RESPONSE TO COMMENT ON LIN ET AL.

Risk Factors for Decline in IQ in Youth With Type 1 Diabetes Over the 12 Years From Diagnosis/Illness Onset. Diabetes Care 2015;38:236–242

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Shan and Ji (1) question the reliability of the association between a decline in performance intelligence quotient (PIQ) and younger age of type 1 diabetes (T1D) onset, which we recently reported from our longitudinal study of youth with T1D and healthy controls (HCs) (2). They suggest that if there is a significant association between decline in PIQ and age of onset, then there should also be a significant difference for change in PIQ between participants with T1D and HCs. They also suggest that the association between decline in PIQ and younger age of T1D onset might be attributed to known age-related changes in IQ from adolescence to adulthood or other factors, such as the researcher conducting the tests or the emotional and physical state of participants. We address each of these concerns in turn.

Shan and Ji suggest that if there is a significant association between PIQ and younger age of T1D onset, then participants with T1D should have significantly lower PIQ scores than HCs. This is not necessarily true. The reduced performance of a subset of individuals with T1D will not always be reflected in overall group differences between T1D and HC.

Next, Shan and Ji suggest that the discrepancy between the findings may be the result of known age-related changes in IQ from adolescence to adulthood. We do not agree with this statement for a number of reasons. First, the association between lower PIQ and early-onset T1D is robust. It has been shown in a meta-analytic review (3) and replicated in studies conducted after this meta-analysis (4,5). Second, their statement is supported by the citation of an article by Alan Kaufman (6). This article refers to declines in PIQ that occur at approximately 45 years of age, which is older than our T1D cohort (mean age of 21.28 years; SD 3.80; range 14–28 years). Moreover, data in the article by Kaufman (6) show that PIQ remains very stable across the age ranges of 16–17, 18–19, 20–24, 25–29, and 30–34 years. Third, if indeed such an effect did exist, our analytic approach would have controlled for it. To account for the fact that participants with T1D onset younger than age 7 were assessed on the Wechsler Preschool and Primary Scale of Intelligence-Revised, we created a test-standardized change in the PIQ score for each participant with T1D, which was essentially a score that adjusted for the change in PIQ experienced by the younger HC participants in our cohort. This test-standardized score for PIQ was used as the dependent variable in regression analyses. This procedure controlled for the different tests used, but also adjusted for the age effect in PIQ to which Shan and Ji refer.

Finally, Shan and Ji suggest that the association between change in PIQ and an early age of T1D onset could be accounted for by the emotional and physical state of participants and different researchers who assessed participants' IQ at baseline and follow-up. This is certainly true, but there is no reason to believe that these factors would have differentially affected older and younger participants and thus cannot be used as an argument for the finding.

Given the points we argue here, we do not believe it is inappropriate to state that negative change from baseline until the 12-year follow-up indicates decline in PIQ.

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