

THE SLOWLY EXPANDING TERRITORY OF LOTTERY GAMES

IF IT'S A LOTTERY GAME, HOW NEW CAN IT BE?

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For those of us who work in the lottery business, anything we can legally sell might be a “lottery game,” and we might want to explore anything that is permitted for us. But in talking to players, it becomes clear that they know what a “lottery game” is. Mostly, it’s about matching numbers. Maybe the game designers can come up with something very different. If they do, then the marketers among us have the opportunity to create a new category in the minds of consumers. In this article, I explore some recent developments that challenge our established categories.

The lottery insider’s way of looking at games is where I start. In June of 2016, I wrote in this space about a system for thinking about the similarities and differences among the games being sold by lotteries in North America – that is, a system for classifying them. That classification is based on how a winning wager is identified. As in biology (my original field), the whole array of forms can be represented by a “tree” structure, whose multiple branches separate at decision points (nodes) based on the answers to key questions. To understand the position of a particular game in the whole array, we answer the key questions as we proceed from the common starting point.

I found that our lottery draw game tree has just three big branches, and a little one. I named the big branches by their most familiar fruit: Lotto, Numbers and Keno. The big branches all answered “yes” to the first key question: “Is the win determined by matching, or not matching, symbols chosen by the player and the lottery?” The little branch, corresponding to “no,” had no particularly

familiar lottery-game fruit when I first looked. However, I think it may develop in an interesting way.

For the games on the big branches, the simple description arising from my classification scheme tells us everything we need to know to understand the probability of every possible outcome of the game. This is not so for the games of the little branch, and this is why I think there is much potential for development there.

The first question that differentiates among the well-known games is: “Do the player and the lottery choose the same number of symbols?” For Keno, the answer is “no.” In Keno, the lottery chooses a greater number of symbols than the player. This fact in turn leads to the most important property of Keno – the frequent occurrence of outcomes with a middling number of matches. This allows Keno, uniquely among the familiar lottery draw games, to deliver a play experience with lots of low-level wins or near-wins. This sort of play experience supports more intense and prolonged engagement with the game, which is why Keno is most successful in its rapid-draw form.

The traditional form of Keno implemented in most North American lotteries involves a lottery choice (draw) of 20 numbers from a field of 80, while the player may choose (pick) as many as 10 numbers or as few as one. Fields of other sizes, and draws and picks of different sizes, can produce variations on the traditional game. In all these cases, all the symbols are drawn without replacement from a single field.

Given this understanding of Keno, describing a game as Keno 4/20/80,

where 4 is the size of the player pick, 20 is the size of the lottery draw, and 80 is the size of the field, tells someone who understands the math all that is needed to calculate the probabilities of the five possible outcomes, i.e. matching 0, 1, 2, 3 or 4 of the lottery’s drawn numbers. The same would be true for Keno 4/6/36, to specify a game that has some interesting properties, but has not been implemented anywhere so far as I know.

In 2016, I felt that the Keno branch was complete with this sort of specification. However, there is an add-on to daily numbers games that involves the lottery drawing more numbers than the player picks. I will return to this development after dealing with the remaining major branches, Lotto and Numbers.

THE LOTTO AND NUMBERS BRANCHES

The big branches called Lotto and Numbers are differentiated by the question: “Is more than one symbol chosen from any field?” Note that the “any” implies there may be multiple fields, each with a player pick and a lottery draw. In Lotto games, more than one symbol is chosen from some field. In fact, in the original form of Lotto, Lotto 6/49, all six numbers are chosen from a single field comprising numbers 1 through 49. The field is depleted as each number is chosen; there can be no duplicates. In Numbers games, only one symbol is chosen from each field.

If multiple symbols are involved, each is chosen from a separate field. This creates the possibility that symbols may repeat. The common Pick 3 game can be represented as Numbers 10, 10, 10, where the field size is all that needs to be specified; it is understood from the definition that both the player and the lottery choose one symbol from each field.

