

A LONGITUDINAL INVESTIGATION OF THE ANTECEDENTS OF LOCUS OF CONTROL ORIENTATION IN CHILDREN

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ABSTRACT

Locus of control (LOC) is related to many aspects of human behavior, yet relatively little is known about what factors in early childhood may dispose a child to develop an internal or external LOC orientation. Data from a British epidemiological, longitudinal, cohort study of 12,463 children and their mothers were used to identify, from a wide range of potential explanatory factors, those having the strongest independent effects on LOC orientation. Socioeconomic status, non-authoritarian parenting style & attitudes, and child activities were hypothesized as and found to be major contributory factors in the model. Though marginal gender differences were found in the antecedents of LOC development, the analyses for boys and girls were generally very similar.

Keywords: Locus of Control (LOC), Socioeconomic Status (SES), Authoritarian, Parenting, Child Activities.

INTRODUCTION

In 1966, locus of control (LOC) as a psychological construct was introduced by Julian Rotter, who proposed that an individual with an internal LOC was more likely to perceive that an "event is contingent upon his [sic] own relatively permanent characteristics," though a person with an external LOC would be more likely to perceive an event not to be entirely contingent upon his or her actions, rather "as a result of luck, chance, fate, or unpredictable because of the forces surrounding him" (p.1). As a concept, LOC has been studied more than any other topic in psychology over the past three decades (Rotter, 1990). However, the study of antecedents of individual differences in LOC has received relatively little attention, despite the fact that Rotter himself underscored the importance of the identification of these key factors and called for the investigation of antecedents to internal-external LOC expectancies in his 1966 monograph on the topic. Instead, researchers have primarily focused on the examination of relationship between LOC and outcome variables, such as academic achievement (Gupta & Sinha, 2004), self-esteem (Tanwar & Sethi, 2009), and

psychological difficulties (Sastry & Ross, 1998; Sinha & Watson, 2007), leaving antecedents of generalized LOC expectancies largely unexplored.

In 1994, Carton and Nowicki assessed the extent literature regarding theory of LOC antecedents. Their review suggested four parental factors that are associated with LOC in young children. First is the degree of parental control; parents that make most all the choices for children tend to have offspring who are more external than internal. Second is the degree of life stress; in families where fathers are absent due to divorce or death or where there is a high degree of marital discord, children again tend to be more external. Third, children whose parents are less "warm" – that is, less emotionally supportive, expressive, and nurturing – tend to be show more external LOC. Lastly, children tend to be more external when parents' reinforcements and punishments are less contingently tied to their children's behavior (Schneewind, 1995, for an additional review).

At the time of their review, Carton and Nowicki (1994) noted that most studies were cross-sectional in nature and used self report methodologies. As a result, they called for

investigations that were longitudinal in design and included direct observations of children's behaviors. Unfortunately, research since their review has continued to be characterized by self-report and cross-sectional studies. However, a few noted exceptions exist, some completed by Carton and colleagues. In a study of primarily White, middle-class mothers and second-grade children, Carton and Carton (1998) found that mothers of internally controlled children displayed more positive touches and looked longer at their children than mothers of externally controlled children, while internally controlled children themselves smiled more often and stayed on task better than those with an external LOC. Also, in two studies of children and mothers with similar demographics on a puzzle-building task, compared to mothers of boys who were more externally controlled, mothers of internally controlled boys were more likely to respond to sons' difficulty with more encouragement and less intrusiveness (Carton, Nowicki, & Balsler, 1996). In contrast, mothers of girls with internal LOC were less likely than mothers of externally controlled girls to react to daughters' frustrations and more likely to ignore their successes. Mothers of internally controlled children, regardless of children's gender, were less likely to be stressed and were rated by observers as warmer and less controlling when compared to mothers of externally controlled children. When a similar puzzle task was combined with dollhouse play, Henry (2006) found that internally controlled mothers were more likely to instruct children using personal agency phrases than were externally controlled mothers. Lastly, in a study of family narratives, Bohanek, Fivush, and Duke (2006) determined that families who were less cohesive and "took turns" reporting their individual memories about a shared experience, rather than integrating their memory stories among the family members' perspectives, were more likely to have children (especially boys) with external rather than internal LOC. Other than the somewhat puzzling finding regarding girls in the Carton and Carton (1998), results from the observational studies are largely consistent with findings from Carton and Nowicki's (1994) review and Rotter's (1966) theory.

