THE STANDARD ERROR OF A "SOCIAL FORCE"

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I. Definitions

In the theory of measurement of social forces certain special cases of frequent occurrence where the population shifts from one date of measurement to the next require the derivation of appropriate standard error formulae.

The theory may be briefly restated[1] in equations as follows: any measurable social change, C, in a population, P, may be defined as the difference in mean scores, S, from surveys or measurements on the dates denoted by subscripts

$$C_{2-1} = S_2 - S_1 = \frac{\Sigma s_2}{P} - \frac{\Sigma s_1}{P} \tag{1}$$

The momentum of a social change may be defined as the product of its time rate in years and the population that is being changed

$$M_{2-1} = PV_{2-1} \tag{2}$$

$$= \frac{PC_{2-1}}{Y_{2-1}} = \frac{P}{Y_{2-1}}(S_2 - S_1) \tag{2a}$$

where Y_{2-1} is the period from date 1 to date 2 and V is the velocity, or speed of change, in that period. The acceleration of a social change is definable as the rate of change of the velocity of change

$$A^{\cdot} = \frac{V_{4-3} - V_{2-1}}{.5Y_{(4-3-2+1)}} \tag{3}$$

where each velocity, being an average for its period, is taken as representing the mid-date of that period.

The resultant social force which produces a measured change is now definable as that which accelerates the change in a population. It is/measurable as the product of the acceleration and the population.[2]

$$F = AP \tag{4}$$

$$= \frac{P}{.5Y_{(4-3-2+1)}}\left(\frac{S_1}{Y_{2-1}} - \frac{S_2}{Y_{2-1}} - \frac{S_3}{Y_{4-3}} + \frac{S_4}{Y_{4-3}}\right) \tag{5}$$

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[1] *A Controlled Experiment on Rural Hygiene in Syria*, Dodd, S. C., Publications of the American University of Beirut, Syria, Social Science Series No. 7, 1934, pp. 336.

Also, *A Theory for the Measurement of Some Social Forces*, Dodd, S. C., Scientific Monthly, Vol. XLIII, No. 1, July 1936, pp. 58–62

[2] Force thus defined in terms of its effect is a resultant force, i.e., the residual force after deducting all resisting forces from the total force in the direction of the change observed. This formula defines quantitatively and exactly the "net" force not the "gross" force