

Understanding Attacks, Bullets and Behaviors for PC and NPC

Helping you create new attacks and bullets, and invoking them using behaviors

By **Themyys** / Discord : themyys_0_0_

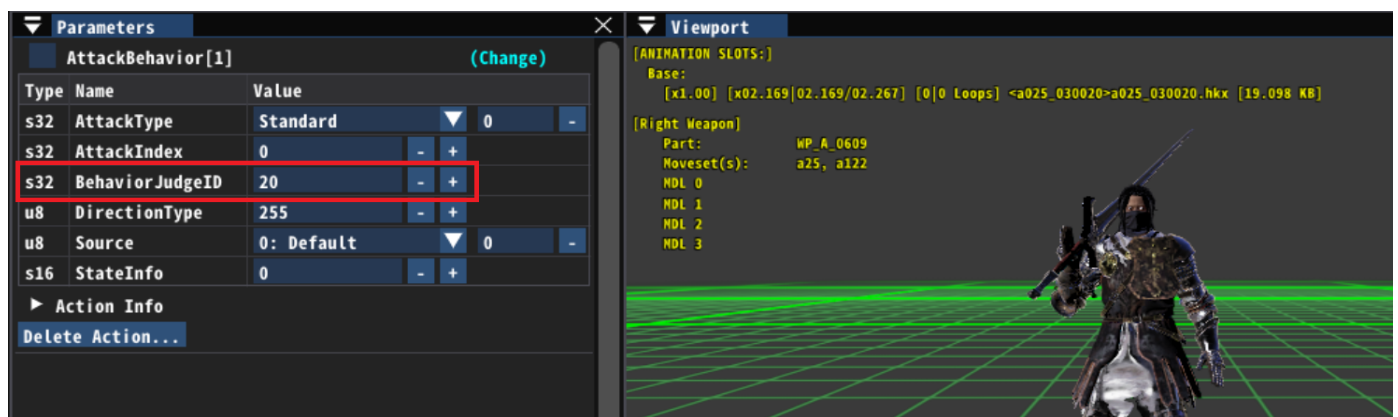
For this tutorial, I will assume you know how Mod Engine 2 works and you have your game unpacked with UXM (chr folder required)

Be sure to have unpacked your game with the [latest UXM](#) and on the latest Elden Ring Patch

If you are interested in Moveset modding, I recommend you check [my former tutorial](#), as I won't go into the very basics in this one

• General Hierarchy

In terms of Hierarchy, **Behaviors** are on top of the food chain, they are the one that are going to get referenced in the tae to actually perform the action. This is controlled by the **Behavior Judge ID** field in both **AttackBehavior** and **BulletBehavior** events in the tae, editable with [DsAnimStudio](#) or [Smithbox](#)'s tae editor

