**Supplement file 1.** The first differencing method to examine the association of changes in individual student perception of school social capital on change in smoking behaviors

The following equation was derived:

where *ΔSmoking it* refers to the change in the smoking status between Wave 1 and 3; *ΔSSCit* refers to the change in individual perceptions of school social capital between Wave 1 and 3; and *ΔΧit* refers to the change in time-varying characteristics between Wave 1 and 3, which include the SES composite index, parental marital status, plans to attend college, friends’ smoking status, family connectedness, parental oversight, and neighborhood social exchange and neighborhood informal social control. *Δεit* refers to the change in error term between Wave 1 and 3. This model controls for time-invariant differences in addition to state-specific effects.