Supplemental Material

Intellectual Function in Mexican Children Environmentally Exposed to Manganese Living in a Mining Area

Horacio Riojas-Rodríguez[1], Rodolfo Solís-Vivanco[2], Astrid Schilmann[1], Sergio Montes[3], Sandra Rodríguez[1], Camilo Ríos[3], Yaneth Rodríguez-Agudelo[2]

MATERIALS AND METHODS

Particulate matter ($PM_{2.5}$ and PM_{10}) measurements were performed at different sampling points in two regions: (Chiconcoac-Tolago exposed group, and four communities in Agua Blanca district, control group) in the period from March to June 2007. The control group was divided into 9 sampling points and the exposure group into 10. Daily (24 hours average) indoors and outdoors measurements of $PM_{2.5}$ and outdoors PM_{10} were conducted and repeated during one week at each sampling point. The monitors used were low-volume equipment (MiniVol samplers, Airmetrics LTD brand) with flows of 5 liters/min using 47 mm Teflon filters (Whatman, Hillsboro, OR, USA). The filters were analyzed to obtain the concentrations of Mn by particle induced x-ray emission technique (PIXE). The outdoor monitors were placed on the roof of the children´s houses and at a distance of at least one meter of any tree or fumes from wood stoves. The monitoring was carried out during one week at each dry and rainy season.

RESULTS

The 24 hour median of Mn from outdoor PM_{10} in the exposed communities was higher than in the control communities (0.13 vs 0.02 $\mu g/m^3$, respectively). The highest and lowest levels found in the exposed communities were 2.2 and 0.01 $\mu g/m^3$, respectively (unpublished results). The exposed community had higher mean concentration of Mn from indoor and outdoor $PM_{2.5}$ (0.09 vs 0.02 indoors; 0.12 vs 0.04 $\mu g/m^3$ outdoors). The Mn outdoor levels were higher than indoor levels in both communities.(Lugo et al. 2008)

REFERENCES

Lugo MC, Dosal SR, Rosas I, Ruelas RS, Rodriguez HR. 2008. Air Manganese and PM2.5 Concentrations in Two Rural Communities of Hidalgo, Mexico. Epidemiology 19(6): S239.