In addition to the use of observational studies, LOC researchers have increased the complexity of their research models and used more diverse populations over the past 15 years. For example, in a Dutch longitudinal sample of young adults, greater parent care and involvement early in life, retrospectively recalled by the offspring, was associated with greater internal LOC and less depression at several interview times in adulthood (Taris & Bok, 1997). In a multiethnic, longitudinal sample of fifth and sixth grade Americans, Rudolph, Kurlakowsky, and Conley (2001) determined that family stressors and disruptions contributed to external LOC orientations and helplessness both at the time of initial interview and one school year later. Lastly, although there are exceptions (e.g., a study with Kuwaitis, Alqashan, 1999; Latinos and African Americans, Suizzo & Soon, 2006), cross-sectional studies and findings involving individuals from other American ethnic groups and other cultures largely mimic those with White, middle-class American samples. This includes groups such as South Asian Indians (Ojha, 2008), Iranians (Khayyer, 2003), African Americans (Enger, Howerton, & Cobbs, 1994), and multi-ethnic American samples (Lee, Daniels, & Kissinger, 2006; Mason, 2005; Suizzo & Soon, 2006; Sun & Yuanzhang, 2002; Trusty & Richard, 1997). Given that socioeconomic status (SES) was not controlled for in these studies, it is unclear to date whether the patterns in ethnic groups that are inconsistent with Rotter's (1966) theory are actually due to aspects of culture, ethnicity, or SES.

Although the studies reviewed by Carton and Nowicki (1994) largely involved the impact of mothers or "parents" (taken together) upon children's LOC, subsequent studies have also looked at the potential influence of other figures and contexts upon children's LOC development. Fathers (Williams & Radin, 1999), siblings (Conger, Conger, & Scaramella, 1997), teachers (Skinner, Zimmer-Gembeck, & Connell, 1998), and even mental disorders (Yates, Hecht-Lewis, Fritsch, & Goodrich, 1994), parental alcohol abuse (Post & Bryan, 1998), and neighborhood danger (Coley & Hoffman, 1996) and density (Regani, 2000) have all been shown to be associated with children's and adolescents' LOC orientation.

A final important change since the time of Carton and Nowicki's (1994) review is the investigation of the relationship between LOC orientations and brain/biological factors. Though most theorists maintain that perceptions of control develop from external factors and social learning, some are now arguing that biological factors may influence LOC through various aspects of cortical functioning (Declerck, Boone, & Brabander, 2006) or vice versa through the hypothalamic-pituitary-adrenocortical (HPA) axis (Granger, Weisz, & Kauneckis, 1994). One prominent study by Bullers and Prescott (2001), involving a multiethnic sample including thousands of pairs of adult twins from the Virginia Twin Registry, indicated that differences in LOC were largely due to non-shared environmental factors such as SES rather than shared environment or genetic factors. They also found that for adults, current SES was more impacting than childhood SES. In summary, though the connection between LOC and biological factors may be tenable, the causal implications of these two variables is not yet clear, and environmental factors such as SES, when compared to biological factors, still are most often thought to be driving LOC development.

The Present Study

The purpose of the present study was to examine a wide range of potential explanatory environmental and familial variables gathered at birth, five, and ten years of age in order to predict children's subsequent LOC orientation at age ten. By employing a longitudinal cohort design, the authors sought to improve upon the inherent limitations of the majority of existing studies, which typically utilize cross-sectional research designs. In the present study, three primary domains were assessed as potential antecedents of LOC orientation.

Social/Family environment: Emphasizing socioeconomic status (SES)

The first area targeted included variables concerning the SES of the families, the parental situation, numbers of children in the household, as well as certain maternal characteristics like depression. Lower social status or social caste has often been linked to more external LOC

(Kraus, Piff & Keltner, 2009; Ojha, 2008). The authors similarly hypothesized that higher SES, measured at age five, would predict more internal LOC in children at age ten. Other family variables that can relate to family stress and chaos, such as the number of children in the household, the presence of a handicap or illness in the immediate family, maternal depression, and hospital visits were hypothesized to relate inversely to internal LOC.

Parenting styles and beliefs

Parenting factors comprise the second domain hypothesized to contribute to the development of generalized control expectancies in children. One major contributor to children's developmental progress and formation of personal attributes and cognitive ability is parenting style. Most parents strive to bring up their children to be happy and responsible people, and they do it in the ways they think best and within the limits of their own abilities and personal circumstances. Patterns of parenting are complex and can depend on many factors such as the child's own responsiveness and temperament from a very early age; the levels of stress the parents experience dependent on their health, education, employment situation; and the quality of the relationship between the parents themselves. Baumrind (1966) defined three primary parenting styles. Authoritarian parents tend to be demanding and restrictive of their children, emphasizing control and obedience. Non-authoritarian (or authoritative) parenting is characterized by the tendency for parents to negotiate solutions with their children and explain to them the reasons why they should behave in certain ways rather than dictating how things should be. Permissive parents generally emphasize freedom and autonomy in their children, putting few restrictions on their children's behavior. Research studies generally find positive benefits for children raised under authoritative parenting, including more internal LOC (McClun & Merrell, 1998). Based on the above reasoning, the authors predicted non-authoritarian parenting child-rearing strategies at year five would predict greater internal LOC in children at age ten. Lastly, they hypothesized that mothers who tended to express non-authoritarian attitudes toward life at year five would also

have children with greater internal LOC at year ten.

