15.1 Limitations

In these days when it is particularly difficult to determine what is “true” and what is not, it is particularly important to indicate the limitations of the research on which much of the information presented in the volume is based. All research has limitations and this is particularly true of the social sciences due to the complexity of the questions under investigation.

15.1.1 All Models Are Wrong to Some Extent

The goal of our research is to present a model of temperament-based individual differences in children at one age level (ages 8 through 12). More specifically, the goal was to develop a taxonomy of the most commonly occurring temperamental profiles. The word “taxonomy” in this context is meant to indicate that the profiles developed through our research procedures would capture the full range of commonly occurring non-pathological behavioral tendencies. This was an ambitious goal, as there have been only a few other studies on which to base our procedures and interpretations.

One important consideration in understanding the approach taken in this volume comes from the idea of a model. In the case of our study, we attempted to capture the most essential aspects of parent and teacher assessments of the behavior of more than 2000 children. Children were assessed on eight broad characteristics. This means we had more than 16,000 pieces of data at our disposal (eight characteristics per child). Through statistical methods we determined that seven behavioral profiles could be extracted from these descriptions that replicated across the three samples studied (US parents, US teachers, and Russian parents).
Our research illustrates a truism about models: They are simplifications. No model can explain all the data in the data set. For example, we described each temperament profile using average scores for each of the eight characteristics, calculated from the scores of all children who were placed in that cluster. However, any given individual in the cluster will deviate to some degree from that average score. Thus, there is variation in characteristics even within a profile. The children described by the profile have similar scores on the characteristics. Their profile scores are closer to those in that cluster of children than they are to children exhibiting any other profile, but they are not all the same. The profile then is a simplification of the scores of children defined by that profile.

Thus, all models are wrong to some extent. What is important is how useful the model is in helping human being understand complex phenomena. Consider, for example, the model of the atom that most of us were taught in high school. It involved electrons circling around a central nucleus (proton and neutron). This model was helpful because it had similarities to the planetary orbits around the sun and so was easily understood. Further, it helped explain important aspects of chemical reactions. However, we now know that the structure of the atom is much more complex than this simple model would suggest. The model was wrong, but it was useful.

There are many other examples of models that affect our lives on a daily basis. Weather prediction is perhaps the one most often encountered. Through consideration of jet stream patterns, atmospheric temperature in various regions of the world, ocean temperatures, etc., predictions are made about the chances of rain in a given area in a specific time period. This model makes predictions in terms of the probability that rain will occur. This means the prediction is known to contain error. It is an oversimplification of all the events that affect weather, but it is a useful model.

This discussion of models leads directly to a practical consideration. If a parent rated their 9-year-old son on the temperament measure that we used, their scores on all eight indicator variables (cognitive and temperamental characteristics) could be used to determine which one of the seven profiles their scores would be most similar to. However, it is likely that they would not be perfect fit. For example, while having many characteristics of well-adjusted high achievers, they might have some characteristics of withdrawn high achievers. Understanding the developmental trajectory of this child might require understanding the assets and risks of both clusters of children.

15.1.2 More or Less than Seven Profiles May Prove Useful

The number of profiles obtained through a statistical process, no matter how sophisticated the procedures used, will depend on the specific variables that are included in the model. We chose eight broad temperamental characteristics that a good deal of previous research indicated were important in lives of children in early and middle childhood. However, a different set of characteristics is likely to result in a different number of profiles. One researcher might include physical attractiveness as judged by peers as an indicator, whereas another researcher might include
individual differences in socio-cultural variables such as parental income or ethnic/racial characteristics. If these characteristics were included in the current model, it is likely that a different number of profiles would be isolated.

Profile structure will also be affected by the sample of children studied. The attempt in the current study was to obtain observations of parents that were representative of the population of parents in the USA who had children in middle childhood. Given the size and representativeness of the sample studied, this was a major strength of our project. In addition, a sizeable sample of teacher observations of individual differences was studied, although this sample was not representative of the US population; all the children were from one region in the state of Georgia. Finally, we obtained a sample of parental observations of children from Russia. This was done in an attempt to understand how generalizable the structure was across cultural differences. This effort was a first attempt at studying cultural differences in profile structure using the indicator variables we studied. While we demonstrated that there was substantial similarity in profile structure, this comparison was limited by the modest size of the Russian sample (about 550 children that we studied). For studies of latent profile structures, this is not a large sample. Also, this sample came from one geographical area in country.