Supplemental Material, Figure 1

Figure 1A. Blood Mn (µg/L) levels by group of exposure

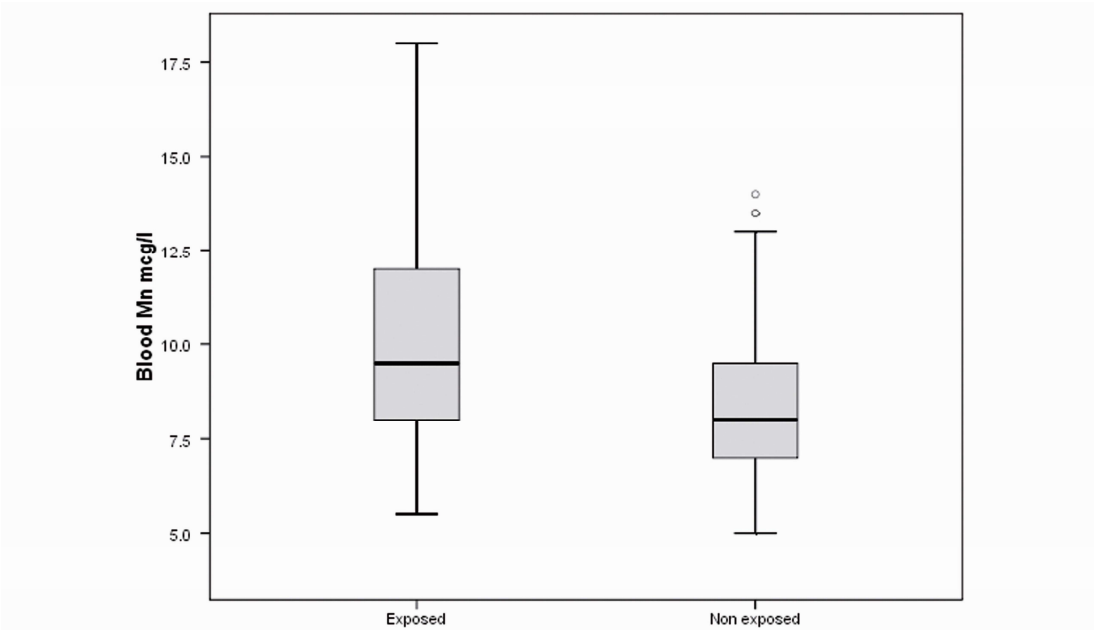
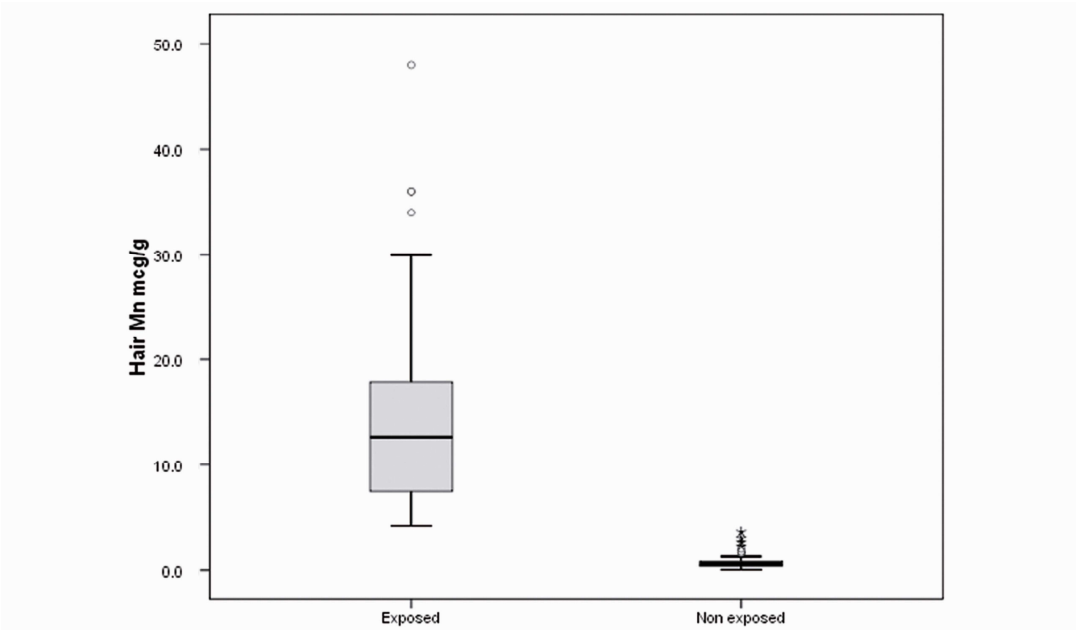


Figure 1B. Hair Mn (µg/g) levels by group of exposure



Supplemental Material, Figure 2

Modification by age and gender of the association between Mn exposure and verbal IQ

