Altering Salary Orderings: The Effect of Consecutive Allocations

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A major task in today's schools is to help students acquire number and data sense. This is best done by composing and analyzing meaningful examples. Examples using money are particularly interesting to students and teachers.

Phyllis, an office supervisor, is partially responsible for setting the salaries of 10 subordinates. Phyllis's supervisor, Nan, wishes to play a part in this salary determination; however, Nan indicates that the primary responsibility rests with Phyllis. To accomplish this, Nan assigns $200,000 for Phyllis to divide among the 10 employees. Nan then reserves an additional $100,000 that she will allocate after Phyllis's task is completed.

Since two-thirds of the money is allocated by Phyllis and only one-third by Nan, one might conclude that Phyllis is making the primary determination of salary levels. If Phyllis and Nan are in basic agreement concerning salary levels, it is not important which of them makes the salary allocations. But, what if they disagree?

A matter of great concern to the 10 employees will likely be the ordering of their salaries. Each will be very interested in knowing whether his or her salary ranks near the top or the bottom of the list. What effect can Nan's $100,000 have on the ranking determined by Phyllis's $200,000?

Suppose that Phyllis determines salaries as in Table 1. Although the salaries are fairly close together, there is a clear ranking of the employees.

Now suppose that Nan allocates her $100,000 as in Table 2.

Table 1

Employee	Phyllis's Salary Allocations
A	$22,500
B	$22,000
C	$21,500
D	$21,000
E	$20,500
F	$19,500
G	$19,000
H	$18,500
I	$18,000
J	$17,500

Table 2

Employee	Nan's Salary Allocations
A	$0
B	$2,000
C	$4,000
D	$6,000
E	$8,000
F	$12,000
G	$14,000
H	$16,000
I	$18,000
J	$20,000

Table 3

Employee	Phyllis's Allocation	Nan's Allocation	Total Salary
A	$22,500	$0	$22,500
B	$22,000	$2,000	$24,000
C	$21,500	$4,000	$25,500
D	$21,000	$6,000	$27,000
E	$20,500	$8,000	$28,500
F	$19,500	$12,000	$31,500
G	$19,000	$14,000	$33,000
H	$18,500	$16,000	$34,500
I	$18,000	$18,000	$36,000
J	$17,500	$20,000	$37,500

Clearly, Nan evaluated the employees differently than Phyllis. Nan allocated only one-half the amount that Phyllis did. Will this smaller allocation have a large effect on the final salary?

Table 3 indicates the striking effect of Nan's smaller salary allocations.

Nan's allocations affected the salaries in the following ways:

1. The ordering of the total salaries is completely reversed from Phyllis's original allocations.
2. The difference between consecutive total salaries is actually larger than it was after Phyllis's original allocation. Not only was Nan able to reverse the order that Phyllis preferred but she also dramatically increased the salary "spread" in this reversed order.

Nan's smaller total had a much greater effect than did Phyllis's much larger amount. In practice, Phyllis used her money to establish minimal acceptable salaries with modest variations. Nan had the luxury of allocating money based on "merit" alone; consequently, Nan's judgments are more visible.

Do you know of any organization in which salaries are determined in this way?