 33(4), 501-516. doi:10.1111/j.1752-0606.2007.00034.x
- Boyd, R., & Richerson, P. J. (2009). Culture and the evolution of human cooperation. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1533), 3281-3288. doi:10.1098/rstb.2009.0134



- Bright-Paul, A., Jarrold, C., & Wright, D. B. (2008). Theory-of-mind development influences suggestibility and source monitoring. *Developmental Psychology*, 44(4), 1055.  
<http://dx.doi.org/10.1037/0012-1649.44.4.1055>
- Brody, G. H., & Stoneman, Z. (1981). Selective imitation of same-age, older, and younger peer models. *Child Development*, 717-720. doi:10.2307/1129197
- Bronfenbrenner, U. 1970. *Two worlds of childhood: US and USSR*, New York: Russell Sage Foundation.
- Bruck, M., & Melnyk, L. (2004). Individual differences in children's suggestibility: A review and synthesis. *Applied Cognitive Psychology*, 18(8), 947-996. doi:10.1002/acp.1070
- Brunstrom JM & Rogers PJ (2009) How many calories are on our plate? Expected fullness, not liking, determines meal-size selection. *Obesity (Silver spring)* 17, 1884-1890. doi: 10.1038/oby.2009.201
- Brunstrom JM, Shakeshaft NG, Scott-Samuel NE (2008) Measuring 'expected satiety' in a range of common foods using a method of constant stimuli. *Appetite* 51, 604-614.  
<https://doi.org/10.1016/j.appet.2008.04.017>
- Burger, J. M., Bell, H., Harvey, K., Johnson, J., Stewart, C., Dorian, K., & Swedroe, M. (2010). Nutritious or delicious? The effect of descriptive norm information on food choice. *Journal of Social and Clinical Psychology*, 29(2), 228-242.  
<https://doi.org/10.1521/jscp.2010.29.2.228>.
- Carlson, S. M., Davis, A. C., & Leach, J. G. (2005). Less is more: Executive function and symbolic representation in preschool children. *Psychological science*, 16(8), 609-616.  
<https://doi.org/10.1111/j.1467-9280.2005.01583.x>

- Casler, K., Terziyan, T., & Greene, K. (2009). Toddlers view artifact function normatively. *Cognitive Development, 24*(3), 240-247.  
<https://doi.org/10.1016/j.cogdev.2009.03.005>
- Chen, D. W., Fein, G. G., Killen, M., & Tam, H. P. (2001). Peer conflicts of preschool children: Issues, resolution, incidence, and age-related patterns. *Early Education and Development, 12*(4), 523-544. [https://doi.org/10.1207/s15566935eed1204\\_3](https://doi.org/10.1207/s15566935eed1204_3)
- Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology, 55*, 591-621.  
<https://doi.org/10.1146/annurev.psych.55.090902.142015>
- Cialdini, R. B., Demaine, L. J., Sagarin, B. J., Barrett, D. W., Rhoads, K., & Winter, P. L. (2006). Managing social norms for persuasive impact. *Social Influence, 1*(1), 3-15.  
<https://doi.org/10.1080/15534510500181459>
- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology, 58*(6), 1015. <http://dx.doi.org/10.1037/0022-3514.58.6.1015>
- Cohen, R., Bornstein, R., & Sherman, R. C. (1973). Conformity behavior of children as a function of group makeup and task ambiguity. *Developmental Psychology, 9*(1), 124-131.  
[doi:10.1037/h0035082](https://doi.org/10.1037/h0035082)
- Cooke, L. J., & Wardle, J. (2005). Age and gender differences in children's food preferences. *British Journal of Nutrition, 93*(5), 741-746. <https://doi.org/10.1079/BJN20051389>
- Corby, B. C., Hodges, E. V., & Perry, D. G. (2007). Gender identity and adjustment in black, Hispanic, and white preadolescents. *Developmental Psychology, 43*(1), 261.  
[doi:10.1037/0012-1649.43.1.261](https://doi.org/10.1037/0012-1649.43.1.261)

- Corriveau, K., Fusaro, M., & Harris, P.L. (2009). Going with the flow: Preschoolers prefer non-dissenters as informants. *Psychological Science, 20*, 372-377.  
<https://doi.org/10.1111/j.1467-9280.2009.02291.x>
- Corriveau, K. & Harris, P. (2010). Preschoolers (sometimes) defer to the majority in making simple perceptual judgments. *Developmental Psychology, 46*(2), 437.  
<http://dx.doi.org/10.1037/a0017553>
- Corriveau, K., Fusaro, M., & Harris, P.L. (2009). Going with the flow: Preschoolers prefer non-dissenters as informants. *Psychological Science, 20*, 372-377. doi:10.1111/j.1467-9280.2009.02291.x
- Corriveau, K., Kim, E., Song, G. & Harris, P. (2013). Young children's deference to a majority varies by culture & judgment setting. *Culture & Cognition, 13*, 367-381.  
doi:10.1163/15685373-12342099
- Corriveau, K. H., & Harris, P. L. (2010). Preschoolers (sometimes) defer to the majority in making simple perceptual judgments. *Developmental Psychology, 46*, 437-445.  
doi:10.1037/a0017553
- Costanzo, P.R., & Shaw, M.E. (1966). Conformity as a function of age level. *Child Development, 37*, 967-975. doi:10.2307/1126618
- Cowart, B. J. (1981). Development of taste perception in humans: sensitivity and preference throughout the life span. *Psychological Bulletin, 90*(1), 43. doi:10.1037/0033-2909.90.1.43
- Cruwys, T., Bevelander, K. E., & Hermans, R. C. (2015). Social modeling of eating: A review of when and why social influence affects food intake and choice. *Appetite, 86*, 3-18.  
<http://dx.doi.org/10.1016/j.appet.2014.08.035>

