Optimized Baron and Mime Setup

Finding the optimal ratio of Barons to Mimes follows much like many Calculus I optimization problems. Let us establish our system of equations. The first will represent the constraint on the number of total Jokers we can hold. Letting b be the number of Barons and m be the number of Mimes, we have

$$b + m = \mathrm{J} \tag{1}$$

where J represents the number of Joker Slots available.

For the second equation, we have a few avenues of choice: total score, total mult, pre-evaluation mult, etc. Because the final score depends only on the number of x1.5 mult triggers - at least for these jokers - we can choose to set our second equation to the total number of triggers, $T(x, y)$. So, our second equation should look something like

$$T = (\#\text{ of Barons}) \times (\#\text{ number of Mimes} + 1) \times (\#\text{ of kings in hand})$$

Note that the second term includes a +1 to account for the initial trigger before the Mimes begin retriggering. Substituting in our earlier established variables and letting K be a constant for the number of kings in hand, we have

$$T(b, m) = b(m + 1)K \tag{2}$$

With our system of equations established, we can now find the b and m which maximize T, and therefore the number of Barons and Mimes to maximize our score. First, we can rearrange equation (1)

$$m = \mathrm{J} - b$$

to simplify equation (2) into an equation of one variable:

$$T(b) = b((\mathrm{J} - b) + 1)K = (-b^2 + (\mathrm{J} + 1)b)K \tag{3}$$

It is worth noting that this form of T is a downward-facing parabola, which has one maximum value (I mention this fact only to skip over some of the steps of the First Derivative Test). Taking the first derivative with respect to b gives

$$\frac{d}{db}T(b) = \frac{d}{db}\Big((-b^2 + (\mathrm{J} + 1)b)K\Big) = K(-2b + (\mathrm{J} + 1))$$

which we can set equal to zero and solve for b.

$$0 = K(-2b + (\mathrm{J} + 1))$$
$$b = \frac{\mathrm{J} + 1}{2}$$

Using our constraint, we can solve for m:

$$m = \mathrm{J} - \frac{\mathrm{J} + 1}{2} = \frac{\mathrm{J} - 1}{2}$$

Finally, with the optimized values of $b = \frac{\mathrm{J}+1}{2}$ and $m = \frac{\mathrm{J}-1}{2}$, we can make some conclusions about which of the two jokers to favor. When you have an odd number of joker slots, the optimal setup would be to have one more Baron than Mimes. For example, with $\mathrm{J} = 5$, $b = \frac{5+1}{2} = 3$ and $m = \frac{5-1}{2} = 2$. On the other hand, with an even number of joker slots there are two equivalent ratios: the same number of barons and mimes or two more barons than mimes. This result may seem initially surprising but is supported by the parabolic shape of equation (3).