Figure 2A. Association between MnH and verbal IQ by age for girls

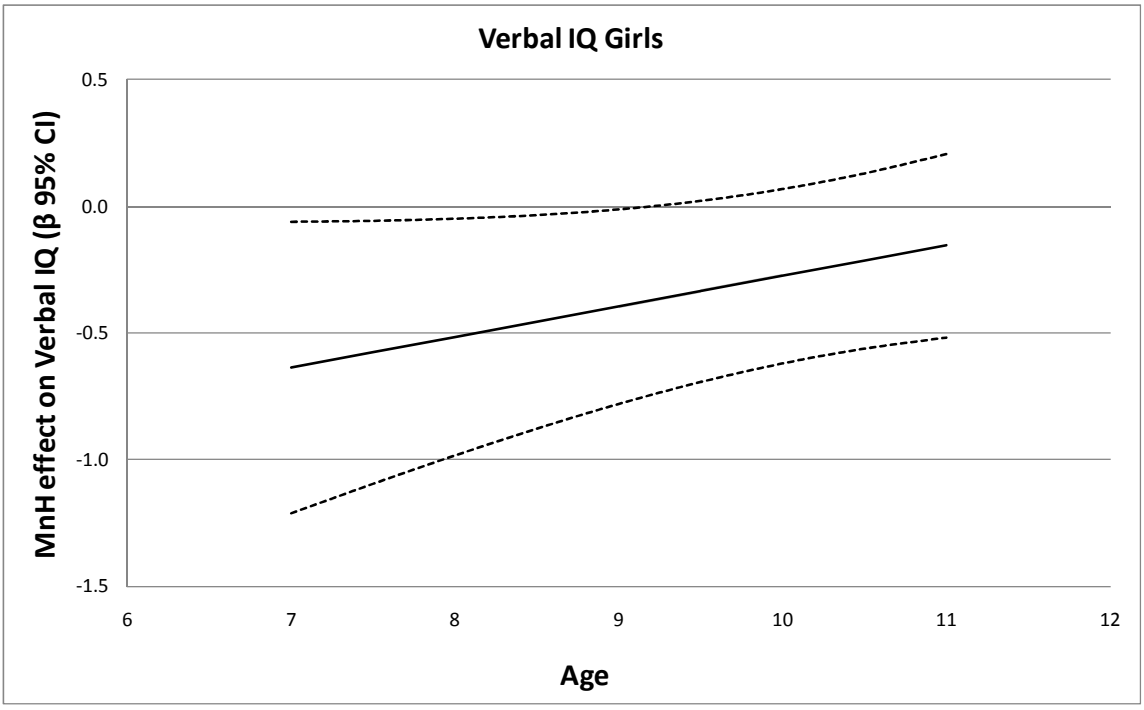


Figure 2B. Association