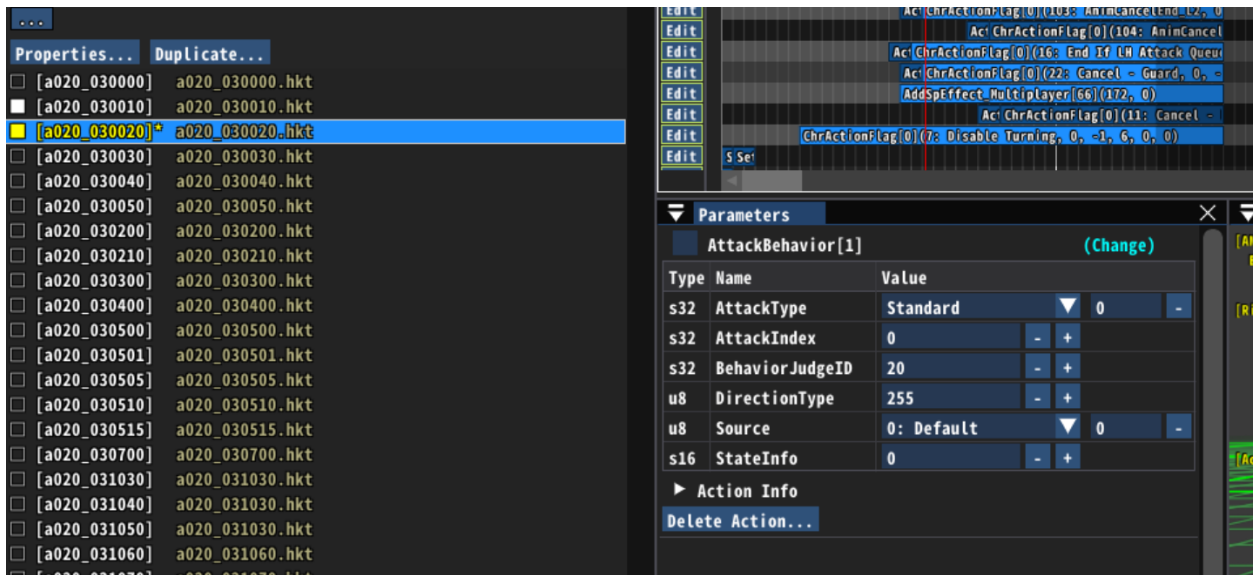


These **Behaviors** are linked to either an **Attack** or a **Bullet** in **BehaviorParam_PC** (In a Param editor like [Smithbox](#)). Then, even if the **BehaviorParam_PC** row references a **Bullet**, the bullet itself (from **Bullet** param) must also reference an **AtkParam_Pc**, since bullets are generally moving hitboxes.

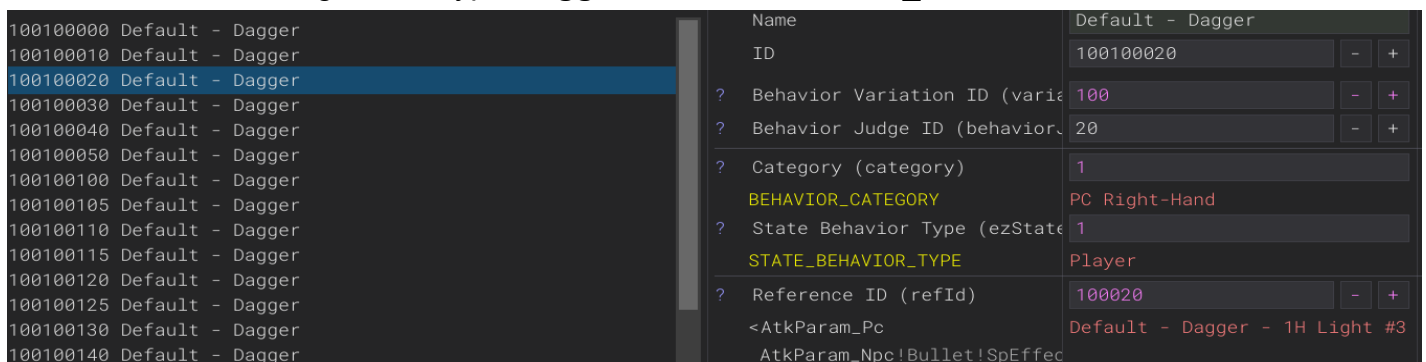
Same goes for **PC** and **NPC**

● Behaviors

Let's look at a typical **AttackBehavior** in a weapon moveset. **Judge ID =20**

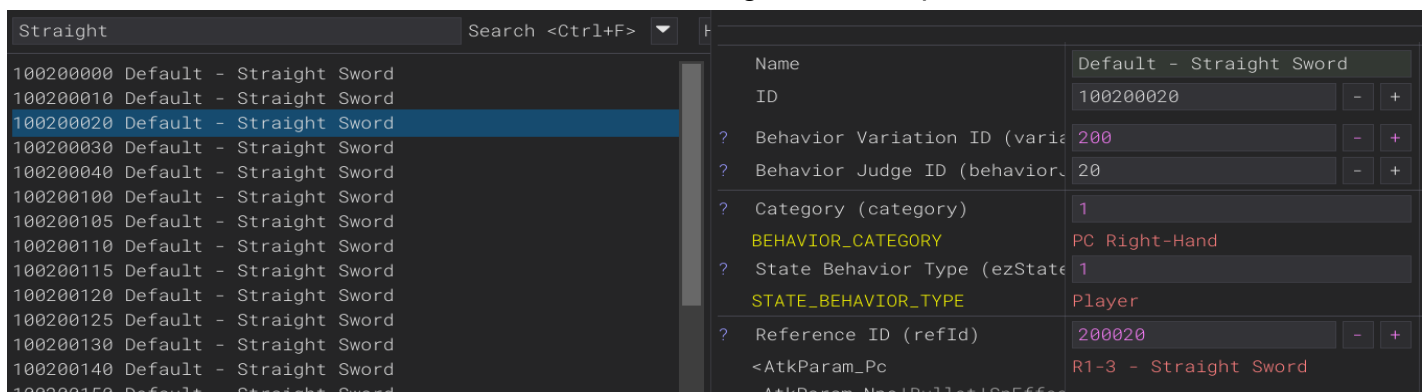


Now, if you look at other **a0XX_030020**, from other weapon moveset tae's, you'll see that every single one has the same **Judge ID =20**. However, **every single weapon category uses its own behaviors**, they reference different attacks that all do different kinds of damage. Let's type **Dagger** in **BehaviorParam_Pc** to understand this.



