Appendix A: Statistical Analysis Details

The statistical significance of differences in risk-relevant event frequencies between the physical (PS) and immersive virtual (IVE) environments was calculated using **Fisher's Exact Test** (one-tailed) shown in Equation 1. This test was selected due to its appropriateness for analyzing 2x2 contingency tables with small sample sizes and expected frequencies. For each event, a 2x2 contingency table was constructed as follows:

	Event Count	Non-Event Count	Total
Virtual Group	a	b	(a+b)
Physical Group	c	d	(c+d)
Total	(a+c)	(b+d)	N

a, c = observed event counts in the IVE and PS groups, respectively.

b, d = are the "non-event" counts, derived from the total observation opportunities, or count of observed B,D or I, minus the event count for each group.

N= (a+b+c+d)

The total BDI counts were **1343** for the IVE group and **1158** for the PS group, based on the coding of the verbal and behavioral data. The p-value for each event was calculated as the sum of the probabilities of the observed table and all more extreme tables favoring the IVE group, under the null hypothesis of no difference between groups. Probabilities were computed using the hypergeometric probability formula:

$$P = \frac{(a+b)!\ (c+d)!\ (a+c)!\ (b+d)!}{a!\ b!\ c!\ d!\ N!}$$

Table 1 to 4 are the contingency tables used for Fisher's Exact Test calculations, showing each event frequencies against total observation opportunities ((a+b)=1343, (c+d)=1158).

	Failure Count	Non-Failure Count	Total
Virtual Group	27	1316	1343
Physical Group	47	1111	1158
Total	74	2427	2501

1.   - Failure Events (BDIB$_f$)

	Risk Amp. Count	Non-Risk Amp. Count	Total
Virtual Group	29	1314	1343
Physical Group	3	1155	1158
Total	32	2469	2501

2.   Risk Amplification Events (BDIB$_a$- or BB$_a$-)

	Reward Amp. Count	Non-Reward Amp. Count	Total
Virtual Group	11	1332	1343
Physical Group	0	1158	1158
Total	11	2490	2501

3.   Reward Amplification Events (BDIB$_a$+ or BB$_a$+)

	Impulsive Act. Count	Non-Imulsive Act. Count	Total
Virtual Group	49	1294	1343
Physical Group	31	1127	1158
Total	80	2421	2501

4.   Impulsive Action Chains ((BDI)^x)