Type of parenting aside, as an indicator of child-centered parenting, at the five-year time point they measured the average number of days per week the child was read to by a parent. The authors predicted that this factor would significantly predict internal LOC when children were ten years old. Additional child-centered variables were assessed at the ten-year time point and were hypothesized to be positively associated with an internal LOC at this time. These factors included the degree to which the father was involved in raising the child, the frequency of family activities (e.g., having meals together, going on a family vacation), parental attitudes and interest in the child's abilities and education, and parental expectations of whether the child would drop out of high school or go on to university following graduation.

Activities of child

Third, the authors assessed numerous children's activities and interests as potential antecedents to LOC orientation. In all cases they expect that greater participation and responsibility in activities can help children to develop self-efficacy and mastery, leading to a greater sense of personal control. Because children's activities that foster responsibility have been found to be associated with internal LOC (Jackson, 1998), they hypothesized that the frequency with which children at age five visited friends' homes or the park or playground and various other activities they could do during their spare time would predict more internal LOC orientation at age ten; examples for these activities include playing sports, reading books, and going to movies. Likewise, exposure to shopping with a parent or riding a bus or train at age five were thought to predict later more internal LOC orientation.

Method

Participants

The data used for this analysis are taken from a national cohort study of 12,463 children (male = 6,443, female = 6,020) born during the week of April 5th through 11th, 1970 in England, Scotland, & Wales and their mothers (Osborn, Butler, & Morris, 1984; Osborn, & Milbank, 1987). The ethnic

origins of children in the study were primarily Caucasian, with 92.3% of the parents' ancestors being from Britain and Northern Ireland. There were 1.4% of the sample whose parents were Afro-Caribbean, 1.8% with Indian/Pakistani parents, and the remaining 4.5% "other."

Mother-child dyads were surveyed at the time of the child's birth and then were followed up at 5 and 10 years of age. The study was multi-disciplinary and epidemiological in nature, and, as such, obtained comprehensive health, social, and educational information. The general aim of the study was to identify factors that were important for children's healthy physical, cognitive, and emotional development. The authors will only report here measures and findings relevant to their study; the results specific to LOC orientation as an outcome factor have not been previously published.

Measures of Interest

Locus of control

A version of the Children's Nowicki-Strickland Internal-External Control Scale for Children (CNSIE; Nowicki & Strickland, 1973), modified for self-completion by 10-year-olds in the Child Health and Education Study (Osborn et al., 1984), was utilized. The CNSIE has been used in over 1,400 studies that attest to its construct validity (Nowicki, 2010). LOC has been shown to relate to academic achievement, social adjustment, and delay of gratification, as well as over 150 other criteria-related outcomes. The CNSIE specifically has been evaluated as the most used and one of the most well-validated measures of LOC for children (Furnham & Steele, 1993). The short form of the CNSIE consists of 15 scale items and 5 distracter items to which the children responded "yes" or "no" depending on whether or not they felt an item applied to themselves. The raw scores ranged from 0 to 15, and these scores were transformed to give a mean of 100 and a standard deviation of 15. Higher scores indicate greater external LOC. The internal consistency of the measure was comparable to the longer original CNSIE ($\alpha = .78$).

Socioeconomic status (SES)

The Social Index is based on a scale comprising seven

items: father's occupation, parental education, housing tenure, type of accommodation, persons-per-room ratio, car ownership, and telephone availability. The rationale of the index and its design is given by Osborn (1987). The Social Index is scaled to have a mean of 50 and standard deviation of 10. In the current sample, the internal consistency is sufficient ($\alpha = .78$, $N = 11,231$). A higher score indicates a higher level of SES.

Mother's authoritarian world view

This scale is based on five attitude items evaluated and scored using principal components analysis. To give an indication of what this scale measures, the two highest loading items are: "Nothing is worse than a person who does not feel a great love, gratitude, and respect for his parents," and "A person that does not let others stand in his way is to be admired." Respondents recorded their attitudes toward these items on 5-point Likert scales (strongly agree to strongly disagree). Higher scores on this dimension indicate a lower authoritarian attitude on the part of the mother. Internal consistency for the measure was $\alpha = .77$.

Mother's authoritarian child rearing dimension

This measure consists of 13 items, of which the highest loading ones in the principal components analysis were: "If preschool children would pay more attention to what they are told, increasing of just having their own ideas, they would learn more quickly;" "A well brought-up child is one who does not have to be told twice to do something;" and "Children under five should always accept what their parents say as being true." Higher scores indicate less support of authoritarian parenting strategies. The principal component (or factor) explained 23.2% of the total variance in the scale items. Internal consistency for the measure was $\alpha = .77$.