100100020 looks to be the one, with a **Judge ID =20** marked in the 2nd field

And if we take a look at the Straight sword Equivalent: **100200020**



The only difference is the **Behavior Variation ID: 100 vs 200**

100100020

1H Dagger 3rd Light Attack

<u>100</u>	<u>100</u>	<u>020</u>
<u>Prefix.</u>	<u>Variation ID</u>	<u>Judge ID</u>
For the PC, Prefix =1 is the norm, it's used for every single attack that is specific to a weapon category. Prefix =3 and above is used for every SwordArts Attack. When Prefix ≠ 1, it needs to be told in the Judge ID. With Prefix =3, when we had Judge ID =20, it would've been Judge ID =3020. Any Prefix will work for any attack if you follow this instruction above. (This is why this is the least important number) For the NPCs, Prefix =2 seems to be the norm, the only other one seems to be Prefix =8, not exactly sure what it means	Take it as the password of a Behavior. PC weapons or NPCs can only use a behavior if they have the corresponding VarID. EquipParamWeapon's 3rd field is Behavior Variation ID, this is how different weapons can access different Behaviors. Daggers for example all have VarID =100-199. If a Dagger has VarID =105, that means it'll only be able to access Behaviors with VarID =100 and 105. Else, if a BEHAVIOR has VarID =0 (000), these behaviors can be used by any weapon. For NPCs, Behavior Variation ID is indicated in NpcParam's 1st field	Take it as the general ID of the Behavior, because this is the only number that's going to change for a given set of Behaviors with a specific VarID. This is the number referenced in the Events like AttackBehavior and BulletBehavior, like seen previously.

For NPCs, this looks more like this

221200100

Malenia's first **BehaviorParam** row

221200100 in this case, and like all other **VarIDs** for NPCs, is the **chr ID** of Malenia

Here's a list of all [chr IDs](#)

● Behavior row

- The **Judge ID** and **Variation ID** fields do **NOT** matter, you don't need to edit them in any way, they have 0 impact on the rest
- **Category** and **State Behavior Type** are self explanatory, no need to explain this.

Don't forget that you can right click on the red text to show any option the game uses for this field, instead of guessing a random number

- **Reference ID** is the actual thing that is being invoked ingame, whether it would be an Attack or a Bullet. In this case, **Reference Type** is set to 0 (Attack), so **Reference ID** is expecting an **AtkParam** row. You can set **Reference Type** to 1 (**Bullet**). When referencing a bullet that constitutes a chain, only the first bullet of the chain is referenced, in a single behavior row.
- **Stamina Cost** is self explanatory. **Poise**, **Durability** and **Humanity Cost** are leftovers from other games and don't need to be edited.

Name	Shared [AOW] Impaling Thrust		
ID	300000010	-	+
? Behavior Variation ID (variation)	0	-	+
? Behavior Judge ID (behaviorJudge)	10	-	+
? Category (category)	12		
BEHAVIOR_CATEGORY	PC Right-hand #2		
? State Behavior Type (ezStateType)	1		
STATE_BEHAVIOR_TYPE	Player		
? Reference ID (refId)	300000010	-	+
<AtkParam_Pc	[AOW] Impaling Thrust		
AtkParam_Npc!Bullet!SpEffect			
? Reference Type (refType)	0		
BEHAVIOR_REF_TYPE	Attack		
? Poise Cost (consumeSA)	0.000	-	+
? Stamina Cost (stamina)	40	-	+
? Durability Cost (consumeDurability)	0	-	+
? Humanity Cost (heroPoint)	0		

● Bullets

This tutorial is not about bullet editing as in editing the bullet properties and trajectories. As you can see, **Bullet** param is quite complex in terms of fields to understand. To get a better grasp at it, I recommend [this video](#)



These fields are self explanatory. the **AtkParam ID** field can be null if the bullet isn't meant to deal damage. You can check this [SFX ID list](#).