- Cusatis, D. C., Chinchilli, V. M., Johnson-Rollings, N., Kieselhorst, K., Stallings, V. A., & Lloyd, T. (2000). Longitudinal nutrient intake patterns of US adolescent women: the Penn State Young Women's Health Study. *Journal of Adolescent Health, 26*, 194–204. [http://dx.doi.org/10.1016/S1054-139X\(99\)00080-4](http://dx.doi.org/10.1016/S1054-139X(99)00080-4)
- de Onis, M., Blössner, M., & Borghi, E. (2010). Global prevalence and trends of overweight and obesity among preschool children—. *The American Journal of Clinical Nutrition, 92*(5), 1257-1264. <https://doi.org/10.3945/ajcn.2010.29786>
- Deutsch, M., & Gerard, H. B. (1955). A study of normative and informational social influences upon individual judgment. *The Journal of Abnormal and Social Psychology, 51*(3), 629. doi:10.1037/h0046408
- Diamond, A. (2013). Executive functions. *Annual Review of Psychology, 64*, 135. <https://doi.org/10.1146/annurev-psych-113011-143750>
- Dubois, L., Farmer, A., Girard, M., & Peterson, K. (2007). Regular sugar-sweetened beverage consumption between meals increases risk of overweight among preschool-aged children. *Journal of the American Dietetic Association, 107*(6), 924-934. <http://dx.doi.org/10.1016/j.jada.2007.03.004>
- Duffey KJ, Popkin BM. Shifts in patterns and consumption of beverages between 1965 and 2002. *Obesity (Silver Spring) 2007*;15:2739-2747. doi:10.1038/oby.2007.326
- Durlak, J. A., Weissberg, R. P., & Pachan, M. (2010). A meta-analysis of after-school programs that seek to promote personal and social skills in children and adolescents. *American Journal of Community Psychology, 45*(3-4), 294-309. <https://doi.org/10.1007/s10464-010-9300-6>

- Eccles, J. S., & Barber, B. (1999). Student council, volunteering, basketball, or marching band: What kinds of extracurricular involvement matters? *Journal of Adolescent Research, 14*, 10-14. <https://doi.org/10.1177/0743558499141003>
- Eccles, J. S., & Gootman, J. A. (2002). Features of positive developmental settings. In J. S. Eccles & J. A. Gootman (Eds.), *Community Programs to Promote Youth Development* (pp. 86–118). Washington, DC : National Academy Press.
- Einav, S. (2014) Does the Majority Always Know Best? Young Children's Flexible Trust in Majority Opinion. *PLoS ONE 9*(8): e104585. <https://doi.org/10.1371/journal.pone.0104585>
- Eisenberg, N., Fabes, R. A., Guthrie, I. K., & Reiser, M. (2002). The role of emotionality and regulation in children's social competence and adjustment. *Paths to successful development: Personality in the life course, 46-70*.
- Eisenberg, N., & Spinrad, T. L. (2004). Emotion-related regulation: Sharpening the definition. *Child Development, 334-339*. doi:10.1111/j.1467-8624.2004.00674.x
- Eisenberg, N., Spinrad, T. L., Fabes, R. A., Reiser, M., Cumberland, A., Shepard, S. A., ... & Thompson, M. (2004). The relations of effortful control and impulsivity to children's resiliency and adjustment. *Child Development, 75*(1), 25-46. doi:10.1111/j.1467-8624.2004.00652.x
- Eisenberg, N., Valiente, C., Spinrad, T. L., Cumberland, A., Liew, J., Reiser, M., ... & Losoya, S. H. (2009). Longitudinal relations of children's effortful control, impulsivity, and negative emotionality to their externalizing, internalizing, and co-occurring behavior problems. *Developmental Psychology, 45*(4), 988. doi:10.1037/a0016213

- Faith, M. S., Scanlon, K. S., Birch, L. L., Francis, L. A., & Sherry, B. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obesity, 12*(11), 1711-1722. doi:10.1038/oby.2004.212
- Fisher, J. O., & Birch, L. L. (2002). Eating in the absence of hunger and overweight in girls from 5 to 7 y of age. *The American Journal of Clinical Nutrition, 76*(1), 226-231.
- Fisher, J. O., Rolls, B. J., & Birch, L. L. (2003). Children's bite size and intake of an entree are greater with large portions than with age-appropriate or self-selected portions. *The American Journal of Clinical Nutrition, 77*(5), 1164-1170.
- Fiske, A. , Kitayama, S. , Markus, H. R. , & Nisbett, R. E. (1998). The cultural matrix of social psychology. In D. T. Gilbert , S. T. Fiske , & G. Lindzey (Eds.), *The Handbook of Social Psychology* (pp. 915-981). New York : McGraw-Hill.1998-07091-036
- Foo, L. L., Vijaya, K., Sloan, R. A. and Ling, A. (2013), Obesity prevention and management: Singapore's experience. *Obesity Reviews, 14*, 106–113. doi:10.1111/obr.12092
- Forde, C. G., Almiron-Roig, E., & Brunstrom, J. M. (2015). Expected satiety: application to weight management and understanding energy selection in humans. *Current Obesity Reports, 4*(1), 131-140. <https://doi.org/10.1007/s13679-015-0144-0>
- Fragar, R. (1970). Conformity and anticonformity in Japan. *Journal of Personality and Social Psychology, 15*(3), 203. <http://dx.doi.org/10.1037/h0029434>
- Frazier, B. N., Gelman, S. A., Kaciroti, N., Russell, J. W., & Lumeng, J. C. (2012). I'll have what she's having: The impact of model characteristics on children's food choices. *Developmental Science, 15*(1), 87-98. doi:10.1111/j.1467-7687.2011.01106.x

