What Should the Next National Game Do?

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When asked whether they bought a lottery ticket within the past year, about half of survey respondents nationwide answer "yes." There is some variation across the country, and the number answering "yes" can peak around 75% after a particularly large and well-publicized jackpot in Mega Millions or Powerball. The first jackpot to approach (and eventually exceed) $1 billion brought unprecedented media attention in January of 2016. Despite the bonanza in free advertising (and the brief celebrity of lottery directors), surveys after the event revealed that all but about 5% of people who bought a ticket during that run had also been on board for earlier jackpots of no more than half that size. The success of lotteries in that event came not so much from gaining new players, as from inciting players to spend more.

Getting significant increases in yield from multistate games will depend on getting people who already play at least sometimes, to play more often and to spend more per play. Our current games exploit the excitement of a jackpot reaching a new record high to gain episodes of accelerated spending. This can be fun, but this excitement is ever harder to come by, and the spending episodes tend to weaken with repetition. An alternative would be to strive for steady spending supported by properties of the game that are consistently, reliably present.

What are the properties of a game that support steady spending? I suggest that there are a few that are essential:

- The top prize must be worth playing for;
- The top prize must be known to be winnable; and
- The actual experience of playing the game must entertain.

These properties are not equally important to everyone. For people who are absolutely regular players of Powerball or Mega Millions regardless of the roll, the first two, and the satisfaction of being "in the running" for a big prize, offset the sparse winning experience provided. The fact that the cost of play is low makes it easy to play. Steady spending from these players is what allows the jackpot in Mega Millions and Powerball to grow.

As the jackpot grows, a jackpot that is "big enough" eventually brings in players who are fairly sure they will lose their wager. The barrier to getting these players is not the cost of the wager, but the departure from routine – making the exception to interact with a clerk or a machine to actually buy a ticket. Once in the queue or in front of the self-service, they may spend well beyond the minimum needed to be "in the big game." If the luck of the draw allows, spending may accelerate to deliver the memorable big jackpots that are the signature of these games. Other, in-state draw games typically show a lift in sales when the multistate games peak. This further suggests that it is not the money cost, but the time and attention cost, that keeps these valuable players away from the big games most of the time.

If the top prize has grown to be "big enough," what makes people think that the top prize is winnable? I suggest that they simply remember hearing or seeing something about a win. The actual number of top prize wins provided by a game may not be important. Powerball and Mega Millions provide only a few wins per year, but most people can remember hearing about someone winning. Not all wins are equally memorable. The wins that are most accessible to memory, and that consequently provide the

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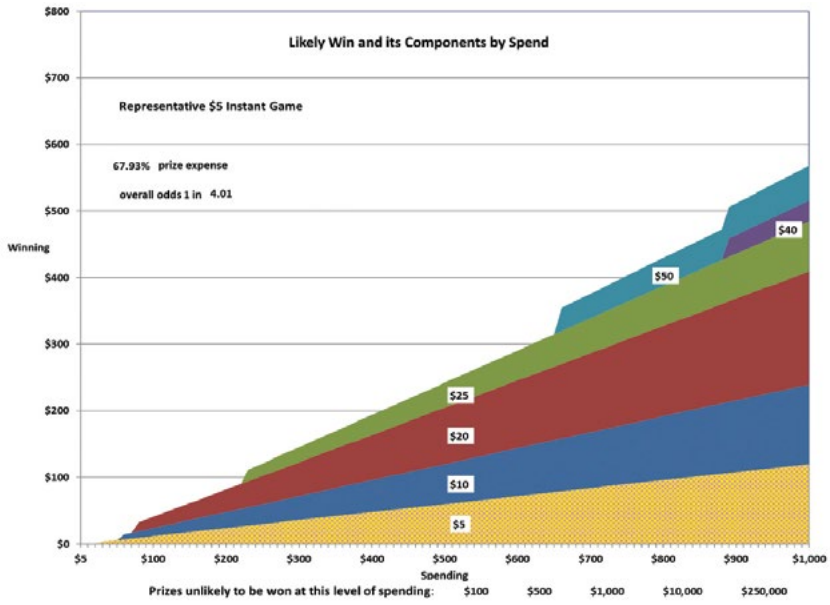
best "proof," are the wins with a story. When a workplace pool wins, that is a story. When someone wins on the only ticket they ever bought, that is a story. Sometimes a picture suggests the story – does that winner remind you of someone you know? The absolute size of the jackpot is less memorable than its relatable human connections. The low probability of winning is an abstract concept; the story of the win becomes a fact.