Name	[Fire Giant] Fireball	
ID	4760080	4760080
? AtkParam ID (atkId_Bullet)	0	0
<AtkParam_Pc	Impact: Oppose	Impact: Oppose
AtkParam_Npc>	Unnamed Row	Unnamed Row
? Projectile SFX ID (sfxId_Bu	647621	647621
PARTICLES	Not Enumerated	Not Enumerated
? Impact SFX ID (sfxId_Hit)	-1	-1
PARTICLES	None	None

- **Hit bullet ID** is the bullet that triggers when this one hits something
- **Bullet emitter** is a bullet that can be fired while this bullet is active. See the video for more details
- These 2 fields determine if the bullet acts by himself, or if it's part of a **bullet chain**
- **Is Use Shared Hitlist** (binary) determines if the whole **bullet chain** can deal damage multiple times. **If it's set to 0 (unchecked)**, each AtkParam in the bullet chain hitting the enemy will deal damage. **If it's set to 1 (checked)**, then if the enemy has already taken damage from a bullet in the chain, no further damage will be dealt.

● AtkParam

Name	Default - Dagger - 1H		
ID	100020	-	+
? Hit 0: Radius (hit0_Radius)	0.300	-	+
? Hit 1: Radius (hit1_Radius)	0.100	-	+

? Attack Correction: Physical	100
? Attack Correction: Magic	100
? Attack Correction: Fire	100
? Attack Correction: Light	100
? Attack Correction: Holy	100
? Attack Correction: Stamina	100
? Attack Correction: Poise	240.000
? Attack Correction: Throw	100
? Attack Correction: Guard	100
? Attack Correction: Guard	100

? Conditional Category [1] (subC	107
ATK_SUB_CATEGORY	Breath Attack
? Conditional Category [2] (subC	123
ATK_SUB_CATEGORY	Magma Attack

- **Hit 0** refers to the actual damage hitbox, while **Hit 1** refers to the collision box (what makes you bounce off). You can set its radius to 0 and it will no longer bounce off.
- **Hit X Dummy Poly [1]** refers to the **start** of the box
- **Hit X Dummy Poly [2]** refers to the **end** of the box.
Dummy Polys are points in 3D space that are placed in the weapon model.
- The **Attack Correction** fields actually determine the damage and poise damage. **Guard Attack** is the value that sets if the attack will be repelled or not. **Guard Break** is the value that sets the stamina damage on enemies when they block incoming attacks. **Throw escape** is always set to 100 (I think..?)
- **Damage level** decides the enemy's knockback animation
- **Conditional category** is a flag to indicate if the damage must receive a buff. Looking at **Theodorix's Magma** row, **Breath Attack** means it'll receive a damage buff from the [Roar Medallion](#)

Now that you have general knowledge, you can take a look at the

● FAQ

- Why does my attack sometimes doesn't hit when I change its Weapon Moveset or SwordArt ?

If you followed the [Behaviors](#) part, I'm sure you can directly guess by yourself that this is a **Variation ID** problem. Here's two solutions:

1. Easy fix: Change the **Behavior Variation ID** field in **EquipParamWeapon** to a **Variation ID** belonging to a weapon which already uses this **Weapon Moveset or Sword Art**. **This can cause other problems**, like causing hitboxes that formerly worked, to no longer work. This is especially likely to happen if your weapon is unique.
2. Alternative: Look for the animations in the tae that have hitbox problems (through testing ingame). After you have identified the **BehaviorParam_PC rows** missing from your current **EquipParamWeapon Variation ID**, make duplicates(ctrl-c;ctrl-v) of them into a new row ID compatible with your **Variation ID**. Might as well use a **VarID =0** to make it compatible with anything

Let's say I gave the **Blade of Calling / Black Knife Heavy attacks (SMC =103)** to any other weapon. This is only one of the Behaviors to duplicate in this case.