- Gelfand, M. J., Raver, J. L., Nishii, L., Leslie, L. M., Lun, J., Lim, B. C., ... & Aycan, Z. (2011). Differences between tight and loose cultures: A 33-nation study. *Science*, 332(6033), doi:1100-1104. 10.1126/science.1197754
- Gerstadt, C. L., Hong, Y. J., & Diamond, A. (1994). The relationship between cognition and action: performance of children 3;2–7 years old on a stroop-like day-night test. *Cognition*, 53(2), 129-153. doi:10.1016/0010-0277(94)90068-X
- Gibson, E. L., Wardle, J., & Watts, C. J. (1998). Fruit and vegetable consumption, nutritional knowledge and beliefs in mothers and children. *Appetite*, 31(2), 205-228. doi:10.1006/appe.1998.0180
- Goldman, S. J., Herman, C. P., & Polivy, J. (1991). Is the effect of a social model on eating attenuated by hunger?. *Appetite*, 17(2), 129-140. doi:10.1016/0195-6663(91)90068-4
- Greenberger, E., & Goldberg, W. A. (1989). Work, parenting, and the socialization of children. *Developmental Psychology*, 25(1), 22. doi:10.1037/0012-1649.25.1.22
- Greenhalgh, J., Dowey, A. J., Horne, P. J., Lowe, C. F., Griffiths, J. H., & Whitaker, C. J. (2009). Positive-and negative peer modeling effects on young children's consumption of novel blue foods. *Appetite*, 52(3), 646-653. <https://doi.org/10.1016/j.appet.2009.02.016>
- Hamm, N.H., & Hoving, K.L. (1969). Conformity of children in an ambiguous perceptual situation. *Child Development*, 40, 773-784. doi:10.2307/1127187
- Hanayama, A., & Mori, K. (2011). Conformity of six-year-old children in the Asch experiment without using confederates. *Psychology*, 2(7), 661. doi:10.4236/psych.2011.27100
- Harper, L. V., & Sanders, K. M. (1975). The effect of adults' eating on young children's acceptance of unfamiliar foods. *Journal of Experimental Child Psychology*, 20(2), 206-214. [https://doi.org/10.1016/0022-0965\(75\)90098-3](https://doi.org/10.1016/0022-0965(75)90098-3)

- Hart, C. H., Ladd, G. W., & Burleson, B. R. (1990). Children's expectations of the outcomes of social strategies: Relations with sociometric status and maternal disciplinary styles. *Child Development, 61*(1), 127-137. doi:10.1111/j.1467-8624.1990.tb02766.x
- Hastings, P. D., Utendale, W. T., & Sullivan, C. (2007). The socialization of prosocial development. *Handbook of Socialization: Theory and Research, 638-664*.
- Haun, D. B. M., & Tomasello, M. (2011). Conformity to peer-pressure in preschool children. *Child Development, 82*, 1759–1767. doi:10.1111/j.1467-8624.2011.01666.x
- Haun, D. B., Rekers, Y., & Tomasello, M. (2012). Majority-biased transmission in chimpanzees and human children, but not orangutans. *Current Biology, 22*(8), 727-731.  
<https://doi.org/10.1016/j.cub.2012.03.006>
- Hendy, H. M. (2002). Effectiveness of trained peer models to encourage food acceptance in preschool children. *Appetite, 39*(3), 217-225. <https://doi.org/10.1006/appe.2002.0510>
- Hendy, H. M., & Raudenbush, B. (2000). Effectiveness of teacher modeling to encourage food acceptance in preschool children. *Appetite, 34*(1), 61-76.  
<https://doi.org/10.1006/appe.1999.0286>
- Henrich, J., 2001. Cultural transmission and the diffusion of innovations: adoption dynamics indicate that biased cultural transmission is the predominate force in behavioral change and much of sociocultural evolution. *American Anthropologist 103*, 992–1013.  
doi:10.1525/aa.2001.103.4.992
- Herman, C. P., Roth, D. A., & Polivy, J. (2003). Effects of the presence of others on food intake: a normative interpretation. *Psychological Bulletin, 129*(6), 873. doi:10.1037/0033-2909.129.6.873



- Hermans, R. C., Larsen, J. K., Lochbuehler, K., Nederkoorn, C., Herman, C. P., & Engels, R. C. (2013). The power of social influence over food intake: examining the effects of attentional bias and impulsivity. *British Journal of Nutrition*, *109*(03), 572-580.  
<https://doi.org/10.1017/S0007114512001390>
- Higgs, S. (2015). Social norms and their influence on eating behaviours. *Appetite*, *86*, 38-44.  
[doi:10.1016/j.appet.2014.10.021](https://doi.org/10.1016/j.appet.2014.10.021)
- Hill, J. O., & Peters, J. C. (1998). Environmental contributions to the obesity epidemic. *Science*, *280*(5368), 1371-1374. [doi:10.1126/science.280.5368.1371](https://doi.org/10.1126/science.280.5368.1371)
- Hill, J.O., Wyatt, H.R., Reed, G.W., & Peters, J.C. (2003) Obesity and the environment: where do we go from here? *Science* *299*, 853–855. [doi:10.1126/science.1079857](https://doi.org/10.1126/science.1079857)
- Hodges, B. H. (2014). Rethinking conformity and imitation: Divergence, convergence, and social understanding. *Frontiers in Psychology*, *5*, 726.  
<https://doi.org/10.3389/fpsyg.2014.00726>
- Hollander, E. P., & Willis, R. H. (1967). Some current issues in the psychology of conformity and nonconformity. *Psychological Bulletin*, *68*(1), 62.  
<http://dx.doi.org/10.1037/h0024731>
- Honkanen, P., Olsen, S. O., Verplanken, B., & Tuu, H. H. (2012). Reflective and impulsive influences on unhealthy snacking. The moderating effects of food related self control. *Appetite*, *58*(2), 616-622. <https://doi.org/10.1016/j.appet.2011.11.019>
- Horne P. J., Tapper K., Lowe C. F., Hardman, C. A., Jackson, M. C., & Woolner, J. (2004) Increasing children's fruit and vegetable consumption: a peer-modelling and rewards based intervention. *European Journal of Clinical Nutrition* *58*(12), 1649–1660.  
[doi:10.1038/sj.ejcn.1602024](https://doi.org/10.1038/sj.ejcn.1602024)