between MnH and verbal IQ by age for boys

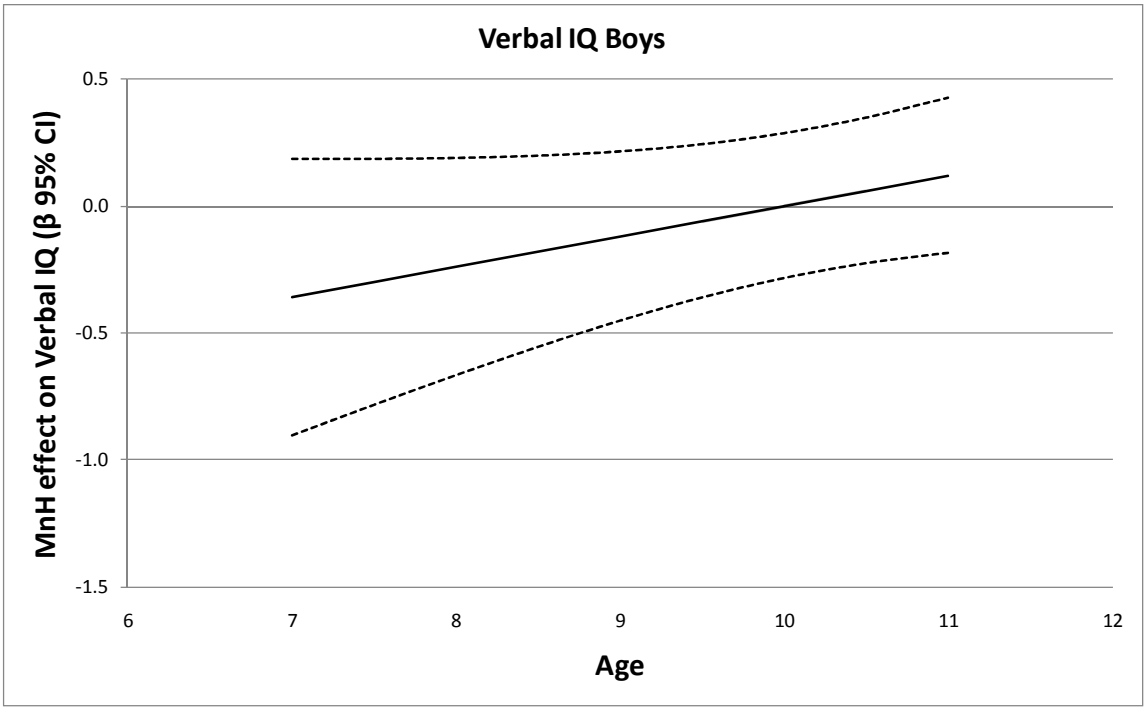
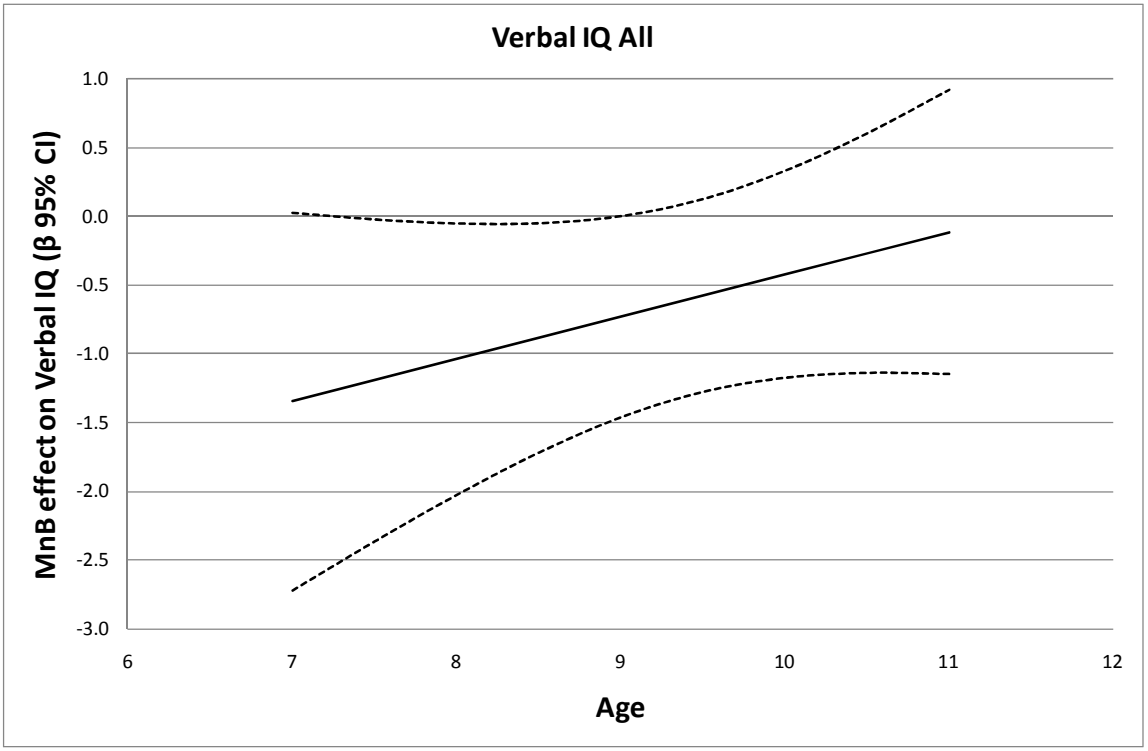