The original Lotto 6/49 specifies top-prize odds of about one in 14 million, and it has been used to play for top prizes upward of one million times the cost of the wager. Note that whether the top prize is set or rolling, and whether it is advertised as a lump sum of cash or as an annuity, it has no impact on the probability of winning it. Neither does the cost of the wager, unless it buys multiple “picks” for the player. All games that answer to the description Lotto 6/49 thus have fundamental similarities in the play experience they deliver.

Many variations of Lotto games have been developed. Many U.S. lotteries have a Lotto where five numbers are chosen from a single field, producing easier top prize odds that are suitable for more frequently paying a prize smaller than one million times the wager. Four-number Lotto is also played, for prizes of several thousand times the wager.

The biggest multi-state games are Lottos with two fields, with five numbers chosen from a big field and one number chosen from a smaller field. It is relatively easy to match a number from the smaller field, and doing so is defined as the lowest-level win. Consequently, a steady player will occasionally have a ticket that wins a prize, even while the odds of winning the top prize are around 300 million to one.

In principle, we could have Lotto games with more than two fields. Likewise, we could have Numbers games with a field size other than ten. For instance, I have proposed a “Rock, Paper, Scissors” game that is essentially a Numbers game with field size three, played over six rounds (Numbers 3, 3, 3, 3, 3, 3). The math of this game produces a fair number of near-wins, as in Keno.

NUMBERS EXTENSION

To return to the example of a daily numbers game add-on, most recently launched by the Texas Lottery as Fireball, in which the lottery draws one more number than the player picks; winning is

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still based on the match between the player’s pick and the lottery’s draw, but the lottery’s draw is now complicated. In the Pick 3 game, the extra draw number (Fireball, or similar names in other jurisdictions) can be substituted in each of the three draw positions, providing four different chances to win on a straight bet. The game is presented as an extra-cost option to the traditional Pick 3 game, and so the win in traditional Pick 3 style pays the same as always. A single win involving the Fireball is more likely and pays correspondingly less. If the player’s pick uses the same digit twice or three times, the possibility to construct two or three Fireball wins arises, with smaller likelihood. The prize table needed to describe all these outcomes is much more complicated than one that describes the base game. The Fireball option is also offered for the Daily 4 game, with corresponding intricacy.

The Fireball option could be understood as a new Numbers sub-branch in the Keno line. As such, it invites us to expand our thinking – for instance, why should the lottery draw only one extra number? Why should a win on the base game pay differently? If the mechanics of scoring become too unhandy, maybe players don’t care – after all, the ticket either validates

for a prize, or it doesn’t. We know that Numbers players on the whole prefer not to use quick-picks, but we don’t know how they would respond to more opportunities to win on their favorite numbers. And if the winning experience is very different, perhaps we could all agree that it is a different game.

The systematic notation described here is useful in discussions among lottery professionals studying variations on the familiar games. It is not useful for describing games to potential players. Telling players about lottery games is already a challenge, and it will become increasingly important as we innovate away from the old established games. If we introduce something truly different, is it wise to call it a “lottery game” at all? Although printed instant games account for most of the sales and about half of the profit across North American lotteries, many players identify the varieties of Lotto and Numbers as lottery games and scratch-off tickets as something else. The Massachusetts Lottery website embraces and applies these folk categories, and that may be more effective for communication than trying to teach a broader concept of “lottery game” including both draw and instant games. But innovations are arriving that will bend or break the folk categories.

ANOTHER VARIATION

An increasingly successful product that bends or breaks categories is the terminal-generated instant game. In this type of game, a dedicated lottery terminal (whether clerk-operated or self-service) communicates with a remote server that hosts a file of outcomes. The server distributes outcomes from the file to the requesting terminal, and to any number of similar terminals. The server manages the depletion or maintenance (as the case may be) of the file of outcomes. The terminal represents the result to the player by printing a ticket on lottery paper stock. The outcome can be revealed in a huge number of ways. Some of these printed reveals are like those used on scratch tickets, some resemble spinning-reel slot machines, some resemble Bingo, and some even resemble Lotto draws.