We believe that this study has provided a model of individual differences in middle childhood that has real potential to be useful. But we make no claim that the seven profiles defined by the eight characteristics we studied will prove to be the most useful model. Most models of complex phenomena, like child behavior, become more precise over time as better measurements are obtained and more characteristics of interest are included.

15.1.3 Longitudinal Changes in Profile Stability Were Not Studied

We have documented that other researchers have found that temperament-related behaviors studied individually have moderate stability. For example, children who exhibit more social withdrawal than their peers as 3-year-olds tend to be more socially withdrawn than their peers at age 5, 10, 15, and even as adults. A few studies have shown that children who exhibit a given temperamental profile in early and middle childhood tend to exhibit related behaviors as adults. Thus, children who exhibit a profile that is primarily defined by poor self-regulation of attention, negative emotions, and antagonistic behaviors have been found to exhibit more problems related to alcohol abuse and gambling as adults.

These important studies have begun a process of documenting behavioral continuity over-time understood as profiles of temperament-related tendencies, but our understanding is still very limited. Does the nature of profile structure (number of profiles, descriptive characteristics) change as children develop? What little evidence that now exists indicates that this is likely. Most probably the number of profiles will increase as behavioral tendencies become more complex with increasing age and developing capabilities of children.
One important question regarding stability involves the extent to which a child maintains his/her behavior profile across developmental stages. What little data is available indicates that early in life there is considerable change, but with increasing maturity, there is increasing probability that a person will exhibit a similar profile.

None of these issues were investigated in our project. The hope is that the project reported here provides useful information on which to build future research efforts. Longitudinal research of this type is extremely difficult and expensive; studies like ours can provide information about which characteristics are most important to include in longitudinal work. An appropriate study of individual and structure stability of profiles in children will require 2000–5000 children at minimum. Undertaking studies of this size requires a substantial commitment of funds (millions of dollars). Such allocations have been made in recent studies in Australia and in Finland. Such research holds great promise for understanding the issues of profile stability.

15.1.4 Latent Profile Analysis Currently Has Limitations

Latent profile analysis (LPA) was used as the primary tool for determining the nature and number of profiles that best describe individual differences of children in middle childhood. This is a useful and highly touted tool, but the method is not highly developed; it is still in its infancy. In large data sets using continuous variables (in our case, temperamental characteristics that are normally distributed across a wide range), most of the typically used criteria to determine the number of profiles in a given data set provide no clear indication of the exact number that is optimal. Further, the criteria in some cases provide contradictory indications. (For details and a number of examples, see Appendix E.) The further development of LPA and related tools takes time and considerable software development to get to the stage that it can be broadly utilized by general researchers. Currently, due to the limitations of these tools, the researcher has to make a number of decisions in the process of data analysis based on theory. All statistical outcomes must be evaluated based on theory, but with further evolution of LPA, more definitive statistical guidelines will no doubt evolve.

15.1.5 Models Are Only as Good as the Measurements Made

There are many factors that contribute to measurement quality, and the measurement tools used in the current study have been studied in a number of contexts and refined through a number of iterations. However, measurement of the perceptions of any parent or teacher is subject to a variety of idiosyncratic biases (mental health status of the observer, experience with children, the understanding of what is typical behavior for a child of a certain age). Some of these biasing effects can be reduced by combining the assessments of parents and teachers. In the current project, measurements were obtained from US parents, US teachers, and Russian parents. However, US parents and teachers did not observe the same children. No data were
available from Russian teachers on the children who were assessed by Russian parents. Thus, it was not possible, given our available data, to combine assessments of parents and teachers for the same child.

There is a long history of research on parent-teacher agreement and important differences in perception are often obtained. However, recent research by Major and colleagues [1] has shown that many of these differences are related to the level of the profile rather than the contour of the profile. In our research, primary consideration was given to the topographic contours of the profile rather than the level of the profile. Specifically, mean level differences in profiles of parents and teachers in the USA were eliminated by calculating scores on each characteristic in relation to the mean of each sample separately (scores were centered at the sample level). The same procedure was used when comparing profiles from Russian parents to those obtained from US parents and teachers. The focus of the research was on individual differences, not on average differences between parent and teacher ratings. However, if the same children had been assessed (rated) by parents and teachers in the current study, issues of profile level and contour could have investigated.

15.2 Summary of Findings

We believe that despite the limitations just mentioned, the research we have reported makes a number of meaningful contributions to the current understanding of individual differences in children. The most important of these contributions are listed below.