Figure 2C. Association between MnB and verbal IQ by age for all



Supplemental Material, Figure 3

Modification by age and gender of the association between Mn exposure and performance IQ

Figure 3A. Association between MnH and performance IQ by age for girls

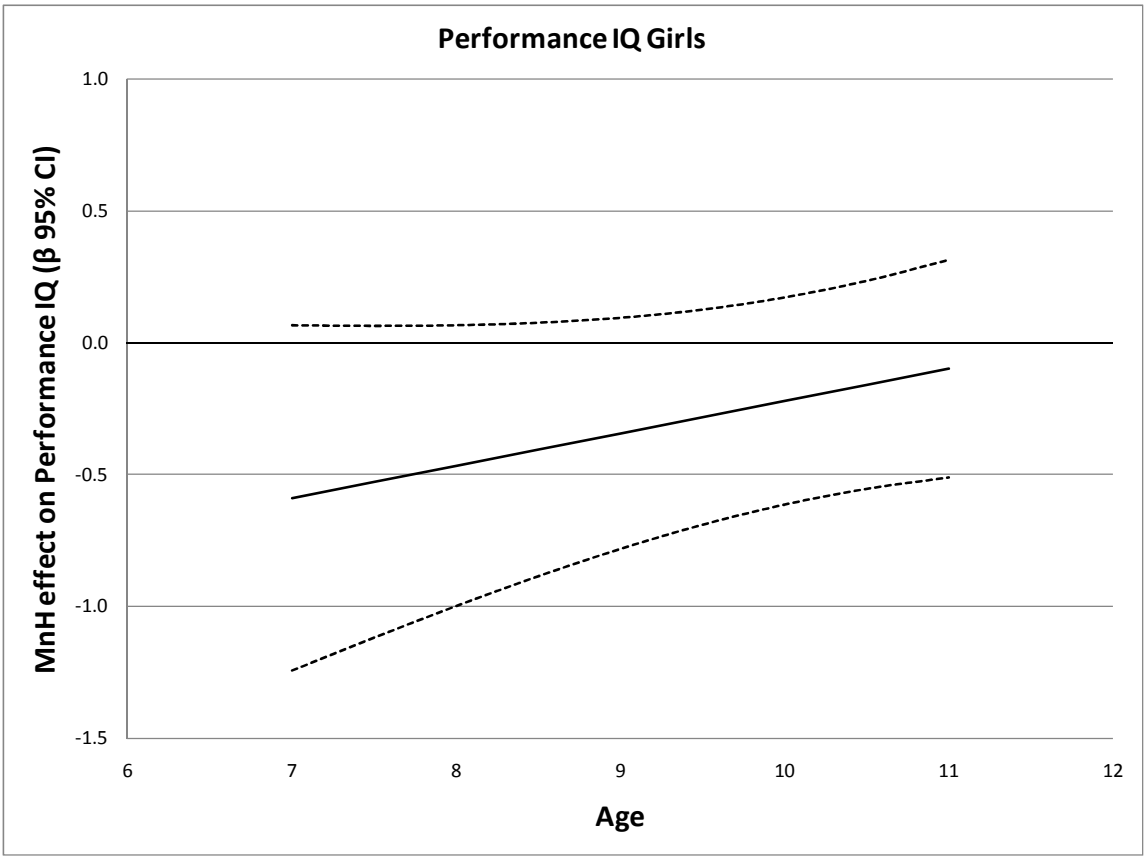


Figure 3B. Association between MnH and performance IQ by age for boys

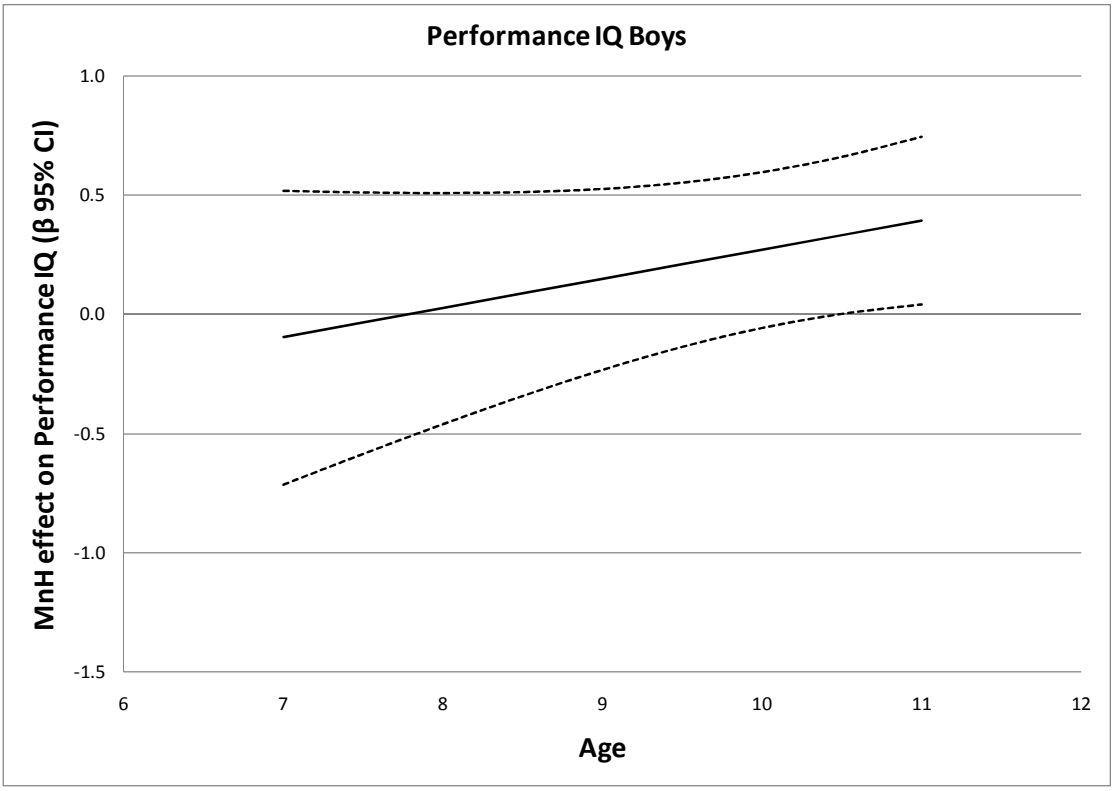


Figure 3C. Association between MnB and performance IQ by age for all