In terms of the folk categories, this looks like a “lottery” (draw) game because it is printed on the same paper by the same printer. What gets printed

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may look more like a scratch game, or like something else altogether. Maybe most salient is that there is no waiting for a drawing. Calling it “Fast Play” or “Instaplay” consistently may result in players recognizing a third category of game, neither “lottery” nor “scratch.” This perception may be strengthened if the printed ticket has some flash and character of its own. Even though the ticket represents only a single outcome distributed in a chance way by the server, the reveal may include many lines of output, any of which may code for a prize of some value. The player may perceive that these are extra chances to win. It is probably immaterial whether players understand that there was only ever one chance involved, so long as the lottery avoids misleading by calling these ways, not chances, to win.

A potentially very significant innovation comes out of the effort to make the main lottery draw games easier to purchase in those multi-lane retail checkouts that many of us see every week. The drive to integrate lottery purchases into the retail point-of-sale (POS) process aims away from printers and paper whose sole purpose is to print lottery tickets. Among the solutions being tried is a printed paper scratch-off ticket that bears one or more player “picks” concealed beneath the latex. This item becomes a wager for the next drawing in the big game only when it is paid for and processed through the store’s usual POS. This approach has many advantages that I will not even try to list here, but consider: It’s a scratch ticket, for a lottery (draw) game. What do we call that, players?

THE SMALL BRANCH

Matching numbers is the key element of the folk category of lottery games, as well as the first question of my systematic classification. Where the answer to “Is the win determined by matching, or not matching, symbols chosen by the player and the lottery?” is “no,” we turn onto the small branch. Game innovations that move away from matching numbers thus have the opportunity to appear as something completely different. This may be advantageous in addressing audiences who would say, “My grandparents play lottery games, not me.” The familiar

game of Bingo is “sort of different” in that it uses matching of numbers, but with a card that defines a geometric relationship among the player’s numbers; scoring involves matching numbers in a straight line. Bingo is legally not a lottery draw game in most jurisdictions, though many instant games reveal the outcome of a wager in a Bingo format. A lottery draw game with a smaller geometric format, based on a 3x3 (Tic-Tac-Toe) grid, is sold in Oregon (Lucky Lines) and Connecticut (Lucky Links). Like Bingo, this game is “sort of different” in that while it requires the player’s picked numbers to match the lottery’s draw, the position of the player’s numbers on the 3x3 grid determines whether these matches define a win. The game pays increasing prizes for increasing numbers of straight lines, defined by the position of matching numbers. This game plays a minor role in the game portfolio in the states where it is sold.

It is possible to define draw games that provide the necessary elements of chance and a variety of outcomes, purely on the basis of arranging all of a small set of symbols in a geometric pattern. I recently described one simple game of this type, based on an arrangement of nine Scrabble tiles, in this space (January/February 2019). Others have shown that this sort of game has potential to support prizes as big as any currently offered in the world. Given the small set of symbols required, this may represent a pathway to get away not only from matching numbers, but from numbers altogether. No such games have yet been offered by lotteries, so far as I know. Would they be perceived as different from “lottery games like my grandparents played?” And would that be an advantage?

The visual appeal of well-merchandized scratch tickets has certainly helped deliver success to lotteries. The creation of “pattern” games may extend this success, especially if the patterns are equally suited to display on the small screen of a mobile device and on printed merchandise. It is conceivable that “make the pattern” games may some day be just as important as “match the numbers” games.

In summary, I think it is important that lottery professionals be aware of, but not particularly respectful of, the folk category of “lottery games.” We can offer more. If players call our new offerings something different, that is a win for us. ■