40000001/ Shared [AOW] Spinning Strikes	Name	Behavior Duplicate		
400000018 Shared [AOW] Spinning Strikes	ID	400000030	-	+
400000019 Shared [AOW] Spinning Strikes	? Behavior Variation ID (varid)	116	-	+
400000020 Shared [AOW] Spinning Strikes	? Behavior Judge ID (behavior)	101	-	+
400000030 Behavior Duplicate	? Category (category)	1		
500000000	BEHAVIOR_CATEGORY	PC Right-Hand		
500000001	? State Behavior Type (ezState)	1		
500000002	STATE_BEHAVIOR_TYPE	Player		
500000003	? Reference ID (refId)	115101	-	+
500000004	<AtkParam_Pc	Blade of Calling		
500000005	AtkParam_Npc!Bullet!SpEffect			
500000006	? Reference Type (refType)	0		
500000007	BEHAVIOR_REF_TYPE	Attack		
500000008	? Poise Cost (consumeSA)	0.000	-	+
501703900	? Stamina Cost (stamina)	8	-	+
501703901	? Durability Cost (consumeDurability)	0	-	+
501703905	? Humanity Cost (heroPoint)	0		
501703950				
501703951				
501703955				
501703970				
501703971				
501703975				

Here's the new **40000030** in a **a103 animation AttackBehavior**

AttackBehavior[1]		(Change)		
Type	Name	Value		
s32	AttackType	Standard	▼	0 -
s32	AttackIndex	0	- +	
s32	BehaviorJudgeID	4030	- +	
u8	DirectionType	0	- +	
u8	Source	0: Default	▼	0 -
s16	StateInfo	0	- +	
► Action Info				
Delete Action...				

- How do I use Enemy Bullets on the Player ?

This is a rather simple task in general, since both **Player** and **Enemy** bullets are shared in the same param: **Bullet**. To summarize, you'll have to create a new **BehaviorParam_Pc** row that will reference a duplicate of the enemy **Bullet** row(s). In these duplicates, you'll want to change the **AtkParam** being referenced, since **AtkParam_Npc** rows will not work for the Player. Lastly, you'll want to change all the **Hit Bullet ID / Bullet Emitter** fields according to your new bullet rows IDs.

Let's say I wanted to duplicate a Fire Giant bullet, here's the process:

Select all the Bullets of a chain and duplicate them. You know bullets are part of the same chain if they are referenced in some bullet **Hit Bullet ID / Bullet Emitter** fields.

```
4760080 [Fire Giant] Fireball
4760081 [Fire Giant] Fireball Explosion
4760082 [Fire Giant]
4760085 [Fire Giant] Fireball
4760086 [Fire Giant] Fireball Explosion
4760087 [Fire Giant]
```

Next, change the **Hit Bullet ID / Bullet Emitter** fields according to your new rows

Name	[Fire Giant] Fireball		
ID	4760085	-	+
? Hit Bullet ID (HitBulletID)	4760086	-	+
<Bullet>	[Fire Giant] Fireball Explosion		

Name	[Fire Giant] Fireball Explosio		
ID	4760086	-	+
? Hit Bullet ID (HitBulletID)	4760087	-	+
<Bullet>	[Fire Giant]		

Here, the 3 Bullets were only linked by **Hit Bullet ID**, so this is all I had to modify

Now, change the **AtkParam** field

Name	[Fire Giant] Fireball Explosi		
ID	4760086	-	+
? AtkParam ID (atkId_Bullet)	300000	-	+
<AtkParam_Pc	Default - Greatsword		
AtkParam_Npc>			