- Hu, F. B., Rimm, E. B., Stampfer, M. J., Ascherio, A., Spiegelman, D., & Willett, W. C. (2000). Prospective study of major dietary patterns and risk of coronary heart disease in men-. *The American Journal of Clinical Nutrition*, 72(4), 912-921. <https://doi.org/10.1093/ajcn/72.4.912>
- Huang, L. C., & Harris, M. B. (1973). Conformity in Chinese and Americans: A field experiment. *Journal of Cross-Cultural Psychology*, 4(4), 427-434. doi:10.1177/002202217300400404
- Huang, Y., Kendrick, K. M., & Yu, R. (2014). Conformity to the opinions of other people lasts for no more than 3 days. *Psychological Science*, 25(7), 1388-1393. <https://doi.org/10.1177/0956797614532104>
- Iscoe, I., Williams, M., & Harvey, J. (1963). Modification of children's judgments by a simulated group technique: A normative developmental study. *Child Development*, 963-978. doi: 10.2307/1126539
- Jahoda, M. (1959). Conformity and independence: A psychological analysis. *Human Relations*, 12(2), 99-120. doi:10.1177/001872675901200201
- Jansen, A., Nederkoorn, C., van Baak, L., Keirse, C., Guerrieri, R., & Havermans, R. (2009). High-restrained eaters only overeat when they are also impulsive. *Behaviour Research and Therapy*, 47(2), 105-110. <https://doi.org/10.1016/j.brat.2008.10.016>
- Jasinska, A. J., Yasuda, M., Burant, C. F., Gregor, N., Khatri, S., Sweet, M., & Falk, E. B. (2012). Impulsivity and inhibitory control deficits are associated with unhealthy eating in young adults. *Appetite*, 59(3), 738-747. <https://doi.org/10.1016/j.appet.2012.08.001>

- Jaswal, V. K. (2004). Don't believe everything you hear: Preschoolers' sensitivity to speaker intent in category induction. *Child development*, 75(6), doi:1871-1885. 10.1111/j.1467-8624.2004.00822.x
- Joshiyura, K. J., Hu, F. B., Manson, J. E., Stampfer, M. J., Rimm, E. B., Speizer, F. E., Colditz, G., Ascherio, A., Rosner, B., Spiegelman, D., & Willett, W. C. (2001). The effect of fruit and vegetable intake on risk for coronary heart disease. *Annals of Internal Medicine*, 134, 1106–1114. doi:10.7326/0003-4819-134-12-200106190-00010
- Kelder, S. H., Perry, C. L., Klepp, K. I., & Lytle, L. L. (1994). Longitudinal tracking of adolescent smoking, physical activity, and food choice behaviors. *American Journal of Public Health*, 84(7), 1121-1126. doi: 10.2105/AJPH.84.7.1121
- Killen, M., & Sueyoshi, L. (1995). Conflict resolution in Japanese social interactions. *Early Education and Development*, 6(4), 317-334.  
[https://doi.org/10.1207/s15566935eed0604\\_3](https://doi.org/10.1207/s15566935eed0604_3)
- Kim, E. B., Chen, C., Smetana, J. G., & Greenberger, E. (2016). Does children's moral compass waver under social pressure? Using the conformity paradigm to test preschoolers' moral and social-conventional judgments. *Journal of Experimental Child Psychology*, 150, 241-251. <http://dx.doi.org/10.1016/j.jecp.2016.06.006>
- Kim, H., & Markus, H. R. (1999). Deviance or uniqueness, harmony or conformity? A cultural analysis. *Journal of Personality and Social Psychology*, 77(4), 785. doi:10.1037/0022-3514.77.4.785
- Kim, J. M., & Turiel, E. (1996). Korean and American children's concepts of adult and peer authority. *Social Development*, 5(3), 310-329. doi:0.1111/j.1467-9507.1996.tb00088.x

- Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: continuity and change, antecedents, and implications for social development. *Developmental Psychology, 36*(2), 220. <http://dx.doi.org/10.1037/00121649.36.2.220>
- Krasnegor, N. A., Epstein, L., Johnson, S. B., Yaffe, S. J., & Epstein, L. H. (Eds.). (2013). *Developmental Aspects of Health Compliance Behavior*. Psychology Press.
- Krebs-Smith, S. M., Heimendinger, J., Patterson, B. H., Subar, A. F., Kessler, R., & Pivonka, E. (1995). Psychosocial factors associated with fruit and vegetable consumption. *American Journal of Health Promotion, 10*(2), 98-104. <https://doi.org/10.4278/0890-1171-10.2.98>
- Laland, K. N. (2004). Social learning strategies. *Animal Learning & Behavior, 32*(1), 4-14. <https://doi.org/10.3758/BF03196002>
- Larson, R. W. (2000). Toward a psychology of positive youth development. *American Psychologist, 55*(1), 170-183. <http://dx.doi.org/10.1037/0003-066X.55.1.170>
- Laupa, M., & Tse, P. (2005). Authority concepts among children and adolescents in the island of Macao. *Social Development, 14*(4), 652-663. doi:10.1111/j.1467-9507.2005.00322.x
- Laursen, B., & Collins, W. A. (2009). Parent—child relationships during adolescence. *Handbook of adolescent psychology*. doi: 10.1002/9780470479193.adlpsy002002
- Ling-Yin, L. A. (2006). Steering debate and initiating dialogue: A review of the Singapore preschool curriculum. *Contemporary Issues in Early Childhood, 7*(3), 203-212. <https://doi.org/10.2304/ciec.2006.7.3.203>
- Liu, S., Manson, J. E., Lee, I. M., Cole, S. R., Hennekens, C. H., Willett, W. C., & Buring, J. E. (2000). Fruit and vegetable intake and risk of cardiovascular disease: the Women's Health Study. *American Journal of Clinical Nutrition, 72*, 922–928.

<https://doi.org/10.1093/ajcn/72.4.922>

MacDonald, G., Nail, P.R., & Harper, J.R. (2011) Do people use reverse psychology? An exploration of strategic self-anticonformity, *Social Influence*, 6:1, 1-14,

doi:10.1080/15534510.2010.517282

Mahoney, J. L., & Cairns, R. B. (1997). Do extracurricular activities protect against early school dropout?. *Developmental Psychology*, 33(2), 241. doi:10.1037/0012-1649.33.2.241

Mahoney, J. L., Larson, R. W., Eccles, J. S., & Lord, H. (2005). Organized activities as developmental contexts for children and adolescents. *Organized activities as contexts of development: Extracurricular activities, after-school and community programs*, 3-22.