Demographic questions

Being that this was an epidemiological study, mothers at the 5- and 10-year assessment times completed questionnaires that asked for information about myriad aspects of their lives. Factors related to LOC were size of family; duration of breast feeding; maternal depressive symptoms; how much parents read to children; parents'

expectations of the child's education after leaving school; how many visits the child made to friends, parks, shops, hospitals, and other places; and what kind of activities children were involved in during their spare time, such as books, musical instruments, and sports.

Procedure

The Child Health and Education Study (CHES) involved a maximum of 15,000 children born throughout the United Kingdom during April 5 to 11, 1970. The fieldwork for the five year follow-up was carried out by health visitors with the agreement of the Area Health Authorities, who gathered information by interview and by leaving forms of behavioral scales for each mother to complete; they also carried out the tests with the children. At the five year test time, children were traced via the general practitioners with whom they were registered. The whole tracing exercise was carried out by health service personnel so that no confidential information, including the study child's current address, was disclosed to the research team until the family had agreed to take part in the study. A total of 13,135 children were traced and interviewed for the five year survey. Tracing for the ten year follow-up took place in the schools. School teachers were asked to scan their class registers for children born during the week of April 5 to 11 in 1970. Using this method, 11,838 children were traced and completed materials. Teachers were given packets to complete for identified children during a one month period of time during the school year.

Data Analysis Strategy

In seeking factors that dispose children to develop either internal or external LOC orientation, the authors do not assume a simple causal model. Instead, they suggest a transactional or interactive model (Lemert, 1972) in which LOC orientation is influenced by and influences other personality, behavioral, and cognitive characteristics. This means that care must be taken when seeking to explain significant associations between LOC and the many other variables analyzed. It is also recognized that many explanatory variables are correlated with each other and may therefore explain the same variance in LOC. Similarly, some associations may be spurious and

could be due to a third, possibly unmeasured factor or a cluster of such other factors. Also, certain factors in children's lives that are important for developmental progress persist over time and therefore have a continuous effect (e.g., parental educational level), but others are life events which occur at one point in time but have effects that may be long lasting (e.g., a temporary but traumatic separation from parents). The significance of this for longitudinal data analysis is that measures of "persisting" life factors may be obtained at any stage in the research program, whereas those referring to specific life events are best obtained close to the time they occur. Often a measure such as SES is obtained at every stage of a longitudinal study, and it can be readily demonstrated that the measures at successive stages are highly correlated, thereby indicating that the relative social standing of families remains fairly consistent over time, although the SES of the entire cohort may increase in absolute terms since the majority of families enjoy a slowly improving standard of living over time. In some families, however, changes occur. For example, some families may be upwardly socially mobile, but the SES of others may decline, and some experience family breakdown and divorce. Such considerations informed the design and interpretation of analyses that aimed to identify the antecedents of LOC.

In the first stage of the analysis, variables from the 5- and 10-year stages hypothesized as having a possible impact on LOC were subject to one-way ANOVA for nominal scale variables and simple linear regressions for continuously distributed variables, with 10-year LOC score always as dependent variable. Those independent variables showing a statistical significance better than $p < .00005$ were then analyzed in stepwise multiple linear regression to identify those having the strongest effect after taking account of the other variables in the analysis. This procedure was carried out for the whole cohort as a whole and for boys and girls separately. The criterion for the stepwise selection of independent variables was the variable with the most significant p -value after the variance in LOC explained by variables already in the equation was removed. The variables thus found to retain

statistical significance ($p < .05$) in either the boys' or girls' regression analyses included in the analyses were presented in this paper. The complete results of the bivariate analyses (zero-order correlations and one way ANOVAs) can be obtained from the authors upon request.

Results

Analysis of Variables Measured at Age Five (Tables 1, 2, and 3)

The 5-year variable having the greatest effect on 10-year LOC was the Social Index score, $F = 158.7$, $p < .00005$. The standardized regression coefficient of .15 indicates that a 1 SD difference in Social Index score predicted a .15 SD difference in LOC score and confirms that socially advantaged children were more likely than children from less advantaged homes to have internal LOC.

The next most significant variable was "Authoritarian child rearing" $SRC = .06$; $F = 23.4$, $p < .00005$, which suggests that authoritarian child rearing practices were predictive of lower internal LOC in the child. "Authoritarian world view" explained a small amount of additional variance in the boys' analysis but not the girls'. Conversely, the "Hospital visiting" attitude dimension and the mother's belief that women should have the same opportunities as men just retained their statistical significance in the girls' analysis, but they were non-significant for boys. Apart from "Authoritarian child rearing," however, the attitudinal dimensions explained little variance in LOC once the other variables were taken into account. The analysis suggests that the sons of depressed mothers were more likely to have external LOC, whereas this effect is less significant for the daughters of depressed mothers.