1. Parents and teachers have a similar understanding of individual differences of children in middle childhood. Seven profiles of cognitive and temperament-related characteristics of children in middle childhood were extracted from assessments of US parents, Russian parents, and US (Georgia) teachers. Each of these profiles, extracted from the three sets of assessments, were shown to be similar in topographic contour (the means of each characteristic for a given profile were similar for the groups of raters). This is the first study to show this level of inter-rater agreement on temperament profile structure in middle childhood where both parents and teachers were used. It is also the first study to demonstrate profile equivalence for parents from different cultural contexts.

2. Temperament-based profiles were demonstrated to relate to how compliant the child is to adult expectations at home and school. Parents and teachers rated the level of compliance each child demonstrated regarding rules and normative expectations at home and at school. The measure of compliance was very strongly related to profile type.

3. Temperament-based profiles were found to significantly relate to ratings of behavioral problems exhibited by children. Parents and teachers also rated several types of behavior problems exhibited by children. Children in different clusters (defined by profiles) were found to have significantly different rates of aggression, hyperactivity, emotional problems, conduct problems, and problems with peers. Specifically, measures of these types of problems were significantly related to profile type, although not all profiles were different from one another on any given problem.
4. Temperament-based profiles were found to be significantly related to achievement as assessed by grade point average. For the Russian sample, profile type was significantly related to grade point average. This result indicates that the perceptions of these parents regarding the temperament-related characteristics of their children were related to their school achievement in meaningful and practically significant ways.

5. Temperament-based profiles based on parent and teacher perceptions were significantly related to the perceptions of academic ability and achievement motivation as rated by peers in school. The perceptions of same-age peers in school regarding academic ability and achievement motivation were obtained from peers who were unaware of the ratings of teachers. Yet the perceptions of peers at school were closely related to the perceptions of teachers in the areas of academic ability and achievement motivation. This indicates that by middle childhood, there is a “community” consensus about the academic talents and motivations exhibited by children.

6. Temperament-based profiles were significantly related to the perceptions of the social status, likeability, social influence, and social prominence of their peers. Current findings demonstrate that temperament-based profiles are related in important ways to the social environmental experiences of children. In middle childhood, the attitudes and behaviors of peers toward one another play an important role in the socialization and development of self-perceptions of children, and temperamental characteristics play a role.

7. Temperament-based profiles were significantly related to the perceptions of peers regarding amount and type of aggression exhibited by children. Children were asked to nominate other children who were verbally, socially (excluding others from the group), or physically aggressive. Profile types (based on parent and teacher perceptions) significantly predicted peer measures of aggression.

8. Temperament-based profiles were significantly related to self-perceptions of motivations. Students rated their own academic motivation and motivations to engage in inappropriate behavior in school. Profile type was significantly related to these self-perceptions in meaningful ways.

15.3 Implications

15.3.1 Similarity in Profile Structure Across Raters and Cultural Environments Reinforces the Ideas that Temperament-Related Individual Differences Are a Natural Part of the Human Condition

We have shown striking similarity in the profile structure of the eight temperament-related behavior characteristics that we studied. This result supports the idea that individual differences in these behaviors are readily observed in the home and in the school setting. Further, they are observed in different cultural settings. Of course,
we have studied only two cultural groups. But our results (and the results of other studies) lead to the notion that these profile structures are a natural part of the human condition; that is, these measures tap individual differences that are commonly observed regardless of the sex of the child, their socioeconomic circumstances, or their minority/majority status.

It is important in this context to understand what we have not demonstrated. We have shown that the contours of the seven profiles we found are very similar. These contours are defined by differences from the mean level of each of the eight behavioral characteristics studied. However, we have not shown that other characteristics of the profiles are similar across rater type or cultural setting. In fact, our data indicates that there are sizeable differences in the variability around these means for parents and teachers, and for parents in different cultural settings. Further, the percentage of the samples exhibiting each profile type in different samples is not equivalent. For example, the teacher profile for the well-adjusted profile contained about 50% more children than the US parent profile. These differences could result from differences in sample characteristics or other technical issues.

However, it is likely that even if these profiles have a high generalizability across setting (home and school) and culture, that setting and culture will play a significant role in how a given profile of behavior is evaluated. For example, it is known that culture plays a role in the value placed on social inhibition. Eastern cultures find inhibition and cautiousness in children a more attractive trait than do those in Western cultures. Social sensitivity, one aspect of social inhibition, has been found to be related to various forms of social maladjustment in Canadian children of ages 4–8 years but is related to better adjustment in children of similar ages in Shanghai [2]. Thus, values placed on specific levels of behavioral characteristics are likely to vary by cultural settings and to have different effects on adjustment based on these values. These values, in turn, may play a role in the initial assessment of the behavioral characteristic and on the social implications of that characteristic for future behavior.