Mattes, R. D. (1996). Dietary compensation by humans for supplemental energy provided as ethanol or carbohydrate in fluids. *Physiology & Behavior*, 59(1), 179-187. doi:

10.1016/0031-9384(95)02007-1

McAlister, A.R., Cornwell, T.B. (2009) Preschool Children's Persuasion Knowledge: The Contribution of Theory of Mind. *Journal of Public Policy & Marketing: Fall 2009*, Vol.

28, No. 2, 175-185. <https://doi.org/10.1509/jppm.28.2.175>

McConahy, K. L., Smiciklas-Wright, H., Mitchell, D. C., & Picciano, M. F. (2004). Portion size of common foods predicts energy intake among preschool-aged children. *Journal of the Academy of Nutrition and Dietetics*, 104(6), 975-979.

*Academy of Nutrition and Dietetics*, 104(6), 975-979.

<http://dx.doi.org/10.1016/j.jada.2004.03.027>

McGuigan, N., & Robertson, S. (2015). The influence of peers on the tendency of 3-and 4-year old children to over-imitate. *Journal of Experimental Child Psychology*, 136, 42-54.

<https://doi.org/10.1016/j.jecp.2015.03.004>

McHale, S. M., Crouter, A. C., & Tucker, C. J. (2001). Free-time activities in middle

- childhood: Links with adjustment in early adolescence. *Child Development*, 72(6), 1764-1778. doi: 10.1111/1467-8624.00377
- McLaughlin, M. W. (2000). *Community counts: How youth organizations matter for youth development*. Washington, DC: Public Education Network.
- Meade, R. D., & Barnard, W. A. (1973). Conformity and anticonformity among Americans and Chinese. *The Journal of Social Psychology*, 89(1), 15-24.  
<https://doi.org/10.1080/00224545.1973.9922563>
- Mennella, J. A., Finkbeiner, S., Lipchok, S. V., Hwang, L. D., & Reed, D. R. (2014). Preferences for salty and sweet tastes are elevated and related to each other during childhood. *PLoS One*, 9(3), e92201. <https://doi.org/10.1371/journal.pone.0092201>
- Mikkilä, V., Räsänen, L., Raitakari, O. T., Pietinen, P., & Viikari, J. (2005). Consistent dietary patterns identified from childhood to adulthood: the cardiovascular risk in Young Finns Study. *British Journal of Nutrition*, 93(6), 923-931.  
<https://doi.org/10.1079/BJN20051418>
- Milgram, S. (1963). Behavioral study of obedience. *Journal of Abnormal Social Psychology*, 67, 371-378. <http://dx.doi.org/10.1037/h0040525>
- Mori, K., Ito-Koyama, A., Arai, M., & Hanayama, A. (2014). Boys, be independent! Conformity development of Japanese children in the Asch experiment without using confederates. *Psychology*, 5(7), 617. doi:10.4236/psych.2014.57073
- Morgan, T. J., Laland, K. N., & Harris, P. L. (2015). The development of adaptive conformity in young children: effects of uncertainty and consensus. *Developmental Science*, 18(4), 511-524. doi:10.1111/desc.12231

- Muraven, M., & Baumeister, R. F. (2000). Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychological Bulletin*, *126*(2), 247-259.  
<http://dx.doi.org/10.1037/0033-2909.126.2.247>
- Murphy, A. S., Youatt, J. P., Hoerr, S. L., Sawyer, C. A., & Andrews, S. L. (1995). Kindergarten students' food preferences are not consistent with their knowledge of the dietary guidelines. *Journal of the American Dietetic Association*, *95*(2), 219-223.  
doi:10.1016/S0002-8223(95)00051-8
- Nail, P. R., MacDonald, G., & Levy, D. A. (2000). Proposal of a four-dimensional model of social response. *Psychological Bulletin*, *126*(3), 454.
- National Institute of Child Health and Human Development Early Child Care Research Network. Early child care and self-control, compliance, and problem behavior at twenty-four and thirty-six months. *Child Development*, *1998*; *69*: 1145–1170.
- Nyczka, Piotr, and Katarzyna Sznajd-Weron. "Anticonformity or independence?—insights from statistical physics." *Journal of Statistical Physics* *151*, no. 1-2 (2013): 174 202.  
<https://doi.org/10.1007/s10955-013-0701-4>
- Neighbors, C., Oster-Aaland, L., Bergstrom, R. L., & Lewis, M. A. (2006). Event-and context specific normative misperceptions and high-risk drinking: 21st birthday celebrations and football tailgating. *Journal of Studies on Alcohol*, *67*(2), 282.  
<https://doi.org/10.15288/jsa.2006.67.282>
- Pettit, G. S., Laird, R. D., Bates, J. E., & Dodge, K. A. (1997). Patterns of after-school care in middle childhood: Risk factors and developmental outcomes. *Merrill-Palmer Quarterly* (1982-), *515-538*. <http://www.jstor.org/stable/23093336>

- Posner, J. K., & Vandell, D. L. (1999). After-school activities and the development of low income urban children: A longitudinal study. *Developmental Psychology, 35*(3), 868. doi:10.1037/0012-1649.35.3.868
- Putnam, S. P., & Rothbart, M. K. (2006). Development of short and very short forms of the Children's Behavior Questionnaire. *Journal of Personality Assessment, 87*, 103–113. [https://doi.org/10.1207/s15327752jpa8701\\_09](https://doi.org/10.1207/s15327752jpa8701_09)
- Qu, L., Audrey, L. S., Jun, L. P., & Qun, N. H. (2013). The impact of social context on preschoolers' flexibility. *Copyright 2013 International Association for Cross-Cultural Psychology ISBN: 978-0-9845627-3-2*, 147.
- Qu, L., Finestone, D. L., Qin, L. J., & Reena, L. Z. (2013). Focused but fixed: The impact of expectation of external rewards on inhibitory control and flexibility in preschoolers. *Emotion, 13*(3), 562.
- Qu, L., & Shen, P. (2013). Development of Theory of Mind in Preschoolers Who Grow up in Two Conflicting and Unbalanced Cultures. *Child Studies in Asia-Pacific Contexts, 3*(2), 123-137.
- Rakoczy, H., & Schmidt, M. F. (2013). The early ontogeny of social norms. *Child Development Perspectives, 7*(1), 17-21. doi: 10.1111/cdep.12010
- Rakoczy, H., Warneken, F., & Tomasello, M. (2009). Young children's selective learning of rule games from reliable and unreliable models. *Cognitive Development, 24*(1), 61-69. <https://doi.org/10.1016/j.cogdev.2008.07.004>
- Reddy, V. (1991). Playing with others' expectations: Teasing and mucking about in the first year.