Reading to the 5-year-old child was an indicator of child-centered parenting in the data set. In this analysis, the difference in mean LOC score between children who were read to every day and those who were not read to amounted to about 3.5 points on the LOC scale; equivalent to nearly a quarter of a standard deviation, it suggests that those who were read to had greater internal LOC. This effect was similar for both boys and girls (the reduced significance levels for the boys' and girls' analyses compared with that of the total sample are

simply due to the reduced sample sizes in the former). Duration of breast feeding seems to be a more important factor for girls ($p = .017$) than for boys ($p = .452$). Girls who were breast fed for at least three months (compared to less than 3 months) were more likely to greater internal LOC. Finally, family size was shown to be a significant factor for boys but not girls. Boys with no siblings at five years old had more internal LOC scores than boys with four or more siblings.

Analysis of Variables Measured at Age Ten (Tables 4, 5, and 6)

Although the Social Index score was found to be the strongest 5-year predictor of LOC, change in Social Index score at year 10, indicating social mobility over the five-year intervening period, was not found to have a very marked effect on residual LOC score. However, the positive standardized regression coefficient indicates that children in upwardly mobile families tended to be more internal, although this effect is weak and, indeed, only achieves statistical significance in the analysis which includes all children. Table 6 shows an interesting positive effect for boys whose mothers were less depressed at the 10-year stage of the study than they were at the 5-year stage. A decline in maternal depression is associated with increased likelihood internal LOC in boys, though not in girls. This finding is consistent with the 5-year analyses (Tables 2 and 3), which found that external LOC in boys, but not in girls, was increased if their mothers were depressed.

Since specific SES effects were controlled and therefore partialled out in the 10-year analyses, the effects shown in Tables 4 to 5 are in addition to the effects directly attributable to SES. The main contrast is between children whose parents expect them to go on to college or university after leaving school and those who expect them to leave school at the earliest opportunity (age 16) or to take up an apprenticeship. The difference in mean change in LOC score was as much as 6 points on the scale, equivalent to .4 SD of residual LOC score, which is quite substantial. This suggests that children whose parents expect them to go on to higher education had higher internal LOC scores than those whose parents

Independent Factors	N	Adjusted Deviation	F
<i>Number of Children in Household</i>			
Only child	969	1.43	4.3**
2	4737	.12	
3	2340	-.26	
4	881	-.58	
5 or more	523	-1.60	
<i>Duration of Breast Feeding</i>			
Never breast fed	5952	-.16	3.5*
< 1 month	1531	-.45	
≥ 1 month, < 3 months	929	.36	
≥ 3 months	1038	1.28	
<i>Number of Days per Week Read to</i>			
Not read to	648	-2.70	16.5****
1-6 days	4731	-.31	
Every day	4071	.79	
Covariates	Standardized Regression Coefficient (β)		F
<i>Social Index Score</i>	.15		158.7****
<i>Maternal Depression Score</i>	.04		15.4***
<i>Mother's Attitude Scores</i>			
Gender equality	-.01		0.7
Hospital visiting	.02		2.9†
Authoritarian world view	.04		8.0**
Authoritarian child rearing	.06		23.4****

Note: Grand mean = 100.41; SD = 15.0

* $p < .05$, ** $p < .01$, *** $p < .001$, **** $p < .00005$ † $p < .10$ (trend)

Table 1. The Effect of Variables Measured at Age Five on 10-Year LOC Score: all Children

Independent Factors	N	Adjusted Deviation	F
<i>Number of Children in Household</i>			
Only child	485	1.51	1.8
2	2318	-.02	
3	1094	-.61	
4	408	.11	
5 or more	249	-.21	
<i>Duration of Breast Feeding</i>			
Never breast fed	2829	-.30	3.4*
< 1 month	728	-.51	
≥ 1 month, < 3 months	466	.60	
≥ 3 months	531	1.80	
<i>Number of Days per Week Read to</i>			
Not read to	302	-3.00	9.6***
1-6 days	2211	-.39	
Every day	2041	.87	
Covariates	Standardized Regression Coefficient (β)		F
<i>Social Index Score</i>	.16		94.3****
<i>Maternal Depression Score</i>	.03		4.0*
<i>Mother's Attitude Scores</i>			
Gender equality	-.04		6.0*
Hospital visiting	.03		4.0*
Authoritarian world view	.02		0.8
Authoritarian child rearing	.06		10.0**

Note: Grand mean = 99.38; SD = 15.2

* $p < .05$, ** $p < .01$, *** $p < .001$, **** $p < .00005$ † $p < .10$ (trend)

Table 2. The Effect of Variables Measured at Age Five on 10-Year LOC Score: Girls

