Impulsivity-Reflectivity and Cognitive Development in Preschoolers: A Longitudinal Analysis of Developmental and Trait Variance

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Because impulsivity-reflectivity (IR), as measured by the Matching Familiar Figures Test (MFF; Kagan, 1965) and KRISP (Wright, Note 1), is correlated with age and IQ, we sought to determine how much variance in impulsivity-reflectivity is attributable to an impulsivity-reflectivity trait and how much to cognitive development, as measured by mental age (MA). Since the usefulness of measures of impulsivity-reflectivity depends upon whether they predict behavior not predictable from developmental level, we included a test of hypothesis behavior, which Kagan (cf. Kagan & Kogan, 1970) believes is central to stylistic differences in cognitive processes.

Fifty-five boys and 47 girls in nursery and daycare settings were tested twice, at a mean interval of 6.0 months; 76 were white and 26 nonwhite. The Stanford-Binet short form was administered at each testing according to an optimizing procedure whereby easy items were alternated with difficult items. At Testing 1, mean chronological age was 50.0 months, mental age 57.3, IQ 103.8, and Hollingshead (Note 2) socioeconomic score 3.0, in which 1 is the highest and 7 the lowest parental occupation. At both testings, a measure of impulsivity-reflectivity and, at Testing 2, a measure of hypothesis usage followed the Stanford-Binet within 3 days. The impulsivity-reflectivity measure was a modification of the KRISP designed to obtain enough variance in impulsivity-reflectivity for a valid test of the target relationships. It comprised six items from Form A and six from Form B of the KRISP, Item 1 of MFF Set 1-F, and an item drawn for this study. The remaining KRISP items were omitted because pilot work showed few errors on them.

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relations of IQ with the impulsivity–reflectivity variables. Eleven of the differences in correlations were significant at the .05 level or better. Furthermore, MA, predicted errors, and latency, about as well as did errors, and latency, (r = .63 for MA,–errors, versus r = .59 for errors,–errors; 
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r = .32 \text{ for MA,–latency, versus .33 for latency,–latency, all } p < .01.
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The power of IR, to predict hypothesis behavior at Testing 2 was assessed with a 2 × 2 × 2 (Sex × IR, × Socioeconomic Status) versus 4–7) unweighted-means analysis of variance on all 68 children who were classified impulsive or reflective at Testing 1. Reflectives used more hypotheses than impulsives, F(1, 60) = 6.18, p < .02; boys used more than girls (p < .05); upper socioeconomic status used more than lower socioeconomic status (p < .05). The latter two effects were due to a Sex × Socioeconomic Status interaction whereby lower-class girls used fewer than the other three groups (p < .05). However, covarying MA, caused the effect of IR, to disappear (F < 1) and the other effects to become nonsignificant. Multiple regression showed that MA, contributed 14.5% (p < .01) of unique variance in hypothesis scores, IR, contributed no unique variance, and 5.9% was common to MA, and IR,.

Because the greater stability of mental age (r, MA,–MA, = .82 versus r, IR,–IR, = .59 for impulsivity–reflectivity) might partially account for its superiority as a predictor over 6 months, a 2 × 2 × 2 (Sex × IR, × Socioeconomic Status) analysis of variance was performed on hypothesis scores for the 77 children classified as impulsive or reflective at Testing 2. The apparent effect of IR, disappeared (F < 1) and the other effects to become nonsignificant when MA, was covaried (F = 3.06). Multiple regression showed that MA, contributed 5.1% and IR, 2.3% of unique variance to hypothesis scores (both ns), while MA, and IR, together contributed an additional 9.5% of shared variance.

The minimal amount of independent trait variance in impulsivity–reflectivity over a 6-month period and its lack of independent contribution to hypothesis behavior carry a warning not only for research on impulsivity–reflectivity, but also for research on other variables that correlate with development. In numerous studies, behavioral differences between impulsives and reflectives have been attributed to their differences in cognitive style. However, the possibility that differences in impulsivity–reflectivity primarily reflect developmental differences has been acknowledged, at most, merely by reporting relations between impulsivity–reflectivity and age or IQ, with no attempt being made to determine whether levels of cognitive functioning accounted for the differences attributed to impulsivity–reflectivity.

The use of impulsivity–reflectivity to account for developmental changes in behavior also deserves scrutiny. Katz (1971), for example, proposed that the change from color to form as a preferred attribute reflects preschoolers' increasing tendency "to go beyond perceptually dominant stimulus characteristics and to analyze, reflect over, and use alternative dimensions" (p. 746). On color-form tests, Katz found that reflectives made more form choices, more glances at the stimuli, and had longer latencies than impulsives. But was color-form sorting derived from a trait of impulsivity–reflectivity that was separable from cognitive development? Katz's impulsives were significantly younger than her reflectives and age correlated significantly with MFF errors, MFF latency, and form responding. Since mental age was not controlled, the correlation of impulsivity–reflectivity with color-form sorting may simply divert attention from what was already known, that is, that children become less impulsive and change from color to form sorting as they mature, perhaps because of changes in a third variable such as their concept of the identity of stimuli. Thus, before valid inferences can be drawn from relationships between two variables that correlate with mental age or chronological age, it must first be demonstrated that their relationship remains significant after their common correlation with mental age or chronological age is controlled.

**REFERENCE NOTES**


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