- Reno, R. R., Cialdini, R. B., & Kallgren, C. A. (1993). The transsituational influence of social norms. *Journal of Personality and Social Psychology*, *64*(1), 104.  
<http://dx.doi.org/10.1037/0022-3514.64.1.104>
- Robinson, E., Thomas, J., Aveyard, P., & Higgs, S. (2014). What everyone else is eating: a systematic review and meta-analysis of the effect of informational eating norms on eating behavior. *Journal of the Academy of Nutrition and Dietetics*, *114*(3), 414-429.  
<http://dx.doi.org/10.1016/j.jand.2013.11.009>
- Rolls B.J., Engell, D., Birch, L.L. (2000). Serving portion size influences 5-year-old but not 3 year-old children's food intakes. *Journal of the American Dietetic Association* *100*(2), 232-234. [https://doi.org/10.1016/S0002-8223\(00\)00070-5](https://doi.org/10.1016/S0002-8223(00)00070-5)
- Romero, N. D., Epstein, L. H., & Salvy, S. J. (2009) Peer modeling influences girls' snack intake. *Journal of the American Dietetic Association*, *109*(1), 133-136.  
[doi:10.1016/j.jada.2008.10.005](https://doi.org/10.1016/j.jada.2008.10.005)
- Rosenstein, D., & Oster, H. (1988). Differential facial responses to four basic tastes in newborns. *Child Development*, 1555-1568. [doi:10.2307/1130670](https://doi.org/10.2307/1130670)
- Rossano, F., Rakoczy, H., & Tomasello, M. (2011). Young children's understanding of violations of property rights. *Cognition*, *121*(2), 219-227.  
<https://doi.org/10.1016/j.cognition.2011.06.007>
- Rothbart, M.K., & Bates, J.E. (2006). Temperament. In W. Damon, R. Lerner, & N. Eisenberg (Eds.), *Handbook of Child Psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp. 99-166). New York: Wiley.

- Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and applied*, 80(1), 1-28.  
<http://dx.doi.org/10.1037/h0092976>
- Salmon, S. J., Fennis, B. M., de Ridder, D. T. D., Adriaanse, M. A., & de Vet, E. (2014). Health on impulse. When low self-control promotes healthy food choices. *Health Psychology*, 33(2), 103–109. doi:10.1037/a0031785.
- Schultz, P. W. (1999). Changing behavior with normative feedback interventions: A field experiment on curbside recycling. *Basic and Applied Social Psychology*, 21(1), 25-36.  
[https://doi.org/10.1207/s15324834basp2101\\_3](https://doi.org/10.1207/s15324834basp2101_3)
- Schultz, P. W., Nolan, J. M., Cialdini, R. B., Goldstein, N. J., & Griskevicius, V. (2007). The constructive, destructive, and reconstructive power of social norms. *Psychological Science*, 18(5), 429-434. <https://doi.org/10.1111/j.1467-9280.2007.01917.x>
- Scullin, M. H., & Bonner, K. (2006). Theory of mind, inhibitory control, and preschool-age children's suggestibility in different interviewing contexts. *Journal of Experimental Child Psychology*, 93(2), 120-138. <https://doi.org/10.1016/j.jecp.2005.09.005>
- Seston, R. S., & Kelemen, D. (2014). Children's conformity when acquiring novel conventions: The case of artifacts. *Journal of Cognition and Development*, 15(4), 569-583.  
<https://doi.org/10.1080/15248372.2013.784973>
- Sharps, M., & Robinson, E. (2017). Perceived eating norms and children's eating behaviour: An informational social influence account. *Appetite*, 113, 41-50.  
<https://doi.org/10.1016/j.appet.2017.02.015>
- Singer, M. R., Moore, L. L., Garrahe, E. J., & Ellison, R. C. (1995). The tracking of nutrient intake in young children: the Framingham children's study. *American Journal of Public*

*Health*, 82, 1673–1677. doi:10.2105/AJPH.85.12.1673

Skinner, J. D., Carruth, B. R., Bounds, W., Ziegler, P., & Reidy, K. (2002). Do food-related experiences in the first 2 years of life predict dietary variety in school-aged children?.

*Journal of Nutrition Education and Behavior*, 34(6), 310-315.

[https://doi.org/10.1016/S1499-4046\(06\)60113-9](https://doi.org/10.1016/S1499-4046(06)60113-9)

Smetana, J. (1981). Preschool children's conceptions of moral and social rules. *Child*

*Development*, 52, 1333–1336. doi:10.2307/1129527

Smetana, J. G. (1989). Toddlers' social interactions in the context of moral and conventional transgressions in the home. *Developmental Psychology*, 25, 499–508. doi:10.1037/0012

1649.25.4.499

Smetana, J. (2006). Social-cognitive domain theory: Consistencies and variations in children's moral and social judgments. In M. Killen & J. Smetana (Eds.), *Handbook of Moral*

*Development* (pp. 119–153). Mahwah NJ: Erlbaum.

Smetana, J. G., & Braeges, J. L. (1990). The development of toddlers' moral and conventional judgments. *Merrill-Palmer Quarterly (1982-)*, 329-346.

Smetana, J. G., Rote, W., Jambon, M., Tasopoulos-Chan, M., Villalobos, M., & Comer, J.

(2012). Developmental changes and individual differences in young children's moral

judgments. *Child Development*, 83(2), 683-696. doi:10.1111/j.1467-8624.2011.01714.x

Spinrad, T. L., Eisenberg, N., Gaertner, B., Popp, T., Smith, C. L., Kupfer, A., . . . Hofer, C.