15.3.2 The Social Environment Stabilizes Behaviors

The results of this project provide data that helps explain why early appearing individual differences in children become progressively more stable as the child matures. One such mechanism is that the social world of the child (parents, teachers, peers) in middle childhood (ages 8–12) is coming to a consensus about his/her behavioral characteristics. This is a period in development in which the child (a) increasingly comes into contact with children outside the home, (b) has the cognitive capabilities to begin to understand the social world, and (c) must perform difficult cognitive and self-regulatory tasks in an increasingly demanding environment. Children in the age range of 3–7 years have begun to experience contact with others outside the home, are asked to perform cognitive tasks, and have to exercise some level of self-regulations. However, in middle childhood, the range of peers the child encounters and the social demands greatly increase. Further, their developmental capacities to begin to make sense of this complex and demanding world are increasing.
As children in middle childhood cope with all of these increasing demands, those around them are forming impressions of, expectations for, and predictions about how they are likely to behave. Our research has made the assumption that these impressions are based primarily on characteristics related to cognitive ability, achievement motivations, physical vigor, irritability/antagonism, self-regulation of attention, social inhibition, social withdrawal, and the tendency to feel insecure and fearful. We based these assumptions on extensive research showing that parents, teachers, and others view these characteristics as being important in interactions within the social world. Further, individual differences in most of these temperamental characteristics can be observed very early in development—some in infancy, others in toddlerhood and the preschool period.

Temperament research indicates that differences in genetic makeup, and in early environmental experiences (including the inter-uterine environment), foster behavioral individual differences. But these differences by middle childhood begin to be encoded by the social environment and a general consensus begins to form. Your mother may believe you are the brightest 3-year-old that was ever born, but by age 8, based on various types of feedback from others in the community (including teachers), a more realistic impression often emerges. Peers observe how well a child performs in school and begins to form an impression of a peer’s academic capability. Through interactions with others, the child’s self-image is formed. All of these processes begin to converge and stabilize through social consensus.

It must be emphasized that not all teachers or peers agree on how a given child is likely to behave. What we have shown in this research is that the average of the perceptions of one’s peers regarding each of the eight characteristics studied agrees with what the average parent and teacher would perceive. Some children, perhaps best friends, would have quite a different view. Still, through constant talking among peers, a general consensus is likely to form.

As the social community begins to predict how you are likely to behavior, this reinforces the original behavioral tendencies of the child. Thus, in addition to genetic and congenital influences that foster individual differences in behavior, the child has created his own social environment through his behavioral tendencies. The way and extent to which those in the environment, in turn, react to those behaviors tend to further stabilize those early individual differences.

15.3.3 Research on Individual Differences in Temperament-Related Behavioral Tendencies Strongly Implies that Relying on One Parenting or Educational Approach Toward Behavior Management Will Be Ineffective if Not Harmful

Fearful, insecure children, who are shy (inhibited in new environments), for example, tend to be sensitive to expectations of adults. They are particularly sensitive to punishment, even mild punishments. Some portion of shy, fearful children are
particularly prone to environmental influences in general, including positive as well as negative conditions (they are susceptible). Many are highly compliant to adults and tend to look to adults for approval. Thus, they thrive under conditions of warmth and support, and when parents and teachers understanding of their behavioral tendencies. If these conditions are not met, they tend to have a poor development outcome.

Poorly self-regulated children, on the other hand, are particularly sensitive to cues of reward and often become angry when the path to the reward is blocked. They are relatively more rewarded by the social world of their peers, because it often leads to social rewards. This group is relatively unaffected by the minor punishments that are used by most parents and teachers. Thus, they are perceived by adults in their world as non-compliant. Some portion is simply less responsive to environmental influence in general, whether this feedback is positive or negative (they are less susceptible).

These two examples indicate that optimal educational experiences and behavioral management of children with these two patterns of behavior are drastically different. Most socially sensitive parents and teachers are aware of these differences and to a greater or lesser degree attempt to treat these two types of children differently. However, there is a natural tendency to treat all of one’s own children the same. This is particularly true in schools where issues of fairness and justice create a press toward uniformity of treatment.

