Unpredictability in Physics & Friction Games

**Pocket Tanks**Unpredictability in Pocket Tanks is created through the firing mechanism for the tanks. Every time a player shoots, they must adjust the angle of the gun and then adjust the power of the shot. The range with which both of these numbers can be changed is quite large and changing one or both of these numbers by even one can change the outcome of the shot dramatically. There is a tool in game that you can use to judge how much you need to adjust the firing angle to hit a certain area, however doing so will use up on of your turns and shots.

Two adjustable values give players a fair bit of control over their shots but predicting the firing arcs of the projectiles are nigh impossible. Players are given a fair few shots though, so there can be (and often is) some trial and error while players get closer and closer to a value combination that hits close to or directly hits the enemy.

**Mario and Sonic at the Winter Olympic Games (Curling)**Unpredictability in this game is created in a few ways – the brushing, the shot power and the turning. When the stone is preparing to be thrown, the player throwing can see roughly where it will land with a few practice swings. When the stone is thrown, players can brush the ice to reduce the friction on the ice – making it smoother means the stone will glide further. This one is the big player here for unpredictability since whereas the shot power has a small bar that shows the shot’s predicted distance in relation to the length of the ice strip, the distance you can increase the shot power by has no indicators – all players know is that brushing more makes the stone go further. Sometimes you can sweep too much, sometimes you may not sweep enough and this is where the unpredictability factor plays out. Turning also has some unpredictability you need to turn the wii remote more to make the stone turn more while travelling along its path. However the movement for this is slower and less jerky, and thus is easier to control so more predictable than the brushing and throwing.

**Angry Birds**Unpredictability in Angry Birds emerges in much the same way as Pocket Tanks – through the firing mechanism. In much the same way as PT, players need to adjust the power and angle of each individual shot. Values for these aren’t just numerical inputs however. Due to the touch screen nature of smartphones, both are controlled by the slingshot. You pull it back further to fire the birds further and then pull it up or down to adjust the angle. Unpredictability is created through this method and also through the variety of birds. Different bird species have different weights, so the power and angle will have to be adjusted to hit the same spot with different birds. This makes a lot harder to nail the same spot several times in a row.

**Trials Evolution**Unpredictability doesn’t play a huge part in Trials, nonetheless there is still some present. It emerges from the combination of velocity and airtime of the bikes. Many of the levels in the game have gaps and jumps that need to be crossed. Players need to be going at least a certain speed before they can make the jump, otherwise they’ll fall into the pit. There may occasionally be objects in the air though or very short platforms players need to land on, so players can’t just full speed through the level. Plus players are awarded bonus points for chaining tricks (front/backflip etc.) into the airtime. Players need to try and figure out how much time they have in the air to judge how many tricks they can chain into the airtime. More tricks will give more points but landing a trick badly will kill the players and set them to spawn again a short distance back. As the game also awards points for times, getting time removed like this is a problem for players. Unpredictability also works itself in this way.

**WarioWare**One of the minigames displays a large foot and kart. Players need to hold down a button for a certain amount of time to charge the kick (longer = more power), and when they let go of the button the foot kicks out and the kart is sent speeding along the track. The idea of this minigame is that the kart needs to stop as close to the edge as possible but it’s competitive against another player. You can play it safe by doing a very low power push so you know you won’t go off the edge but you also won’t go very far, then just hoping the other player goes off the edge or goes less distance than you. You can also risk a very powerful push but risk going off the edge and insta-losing. You need to judge the power of the kick as best as possible as you only have a few seconds for the minigame. The levels aren’t just flat either. They comprise of ramps of various heights as well, so you often need quite a bit of power just to get over the first hurdle. The unpredictability arises from the judgement of the kick’s power in combination with the number and height of hills.

**Summary + Ideas for our Game**All of these games feature unpredictability in some manner. In all cases, players just playing the game can get a feel for the variables in question and get closer to what they think is accurate with continued practice, however it’s practically impossible to get to the point you can do all of them perfectly first time. The fact is, unpredictability will remain no matter how much practice is done and I feel as though that’s the key point. Experienced players may be able to have better educated guesses but that’s all they are - guesses. A new player being lucky may just win sometimes even though their level of skill is lower than the other player. Leaving a game like this entirely skill based will quickly get boring as the one with better reflexes or more practice would win 100% of the time. Other factors need to be in play to increase the unpredictability to a level that players can’t just know everything.

∙ *Have players adjust the angle of the ramp using W and Up arrow (for different players) to move the pan up and S and Down arrow (for different players) to adjust the pan’s angle. The round will start when each player has selected their angle and their egg will automatically start gliding down the pan. The pan will also quickly drop back to a flat position, so the egg needs to build up momentum quickly and then as the pan’s angle becomes smaller and smaller, be able to continue travelling down the pan to get as close to the centre as possible.*

**I’M REALLY STRUGGLING TO COME UP WITH IDEAS SO JUST TRY SOMETHING LIKE THIS FOR NOW.**