If we wish to explore the potential for increasing steady revenue from national-scale games, we must understand which obstacles most limit our success. I suggest that the money is there, and that effective storytelling can amplify the effect of even a small number of wins. But really big jackpots are by definition rare: When $100 million became commonplace, it was not big anymore. There is a big opportunity in providing entertainment for a steady player, beyond daydreams about an incomprehensibly big prize. What we want is engagement that is steady, not episodic.

The Engaged Player

Within the lottery portfolio, we already have games that excel at sustaining steady engagement. Instant games teach us that while the size of the top prize can be an important motivator, the odds of winning the top prize have almost no effect on sustaining play. What sustains play in instant games is the actual winning experience. I have been particularly interested to understand how the size and frequency of wins keeps players engaged. What do players of a popular $5 scratch game actually win, most of the time?

We need to understand how "what I am likely to win" relates to "how hard I play." Every ticket has a statement about the likelihood of winning any prize, like "Overall odds are 1 in 4." From this it is easy to understand that if we buy only one ticket, it is more likely to be a non-winner than a winner. If 100 people each bought one ticket, we would expect that about 25 of them would win something. In just the same way, if one player bought 100 tickets, we would expect that about 25 of these would win some prize. Whether that player goes on to buy a next ticket surely depends upon the entertainment provided by those (roughly) 25 wins. If all of them were break-even prizes, our player would not likely be keen to buy another.



Intuitively, we understand that in order to sustain play, some of the wins need to be "big enough." Likewise, intuitively, we understand that as game designers we need to think about "just big enough." After all, the lottery needs to make money for good causes. Effective game design is a very quantitative art.

Like many quantitative subjects, this one is easier to understand by using visual tools. The chart above is a visual tool that represents how greater spending by a player makes winning particular prize levels more likely. Every prize level defined in a particular instant game is represented in the chart ($5, $10, $20, etc.), or in the list below the horizontal axis. Only those that are more likely than not to be won at a represented level of spending appear in the body of the chart. The body of the chart answers the question, "What is the winning experience that sustains engagement of players?" Further, the chart shows both "What are the parts (prize levels) of this experience?" and "What do the parts add up to?" – the overall rate of return for the player, or RTP.

The chart uses colored wedges that begin (going left to right) at the amount of spending where the corresponding prize is more likely than not to be won. The thickness of the wedge increases to represent the likely RTP from this particular prize level, over all players spending this amount of money. As spending increases, multiple prize levels are represented by wedges;

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their combined thickness adds up to the likely overall RTP. The overall RTP is read on the vertical axis.

This particular chart represents a $5 scratch game, similar to hundreds that sell briskly every week across North America. It's just typical of the type, and of course within this big and successful category of instant games, there are many variants. But, after looking at hundreds of these, I am comfortable making some generalizations, in particular regarding overall RTP and its components:

1) Among the first 100 tickets, wins of anywhere between four times and 10 times the wager are likely, and these comprise a big share of the overall RTP.
2) The overall RTP reaches about 50% within the first 100 tickets.
3) A player who buys 300 tickets is likely to experience every prize level the game will show him, even if he goes on to buy 1,000 tickets.

Just by way of contrast, a similar chart prepared for Powerball would show, for $1,000 spent, a likely RTP of 9% and no prize larger than $7. But of course, the overall RTP of Powerball is by design about 50%, with the rest going to the complement of RTP, gross gaming revenue (GGR). If the experience from scratch games suggests that 50% RTP is the price of sustained engagement, does this mean that a national game that engages players steadily, regardless of a rolling jackpot, must give up 50% RTP even before considering the funding of top prizes?

I suggest that this is exactly what we should plan for. The instant category has become increasingly important for lotteries, because the engaged player sustains a frequency of play that overcomes the thinner GGR margin of instant games. Lower margin with higher volume has been a path to success.

But in Powerball and Mega Millions, funding the top prize alone consumes more than 30% of revenue. Clearly, the top prize in a high-volume national game must be funded at lower cost than this. Again, instant game prize structures show that top prizes big enough to incite play do not need to cost more than 5% of revenue. Instant game top prizes do not need to grow, and they do not have to be offered at particularly good odds. They just need to be big enough to be attractive. And, as with any top prize, memorability (more than accounting) provides "proof" of winnability.

So, as a common sense player, will I approach the game in the same way next week, knowing that someone in my state won the big prize this week?