But the world is moving toward individualized consuming (creating more and more options), individualized advertising, and individualized medicine. The latter example is of interest because individualized medicine is based on the idea that not all people process (metabolize) the medication in the same way or have the same tendencies toward particular pathologies. Therefore, a given medication does not have the same effect on all people. Further, some groups because of their genetic propensities have a greater likelihood of contracting specific diseases. However, for many reasons, we tend to treat all our children in schools in the same way, unless they have a medical or psycho-educational diagnosis. Any individualization is left to the natural instincts of the teacher. Some do a wonderful job, many do not. Most teachers receive excellent instruction on how to create curricular materials but very little instruction on child development, in general, and on individual differences, in particular. Many parents have a very poor understanding of normal individual differences.

A first step toward individualization would be for researchers and evaluators of parent-based and school-based interventions to test the differential effects of each behavioral or academic intervention on children who have different cognitive abilities and temperamental profiles. A profile model like the one we have proposed could be helpful in this regard. In this way, the effects of the natural predispositions of the children would serve as a moderator variable, allowing for the discovery of exactly which groups of children profit from the intervention and which do not. A similar approach could be taken with parent intervention programs.
15.3.4  Appropriate Clinical Diagnosis of Behavior Problems Requires an Understanding of the Normal (Non-pathological) Behavioral Tendencies of the Child

Good clinicians have always known that making decisions about whether a child meets some set of criteria for a particular mental or behavioral disorder does not in itself allow for appropriate treatment. Consider the example of a diagnosis of a viral infection. Once a test determines that the individual has the corona virus, for example, the next question is: What is the person’s general health status? Do they have chronic lung problems? Do they have allergies to specific medications? Are they cognitively and behavioral capable of following an appropriate therapeutic regime?

In a specific example of a behavioral problem that has reached the point of being detrimental to the child’s developmental progress, a child of age 9 might be given a diagnosis of ADHD. How parents and teachers go about devising an appropriate program for this child should be made based on some of the following considerations: Does this child have the cognitive ability to cope with the schooling demands they currently are facing? How happy is the child on most days? Is the child considerate and empathetic toward others? Is the child shy when first meeting new people? Does the child become frustrated easily and express negative emotion in these circumstances? The answer to these questions and several others will relate to how much they enjoy schooling, their friendship patterns, and their social status; how well they are liked by teachers; and what other kinds of sub-clinical behavioral problems the child might have. Bright children who enjoy learning in spite of attention problems and have a high activity level have a much different prognosis than children who struggle at school. The optimal intervention for academically talented children is likely to be very different than the intervention for children who learn at a slower rate than their peers.

15.3.5  Allowing Children to Be Who They Are Is Likely to Have the Most Positive Effect on Their Developmental Path

The LGBTQ movement has opened the eyes of many to the harm caused by forcing children and adults into overly restrictive behavioral roles. The women’s movement, in all its forms, has liberated women to develop skills and play any of the roles in the society that are available to men. Similar movements toward racial and religious equality have fought for equal opportunity and tolerance for differences. The profiles we have modeled regarding the behavior of children have a similar meaning. Valuing these patterns of individual differences is particularly important as they interact with differences in cultural, religion, or sexual orientation. For example, an African American adolescent in the USA who has a tendency toward poorer
self-regulation of emotion may be at much higher risk in confrontations with authority figures (e.g., have discipline problems in school and have harmful interactions with legal authorities like the police) than his more self-regulated peer of the same cultural background.

Children in all cultures, in families with all religious or political orientations, and with parents who are of the same sex or different, exhibit a wide range of learning ability, achievement orientation, motor vigor, irritability, shyness, insecurity, fearfulness, and desire to be with others. In our research, we found very little effect of socioeconomic status, or ethnicity/race on the behavioral tendencies we measured. Thus, all human beings exhibit these social and emotional differences.

Yet, some kinds of behavioral predispositions are typically undervalued. This results in attempts by well-meaning adults to push for changes in children toward cultural norms that often fail, and in fact, exacerbate behavioral problems. Valuing individual differences in social and emotional predispositions does not mean that parents and teachers do not have to enforce rules that keep the child from harming others or themselves. In fact, parents and teachers have the obligation to help the child learn the skills to exercise self-control of behavioral tendencies that do not work well in some environments and to help the child find those environments where their natural tendencies do work well. All the behavioral profiles we have outlined work well in some environments, given some specific circumstances, but they all do not work well in others. Helping children find their environmental niche and helping them cope more effectively with the difficult task of controlling one’s behavior in situations where your natural predispositions do not fit well are the challenging roles of the parent and teacher.

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