1086-VO-595 **Virginia A Hogan*** (ginny5hogan@gmail.com), 1125 Fifth Avenue, New York, NY 10128, and **Steven J Miller**. *When Almost All Generalized Sumsets Are Difference Dominated.*

We expect a generic finite set of integers A to have a larger difference set (the set of all differences of elements in A) than sumset because addition is commutative and subtraction is not. In 2009, Hegarty and Miller proved that if elements of $\{0, \ldots, N\}$ are chosen independently to be in A with probability $p(N)$ tending to 0, then almost surely A has a larger difference set.

We generalize this to arbitrary combinations of sums and differences. Let h be a positive integer, and choose pairs of integers (s_i, d_i) with $s_i \geq d_i$ and $s_i + d_i = h$. Let each element of $\{0, \ldots, N\}$ be independently chosen to be in A with probability $p(N) = N^{-\delta}$. For $\delta \geq \frac{h-1}{h}$, the set $A_{s_i,d_i} = A + \cdots + A - A - \cdots - A$ (with s_i positive signs and d_i minus signs) with the larger d_i is larger almost surely. There is a phase transition in the behavior when δ passes from exceeding $\frac{h-1}{h}$ to equaling $\frac{h-1}{h}$.

We bound the number of times distinct $h_{(s,d)}$-tuples generate the same element. This allows us to discount the number of repeated elements in the generalized sumset. We use strong concentration techniques to deal with these obstructions, and from this our result follows. (Received September 08, 2012)