Next National Game

Nevertheless, I do not suggest that a printed instant game is the best "next thing" for a national-scale lottery game. This is largely because the printed instant game is in effect a perishable product, and its logistical problems become daunting with increased scale.

Printing an instant game makes prize liability a fact, rather than a probability. Only a certain small number of top prize tickets can be printed. Once they are all consumed, most lotteries are required by rule to withdraw all remaining tickets from the market. Withdrawing printed tickets from the market can be a logistic hardship. Failing to sell lots of tickets can have a negative impact on the GGR of the game – after all, the top prize consumes the intended share of revenue only if essentially all the tickets are sold.

To reduce the risk of this outcome, the manufacturing process distributes the top prizes in a manner less than random. That is, if we think of the game as having, for example, 100 million consecutively numbered tickets, ten of which are top prizes, we can be pretty confident that there will be a top prize somewhere in the last 10 million tickets. The precise location of any top prize is unknown, but on the other hand finding one of those top prizes certainly decreases our expectation that its close neighbors have the same value.

This is a fact known to many lottery insiders. It is also a universal expectation among players, simply on the basis of common sense rather than insider knowledge. So, as a common sense player, will I approach the game in the same way next week, knowing that someone in my state won the big prize this week? If the common sense players decline to buy tickets that they think have no chance of winning big, this creates both a logistic problem (withdrawing all those printed tickets from the market) and a financial problem (the game falls short of its target GGR if all the big wins are claimed, with lots of other tickets outstanding, when the game closes).

Further, if a printed game with 10 top prizes is being shipped to 40 states, some states are sure to have no top prizes. Is there some way to make all participating states feel that they are presenting the same value to their players? Should every state receive "slices" from all parts of a run of 100 million tickets? These are problems that are very likely arise when considering multistate scratch games on a grand scale.

An electronic instant game, as compared to a printed game, may avoid these logistical problems. However, in the short term, only a few jurisdictions would be able to legally join a consortium for such a game.

In a draw game, on the other hand, the top prize is always there. It follows a truly random distribution and cannot be depleted. The likelihood of awarding the top prize varies, as the volume of play in the particular drawing varies, in a non-linear but calculable way. The

drawings are independent events. The implication is that awarding a top prize in tonight's drawing has no effect on the likelihood of awarding a prize in tomorrow night's drawing.

A game where the outcomes are revealed for every player in a scheduled drawing also has the potential to briefly draw the attention of a huge audience nationwide. This flicker of synchronized attention should be valuable to a creative marketer.

For these reasons, I suggest that it is worthwhile to think about a national-scale draw game that delivers an instant-like winning experience, through frequent play at a premium price. Let's say daily, at $5 per play.

A daily national game is not a goal in itself, it is a way to reach the goal of providing more revenue for the lotteries' beneficiaries. How big might the opportunity be? We can get some idea of scale by comparing to the current reality of Mega Millions and Powerball. If we can get people to play a new game daily, i.e. every day rather than twice per week, we could increase revenue by factor 7/4, or 1.75 times the current level. If we could make their play worth $5 rather than $2, we could increase revenue by 5/2, or 2.5 times. If we could do both at once, we could gain 1.75 *2.5 = 4.375 times the revenue we currently handle. Calculations like this prove nothing, of course. However, it may not be crazy to think that a new game, with double the revenue of our current multistate games, is possible.

In Powerball and Mega Millions, we might currently handle about $8 billion per year at 50% RTP, for GGR of $4 billion. If we can increase revenue by factor 2 (to keep the mental math easy) to $16 billion, we could earn the same GGR by retaining only one-quarter of the revenue. In other words, we could build for an RTP of 75% – right up there with the current spectrum of premium-priced instant games. We know how to build $5 prize structures that engage players to play every day – we are doing that right now, and further we are doing it with RTP considerably less than 75%. It may be possible to allocate funding so as to offer a very distinctive top prize in a new game.

Of course, any new game carries a risk of cannibalizing both our existing national games and single-jurisdiction games. This risk may be reduced by clear differentiation not only on price and play frequency, but on top prize value. There may be room for a game with a set top prize in the low tens of millions, for instance.

Is it even possible to design a draw game that would provide the values discussed here? After all, the algorithm that distributes prizes over play outcomes in instant games can be as complicated as may be needed. It need not be explained to anyone outside a very small circle of experts in the house that manufactures the product. Draw game rules, on the other hand, need to be simple.

This article does not begin to suggest how to build such a game. Rather, it suggests a set of properties that might qualify a game for serious consideration as the best "next thing." If you can explain a draw game structure that provides these properties, you deserve our close attention!