(2007). Relations of maternal socialization and toddlers' effortful control to children's

adjustment and social competence. *Developmental Psychology*, 43, 1170-1186. doi:

10.1037/0012-1649.43.5.1170

- Staiano, A. E., Marker, A. M., Frelief, J. M., Hsia, D. S., & Martin, C. K. (2016). Influence of screen-based peer modeling on preschool children's vegetable consumption and preferences. *Journal of Nutrition Education and Behavior*, *48*(5), 331-335. doi:10.1016/j.jneb.2016.02.005
- Stallen, M., Smidts, A., & Sanfey, A. G. (2013). Peer influence: neural mechanisms underlying in-group conformity. *Frontiers in Human Neuroscience*, *7*.  
<https://doi.org/10.3389/fnhum.2013.00050>
- Steinberg, L.S., & Monahan, K.C. (2007). Age differences in resistance to peer influence. *Developmental Psychology*, *43*, 1531-1543. <http://dx.doi.org/10.1037/0012-1649.43.6.1531>
- Steiner, J. E. (1979). Human facial expressions in response to taste and smell stimulation. In *Advances in Child Development and Behavior* (Vol. 13, pp. 257-295). JAI.  
[https://doi.org/10.1016/S0065-2407\(08\)60349-3](https://doi.org/10.1016/S0065-2407(08)60349-3)
- Sun, S., & Yu, R. (2016). Social conformity persists at least one day in 6-year-old children. *Scientific Reports*, *6*, 39588. doi:10.1038/srep39588
- Templeton, L. M., & Wilcox, S. A. (2000). A tale of two representations: The misinformation effect and children's developing theory of mind. *Child Development*, *71*(2), 402-416. doi:10.1111/1467-8624.00153
- Thomsen, Y., & Berntsen, D. (2005). Knowing that I didn't know: preschoolers' understanding of their own false belief is a predictor of assents to fictitious events. *Applied Cognitive Psychology*, *19*(4), 507-527. doi:10.1002/acp.1123

- Tomasello, M., Carpenter, M., Call, J., Behne, T., & Moll, H. (2005). Understanding and sharing intentions: The origins of cultural cognition. *Behavioral and Brain Sciences*, 28(05), 675-691. <https://doi.org/10.1017/S0140525X05540123>
- Turiel, E. (1983). *The development of social knowledge: Morality and convention*. Cambridge, England: Cambridge University Press.
- Turiel, E. (1998). The development of morality. *Handbook of Child Psychology*.
- Turiel, E. (2006). The development of morality. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of Child Psychology: Vol. 3. Social, emotional, and personality development* (6th ed., pp. 789–857). New York: Wiley.
- Turner, J. C. (1991). *Social influence*. Thomson Brooks/Cole Publishing Co.
- Turner, C. R., Nielsen, M., & Collier-Baker, E. (2014). Groups' actions trump injunctive reaction in an incidental observation by young children. *PloS one*, 9(9), e107375. <https://doi.org/10.1371/journal.pone.0107375>
- Walker, M., & Andrade, M. (1996). Conformity in the Asch task as a function of age. *Journal of Social Psychology*, 136, 367–372. <https://doi.org/10.1080/00224545.1996.9714014>
- Walton, K. L. (1990). *Mimesis as make-believe*. Cambridge, MA: Harvard University Press.
- Wansink, B., & Cheney, M. M. (2005). Super bowls: serving bowl size and food consumption. *Jama*, 293(14), 1723-1728. [https://doi.org/10.1016/S0031-9384\(03\)00203-8](https://doi.org/10.1016/S0031-9384(03)00203-8)
- Wardle, J., Cooke, L. J., Gibson, E. L., Sapochnik, M., Sheiham, A., & Lawson, M. (2003). Increasing children's acceptance of vegetables; a randomized trial of parent-led exposure. *Appetite*, 40(2), 155-162. [https://doi.org/10.1016/S0195-6663\(02\)00135-6](https://doi.org/10.1016/S0195-6663(02)00135-6)

- Weiss, B., Dodge, K. A., Bates, J. E., & Pettit, G. S. (1992). Some consequences of early harsh discipline: Child aggression and a maladaptive social information processing style. *Child Development, 63*(6), 1321-1335. doi:10.1111/j.1467-8624.1992.tb01697.x
- Welch-Ross, M. K. (1999). Interviewer knowledge and preschoolers' reasoning about knowledge states moderate suggestibility. *Cognitive Development, 14*(3), 423-442.  
[https://doi.org/10.1016/S0885-2014\(99\)00013-1](https://doi.org/10.1016/S0885-2014(99)00013-1)
- Welch-Ross, M. K., Diecidue, K., & Miller, S. A. (1997). Young children's understanding of conflicting mental representation predicts suggestibility. *Developmental Psychology, 33*(1), 43. doi:10.1037/0012-1649.33.1.43
- Wellman, H. M., & Liu, D. (2004). Scaling of theory-of-mind tasks. *Child Development, 75*(2), 523-541. doi:10.1111/j.1467-8624.2004.00691.x
- Williams, T. P., & Sogon, S. (1985). Group composition and conforming behavior in Japanese students. *Japanese Psychological Research, 26*(4), 231-234.  
<https://doi.org/10.4992/psycholres1954.26.231>
- Willis, R. H. (1963). Two dimensions of conformity-nonconformity. *Sociometry, 4*, 499-513.  
doi:10.2307/2786152
- Willis, R. H., & Hollander, E. P. (1964). An experimental study of three response modes in social influence situations. *The Journal of Abnormal and Social Psychology, 69*(2), 150.  
<http://dx.doi.org/10.1037/h0048705>
- Wilkinson, L. L., Hinton, E. C., Fay, S. H., Ferriday, D., Rogers, P. J., & Brunstrom, J. M. (2012). Computer-based assessments of expected satiety predict behavioural measures of portion-size selection and food intake. *Appetite, 59*(3), 933-938.  
doi:10.1016/j.appet.2012.09.007

