

“Struck by Lightning” Supplementary Materials

Group exercise about the game “Smallsum”.

1. To begin, assign one group member to be Player A, and another to be Player B. The third group member is the dealer/referee/observer.
 2. Give 8 pennies to each player, and repeatedly play the game Smallsum (described below) until one player has won all of the other player’s pennies (or, if it takes too long, you can mutually agree to stop earlier).
 3. Repeat step 2 several times, rotating who is Player A and who is Player B, and keeping track of who wins each time.
 4. As a group, try to figure out the optimal STRATEGY for how to maximise your probability of winning at Smallsum.
 5. When you are done with the above, then consider the variation Smallsum Choice (described below). Again, play the game several times, keeping track of who wins each time. Then, as a group, try to figure out the optimal strategy.
 6. When you are done with the above, then consider the variation Smallsum Alternate (described below). Again, play the game several times, keeping track of who wins each time. Then, as a group, try to figure out the optimal strategy.
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Rules for the game “Smallsum”.

The game Smallsum is played with 13 playing cards, all of the same suit. Each round proceeds as follows:

1. The 13 cards are shuffled.
2. Each player is dealt two face-up cards and one face-down card. [Note: A face-down card is one that the player holds in their hand so they can see it but no one else can. A face-up card is one that sits in front of the player, which is not shared, but which can be seen by everyone.]
3. Simultaneously, each player puts a fist on the table, with either one or zero pennies secretly hidden in it.
4. The fists are then opened, and any pennies inside the fists are put in the pot (i.e., in the middle of the table).
5. Each player must then MATCH their opponent’s bet, as follows. If your opponent had a penny in their fist, then you must MATCH them by adding another penny to the pot yourself. [Note: you must match your opponent’s bet WHETHER OR NOT you already put in a penny in your own fist.] The one exception is, if a player is out of money and

does not HAVE a penny to use to match their opponent's bet, then their opponent shall instead REMOVE the penny that they just added.

6. The face-down cards are then shown to everyone. Each player counts the sum of the values of their three cards (where Ace counts as 1, and Jacks and Queens and Kings each count as 10, and all other cards count as the number written on the card).

7. Finally, all pennies in the pot are given to whichever of the two players has the SMALLER sum. [If the sum is exactly TIED, then the pot is divided evenly.]

Rules for the game “Smallsum Choice”.

This game is just like Smallsum, except that the number of pennies each player puts in their fist can be zero or one or two or three (but they cannot put in more pennies than they have). The other player must then match ALL of these pennies. As before, you must match your opponent's entire bet REGARDLESS of how many pennies (if any) you had already put in your own fist. As before, the one exception is that if you run out of pennies, then you only have to match as many pennies as you have, and the other player shall remove any pennies that cannot be matched.

Rules for the game “Smallsum Alternate”.

This game is just like Smallsum Choice, except that (a) At the beginning of the each game (before the cards are dealt), each player puts one penny (called the “ante”) into the pot; and (b) the steps 3–5 involving fists and matchings are instead replaced by the following steps:

3'. Player A first puts zero or one or two or three pennies into the pot. Player B then chooses EITHER to match those pennies, OR to “fold” (in which case Player B does not need to match any of the pennies, but Player A gets all the pennies which are in the pot so far, and the current game ends at that point). The usual exception is still in force, i.e. you only have to match as many pennies as you can, so you never have to fold just because you are out of pennies, and any unmatched pennies are immediately removed from the pot.

4'. The previous step is then repeated with Player A and Player B interchanged (i.e., Player B puts zero or one or two or three pennies into the pot, and Player A then chooses either to match those pennies or to fold).

The rest of the game is the same as in the original Smallsum game.

Note: Each game consists of only one round of betting (as in steps 3' and 4' above), i.e. even if both Player A and Player B choose to put in several pennies in the above steps, the betting still does not continue after that.