Independent Factors	N	Adjusted Deviation	F
<i>Number of Children in Household</i>			
Only child	484	1.43	4.6**
2	2419	.28	
3	1246	-.01	
4	473	-1.22	
5 or more	274	-2.82	
<i>Duration of Breast Feeding</i>			
Never breast fed	3123	-.07	0.9
< 1 month	803	-.40	
≥ 1 month, < 3 months	463	.20	
≥ 3 months	507	.88	
<i>Number of Days per Week Read to</i>			
Not read to	346	-2.51	8.0***
1-6 days	2520	-.28	
Every day	2030	.77	
Covariates	Standardized Regression Coefficient (β)	F	
<i>Social Index Score</i>	.14	68.2****	
<i>Maternal Depression Score</i>	.05	11.4***	
<i>Mother's Attitude Scores</i>			
Gender equality	.02	1.1	
Hospital visiting	.01	0.1	
Authoritarian world view	.05	9.1**	
Authoritarian child rearing	.06	12.4***	

Note: Grand mean = 101.36; SD = 14.7
* p < .05, ** p < .01, *** p < .001, **** p < .00005 † < .10 (trend)

Table 3. The Effect of Variables Measured at Age Five on 10-Year LOC Score: Boys

expect their formal schooling to cease in late adolescence.

In terms of activities associated with LOC, children were more likely to have more internal LOC scores if they engaged in sports, often read books, or played a musical instrument. However, whereas reading is an important activity for both boys and girls, boys benefit rather more from sports and girls from playing music, although these gender differences are not large. Finally, 10-year-old boys with four or more siblings were likely to have more internal LOC scores than children from smaller families.

Discussion

The present investigation is among the first to complete a prospective, epidemiological study using a large community sample to investigate possible parental, child, and environmental factors that predict or are associated with LOC orientations measured in children who are ten years of age. Though the report of correlations between LOC and variables at the 5- and 10-year testing times were informative, the most meaningful

Independent Factors	N	Adjusted Deviation	F
<i>Parents' Expectations of Child's Education after Leaving School</i>			
Further education	550	-.43	27.6****
College or university	1389	3.80	
Apprenticeship	148	-1.50	
Specific job	369	.32	
Leave at 16, no other plans	2993	-2.18	
Leave at 17, no other plans	1028	-.41	
Leave at 18, no other plans	1750	1.15	
<i>Child's Spare Time Activities: Sports</i>			
Never or hardly ever	616	-1.68	18.9****
Sometimes	3098	-.91	
Often	4513	.85	
<i>Child's Spare Time Activities: Books</i>			
Never or hardly ever	518	-1.78	22.5****
Sometimes	3039	-1.15	
Often	4670	.95	
<i>Child's Spare Time Activities: Musical Instrument</i>			
Never or hardly ever	4326	-.18	4.7**
Sometimes	1641	-.58	
Often	2260	.76	
<i>Number of Children in the Household</i>			
Only child	826	-.54	2.0†
2	3975	-.20	
3	2313	.06	
4	754	.73	
5 or more	359	1.58	
Covariates	Standardized Regression Coefficient (β)	F	
<i>Change in Social Index Score</i>	.03	5.9*	
<i>Change in Maternal Depression Score</i>	.02	4.8*	
Percentage of variance explained = 4.5%			

Note: Grand mean = -.04; SD = 14.4
* p < .05, ** p < .01, *** p < .001, **** p < .00005 † < .10 (trend)

Table 4. The Effect of Variables Measured at Age Ten on 10-Year LOC Score: all Children

findings were obtained via regression analyses, which found significance in three main areas: socioeconomic status, parental behaviors and attitudes, and children's activities and behaviors. Each set of findings contribute information, some prospective and some concurrent, that may be useful in clarifying the kinds of experiences and characteristics that predict internal LOC expectancies.

Socioeconomic Status (SES)

The most significant single variable associated with LOC in the present study was SES. In fact, SES at the five year level appeared to predict LOC at age ten even when families were changing toward higher SES in the years between

Independent Factors	N	Adjusted Deviation	F
<i>Parents' Expectations of Child's Education after Leaving School</i>			
Further education	255	-.66	27.6****
College or university	671	3.25	
Apprenticeship	10	-4.98	
Specific job	230	1.29	
Leave at 16, no other plans	1410	-2.10	
Leave at 17, no other plans	517	-.60	
Leave at 18, no other plans	882	1.14	
<i>Child's Spare Time Activities: Sports</i>			
Never or hardly ever	417		1.1
Sometimes	1912		
Often	1646		
<i>Child's Spare Time Activities: Books</i>			
Never or hardly ever	118	-2.29	17.9****
Sometimes	1161	-2.00	
Often	2696	.96	
<i>Child's Spare Time Activities: Musical Instrument</i>			
Never or hardly ever	1354	-1.27	8.2***
Sometimes	1005	-.13	
Often	1616	1.06	
<i>Number of Children in the Household</i>			
Only child	410	-.71	1.9
2	1937	-.35	
3	1110	.26	
4	330	1.75	
5 or more	188	.53	
Covariates	Standardized Regression Coefficient (β)		
Change in Social Index Score	.03		3.8†
Change in Maternal Depression Score	.01		0.4
Percentage of variance explained = 4.8%			