- Wiseman, N., Harris, N., & Lee, P. (2016). Lifestyle knowledge and preferences in preschool children: Evaluation of the Get up and Grow healthy lifestyle education programme. *Health Education Journal*, 75(8), 1012-1024. doi:10.1177/0017896916648726
- Wright, D. B., Self, G., & Justice, C. (2000). Memory conformity: Exploring misinformation effects when presented by another person. *British Journal of Psychology*, 91(2), 189-202. doi:10.1348/000712600161781
- Yau, J., & Smetana, J. G. (2003). Conceptions of moral, social-conventional, and personal events among Chinese preschoolers in Hong Kong. *Child Development*, 74(3), 647-658. doi:10.1111/1467-8624.00560
- Zhang, P., Zhang, Y., Mu, Z., & Liu, X. (2017). The Development of Conformity Among Chinese Children Aged 9–15 Years in a Public Choice Task. *Evolutionary Psychology*, 15(4), doi:1474704917743637
- Zimbardo, P.G. (1973). On the ethics of intervention in human psychological research: With special reference to the Stanford prison experiment. *Cognition*, 2(2), 243-256. doi:10.1016/0010-0277(72)90014-5

## Appendix A

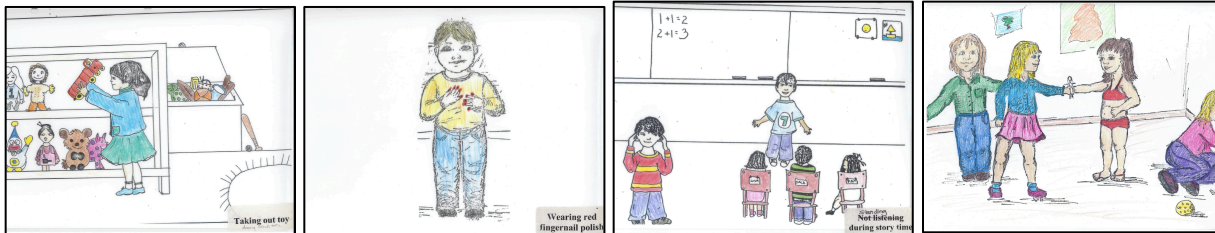
### Study 1 Pretest Trial Objects

The moral transgressions are: calling another child names, hitting another child, shoving another child, and teasing another child.



### Moral Judgments

The social-conventional items are: taking out a toy during snack time, a boy wearing nail polish, standing during story time, and wearing a bathing suit to day care.



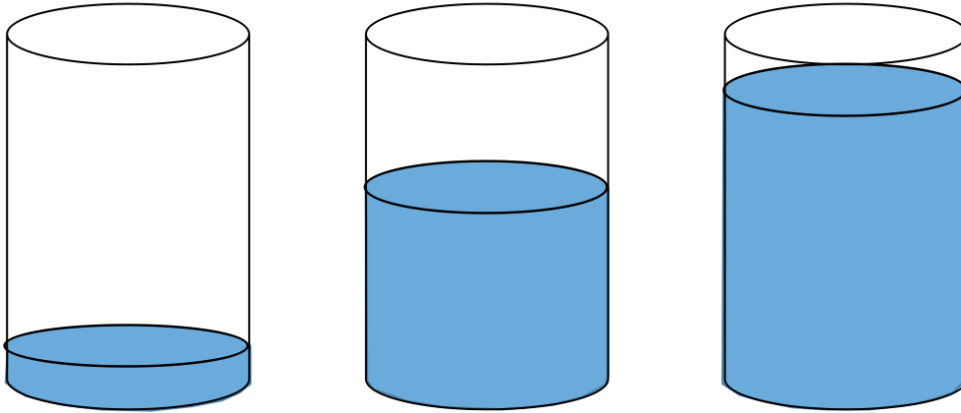
### Social-conventional Judgments

Reprinted by permission from Judith Smetana. Smetana, J. G., Rote, W. M., Jambon, M., Tasopoulos-Chan, M., Villalobos, M., & Comer, J. (2012). Developmental changes and individual differences in young children's moral judgments. *Child Development*, 83(2), 683-696.



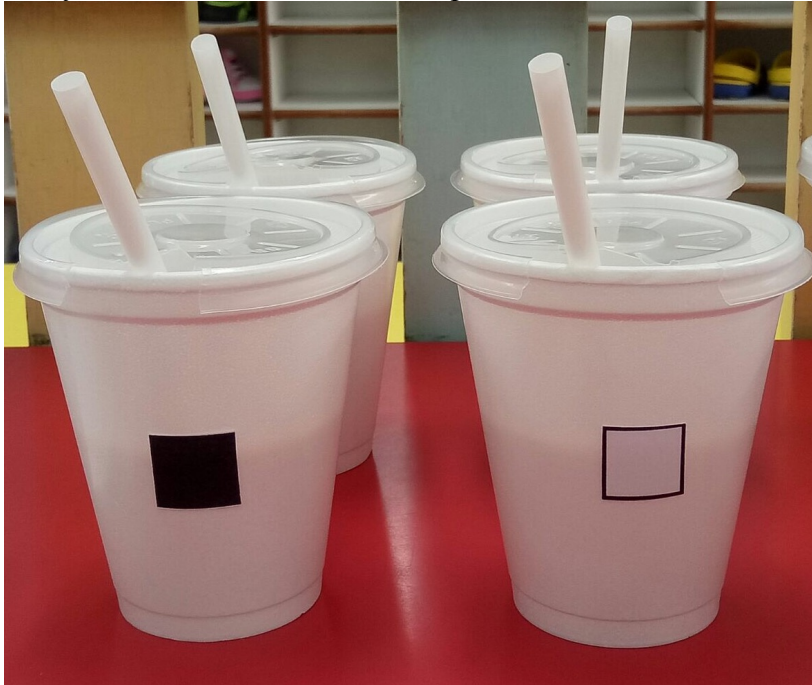
Appendix B

Study 4 Thirst assessment



Appendix C

Study 4 Pretest and Post test drink pairs



Study 4 manipulation

