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Dear Sir:

Haitovsky [2] proved that the $\bar{R}^2$ can be increased by discarding a variable whose t value is smaller than unity. He further suggested sequential deletion of the independent variables whose associated t statistics are smaller than unity for maximizing $\bar{R}^2$. This procedure is necessary but not sufficient for maximizing $\bar{R}^2$. The following numerical example demonstrates that when more than one variable is discarded, $\bar{R}^2$ can be increased even though the t values corresponding to these variables are larger than unity. As shown by Edwards [1] the necessary and sufficient condition is the relevant F value.

The data corresponds to 22 observations and the correlation matrix of all the variables is:

	x_1	x_2	x_3	x_4
y	.3418	.7430	.5826	−.8258
x_1		.7982	.1971	−.4206
x_2			.3674	−.8443
x_3				−.3337

The two regression equations fitted to the above data are:

$$y = -0.60\,x_1 + 0.89\,x_2 + 0\,23\,x_3 - 0.29\,x_4$$
$$[-1.30] \quad [1.31] \quad [2.62] \quad [-1.02]$$
$$\bar{R}^2 = 0.7631 \quad (1)$$

$$y = 0.26\,x_3 - 0.62\,x_4 \qquad \bar{R}^2 = 0.7658 \quad (2)$$
$$[3.08] \quad [-6.34]$$

The figures in the parentheses are the t values. Haitovsky's procedure would lead to the conclusion that in equation (1) $\bar{R}^2$ cannot be increased by deleting any of the variables. By deleting variables x_1 and x_2 we obtained higher $\bar{R}^2$ in equation (2).

Sincerely

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REFERENCES

[1] Edwards, J. B., "The Relation between the F-test and $\bar{R}^2$," *The American Statistician*, Vol. 23, No. 5, (December, 1969), p. 28.

[2] Haitovsky, Y., "A Note on the Maximization of $\bar{R}^2$," *The American Statistician*, Vol. 23, No. 1, (February, 1969), pp. 20–21.