Note: Grand mean = 0.4; SD = 14.6
* p < .05, ** p < .01, *** p < .001, **** p < .00005 † < .10 (trend)

Table 5. The Effect Of Variables Measured At Age Ten On 10-Year LOC Score: Girls

ages five and ten. Theorized to be important by Rotter (1966) himself, research investigating the relationship between SES and LOC, sometimes alternatively called social class, dates back to the origins of LOC construct itself; however, this association tells us little unless we uncover the mechanisms by which SES impacts LOC development. For example, from the findings in the present study, it appears that the some of the impact of SES on LOC may be traced to the manner in which parents perceive and interact with their children, where larger family size is related to lower social class. This may in turn mean that parents with more children may simply have less time to spend with them, and the time they do spend

Independent Factors	N	Adjusted Deviation	F
<i>Parents' Expectations of Child's Education after Leaving School</i>			
Further education	295	-.49	14.5****
College or university	718	3.86	
Apprenticeship	138	-2.17	
Specific job	139	-.62	
Leave at 16, no other plans	1583	-2.01	
Leave at 17, no other plans	511	-.05	
Leave at 18, no other plans	868	1.12	
<i>Child's Spare Time Activities: Sports</i>			
Never or hardly ever	199	-2.48	7.3***
Sometimes	1186	-.85	
Often	2867	.52	
<i>Child's Spare Time Activities: Books</i>			
Never or hardly ever	400	-2.13	14.8****
Sometimes	1878	-.85	
Often	1974	1.24	
<i>Child's Spare Time Activities: Musical Instrument</i>			
Never or hardly ever	2972	-.27	6.5**
Sometimes	636	-.59	
Often	644	1.85	
<i>Number of Children in the Household</i>			
Only child	416	-.41	2.7*
2	2038	-.18	
3	1203	-.03	
4	424	-.04	
5 or more	171	3.44	
Covariates	Standardized Regression Coefficient (β)		
Change in Social Index Score	.02		2.5
Change in Maternal Depression Score	.04		7.0**
Percentage of variance explained = 4.8%			

Note: Grand mean = -.11; SD = 14.2
* p < .05, ** p < .01, *** p < .001, **** p < .00005 † < .10 (trend)

Table 6. The Effect Of Variables Measured At Age Ten On 10-Year LOC Score: Boys

with them may not be characterized by the kinds of child & family activities conducive to the development of internal LOC expectancies.

Results from past cross-sectional and longitudinal research studies found that warm and supportive family structures and stimulating family environments were associated with children having more internal LOC (Nowicki & Schneewind, 1982; Schneewind, 1982, 1989, 1995). A host of parental and family activities identified by past researchers and found in the present study may provide viable candidates for intervention. The present study suggests a previously unidentified activity, reading daily to children when they are younger, as an especially

important activity that predicts internal LOC. Perhaps lower SES parents have less opportunity to engage in the kind of activities that may facilitate the learning of appropriate internal LOC expectancies. If this is so, the optimistic news is that with some guidance parents from any social class can be helped to create the kind of family environment and activities to facilitate the growth of internal LOC expectancies. Reading to a child daily is probably a marker that indicates child centeredness and attention that may more easily be obtained in higher SES households, but it also suggests one activity that may be employed by any set of parents regardless of social class to help engender internal LOC expectancies in their children. Of course more information is needed to more specifically identify what actually goes on in the reading session that leads to more internal LOC: Is it the actual reading, aspects of the parent-child relationship and interaction, or some combination of these or other factors that positively affect children?

Parental Non-Authoritarian Behaviors and Perspectives

The idea that parent behaviors and attitudes are important to the development of internal LOC expectancies originated in Rotter's (1990) social learning theory. He suggested that one of the main developmental tasks children faced was learning the appropriate connections between what they did and what happened to them as a consequence. This "contingency" learning, Rotter assumed, was essential for the development of appropriate internal LOC expectancies, that is, knowing the degree to which behaviors were realistically associated with consequences. Without contingency learning children would not be aware of what they could and could not do to affect their world (Levenson, 1972; Rotter, 1990). To facilitate contingency learning, Rotter and later Lefcourt (1981, 1983, 1984) theorized that children needed to be raised in safe and secure family and educational environments in which they felt free to explore and, through that exploration, to become aware of the realistic consequences of their actions, a proposition highly commensurate with secure attachment theory (e.g., Ainsworth & Bowlby, 1991; Bowlby, 1969).

As the authors hypothesized, children in the present study who had parents that were non-authoritarian in their general outlook and non-authoritarian in their specific child rearing perspectives had more internal LOC than their peers with parents who had authoritarian child raising attitudes. The present study is not the first to note the unique association between parental attitudes and LOC. The negative impact of authoritarian child rearing attitudes has been found by others who have noted that parental over-involvement, too much directiveness, and lack of warmth, factors which characterize authoritarian behavior and attitudes, are associated with children's external control expectancies (see Carton & Nowicki, 1994; Schneewind, 1995). Moreover, their findings mirror those from the few extant observational studies that also suggest authoritarian parental behaviors may contribute to greater externality in children. For example, Carton et al. (1996) found that mothers of internally controlled children were more likely to let them work on tasks without interfering with their efforts in contrast to externally controlled children whose mothers were characterized as intrusive. In fact, the researchers reported anecdotally that mothers of children with external LOC would, at times, go so far as to take over completing the children's task. On the other hand, mothers of children with internal LOC were observed to be more supportive and to offer more warm and encouraging verbal and nonverbal messages and fewer intrusive ones (Carton & Nowicki, 1996).

What is unique about the present study is that parental attitudes when children were younger were found to predict children's LOC outcomes five years later. This provides stronger evidence than previous cross sectional investigations that parental attitudes may pre-date LOC differences. However, to provide more support for this possibility, children's LOC would have had to been assessed at age 5 as well because it is not known if the association was already present at age 5 or perhaps younger. Perhaps future research will clarify the viability of this possibility.

Child Behaviors and Activities

Present study suggests that as the authors hypothesized, there are significant differences in what children with

internal or external LOC do with their time and how they approach school-related activities. Demographic information revealed that children with high internal LOC orientation were more likely to read or play musical instruments than children with external LOC. Parents of children with more internal LOC expected more academic achievement from them than did parents of children with external LOC. Higher parental expectancies regarding their child's education can be in one sense an indicator of the value they place on education, but it also could be a possible response to their perceptions of how well the child is doing at school. Internal LOC together with other positive school related behaviors associated with internality are likely to increase the child's school performance and hence raise parental aspirations and expectations. This, in turn, would encourage positive parenting and thereby reinforce the development of internal LOC. In this sense, once the sequence begins it may be difficult to separate cause and effect. The results are consistent with those from at least one longitudinal study showing that individuals who retrospectively reported their early childhood environments as more stimulating or involving a greater variety of recreational activities also reported greater internal LOC orientations as young adults (Schneewind, 1995).

Limitations

Although it appears that though there are a variety of socioeconomic factors and parental characteristics – especially those regarding parents' child rearing attitudes and the time and manner of their interaction with their sons and daughters – are associated with their children's LOC, the findings must be viewed with some caution. Though the size and representativeness of the sample are strengths of this methodology, the study was not originally set up to investigate antecedents of LOC specifically. Its purposes were much more general and tied to broader educational and societal outcomes. Therefore, directly relevant information regarding origins of LOC such as contingency learning was not gathered, and parent-child interactions were not directly observed to assess whether parents of children with more internal or external LOC behaved differently.

It is also true that the use of a population study from Great Britain in the 1970s may limit the generalizability to other English and non-English speaking countries in more recent times. However, as was noted in the introduction, previous cross-sectional findings regarding behaviors associated with LOC were found to generalize across a number of cultures and ethnic groups. This may be the case for the results in the present study, but that will have to await the outcome of further research. Relevant data may be forthcoming from another longitudinal study in which children ($N = 9,987$) born in the year 1991 in the Bristol, England, are being followed and will continue to be followed into adulthood. Data on a variety of physical and psychological measures are gathered every six months. Preliminary results suggest not only that authoritarian parental child rearing attitudes are related in a similar manner to LOC in children but that parental LOC assessed prenatally is also associated children's LOC measured eight years later (Nowicki, 2010).

Conclusion and Recommendation

The findings from this study suggest that parents who are child centered, non-authoritarian in their approach to child rearing, spend more time with their children reading and interacting, and expect their children to succeed academically are more likely to have children with greater internal LOC expectancies. In turn, cross-sectional results found that children with more internal LOC are more likely to show the kinds of behaviors that are associated with success in school (e.g., time reading books). Though some of the findings were prospective and suggest that certain early experiences are important in determining later LOC, others were concurrent and less helpful in untying the cause and effect relation between LOC and parent/child behaviors and attitudes. The concurrent findings may be helpful, however, in suggesting where researchers might begin their search for the determinants of LOC, information that may save time and make future longitudinal and experimental research more efficient.

Additionally, although the parenting strategies and attitudes discussed above may be beneficial for all children, cultural context should certainly be taken into

account. For example, parents of children in Indian culture, based on Hindu philosophy with a more collectivistic approach, generally teach children to control their emotions more than White, U.S. American parents do (Raval, Martini, & Raval, 2009). It may be that Indian parents have different values for LOC and practices regarding its establishment LOC as well, where high levels of internal LOC may reflect a violation of cultural norms (Sastry & Ross, 1998; Stanhope, 2002). Therefore, future research should investigate whether the antecedents of LOC found in a British context work similarly or differently in myriad cultural milieus.

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