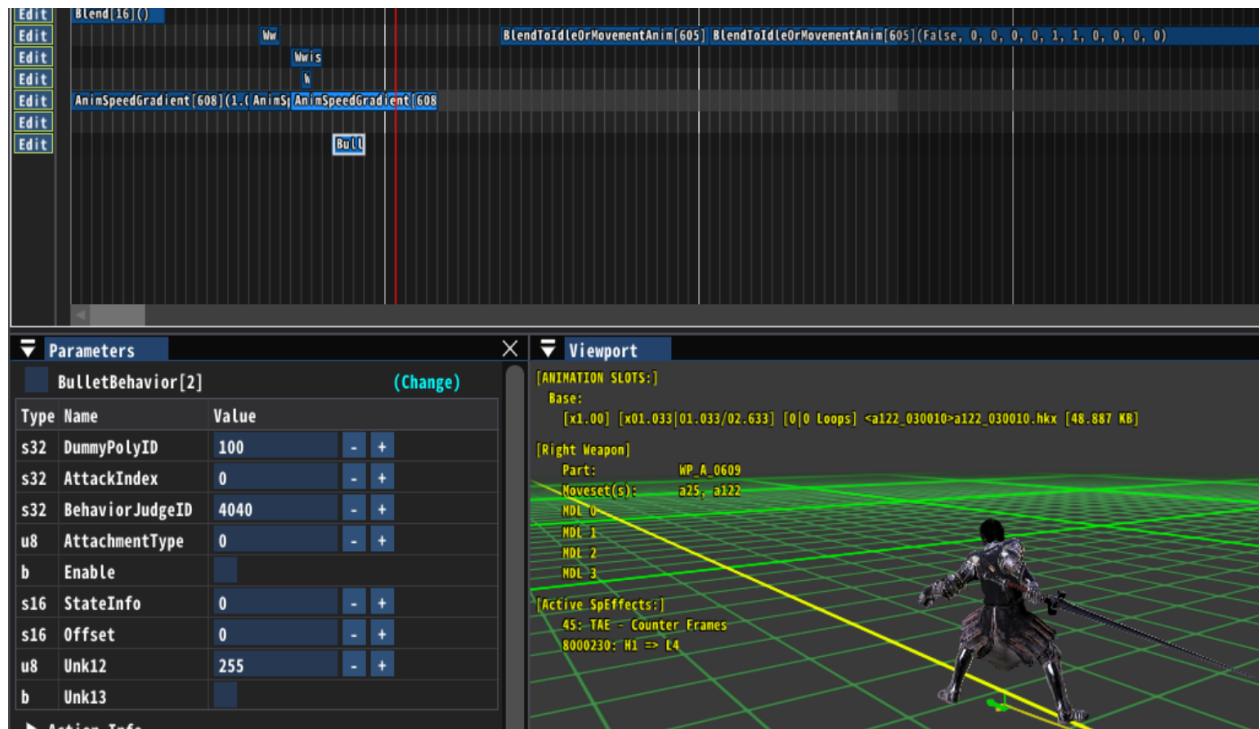
You can select any generic **AtkParam** to test things out.

After that, duplicate any **BehaviorParam_PC** row and set it with **VarID =0** for convenience (The ID, not the **Behavior Variation ID** field).

Search <Ctrl+F>																																																																	
----- spinning strikes----- 400000017 Shared [AOW] Spinning Strikes 400000018 Shared [AOW] Spinning Strikes 400000019 Shared [AOW] Spinning Strikes 400000020 Shared [AOW] Spinning Strikes 400000040 Enemy Bullet to Player 500000000 500000001 500000002 500000003 500000004 500000005 500000006 500000007 500000008 501703900 501703901 501703905 501703950 501703951 501703955 501703970	<table><tr><td>Name</td><td colspan="3">Enemy Bullet to Player</td></tr><tr><td>ID</td><td>400000040</td><td>-</td><td>+</td></tr><tr><td>? Behavior Variation ID (varid)</td><td>116</td><td>-</td><td>+</td></tr><tr><td>? Behavior Judge ID (behavior)</td><td>101</td><td>-</td><td>+</td></tr><tr><td>? Category (category)</td><td colspan="3">1</td></tr><tr><td>BEHAVIOR_CATEGORY</td><td colspan="3">PC Right-Hand</td></tr><tr><td>? State Behavior Type (ezState)</td><td colspan="3">1</td></tr><tr><td>STATE_BEHAVIOR_TYPE</td><td colspan="3">Player</td></tr><tr><td>? Reference ID (refId)</td><td>4760085</td><td>-</td><td>+</td></tr><tr><td><Bullet!AtkParam_Pc!AtkParam</td><td colspan="3">[Fire Giant] Fireball</td></tr><tr><td>? Reference Type (refType)</td><td colspan="3">1</td></tr><tr><td>BEHAVIOR_REF_TYPE</td><td colspan="3">Bullet</td></tr><tr><td>? Poise Cost (consumeSA)</td><td>0.000</td><td>-</td><td>+</td></tr><tr><td>? Stamina Cost (stamina)</td><td>8</td><td>-</td><td>+</td></tr><tr><td>? Durability Cost (consumeDura</td><td>0</td><td>-</td><td>+</td></tr><tr><td>? Humanity Cost (heroPoint)</td><td colspan="3">0</td></tr></table>	Name	Enemy Bullet to Player			ID	400000040	-	+	? Behavior Variation ID (varid)	116	-	+	? Behavior Judge ID (behavior)	101	-	+	? Category (category)	1			BEHAVIOR_CATEGORY	PC Right-Hand			? State Behavior Type (ezState)	1			STATE_BEHAVIOR_TYPE	Player			? Reference ID (refId)	4760085	-	+	<Bullet!AtkParam_Pc!AtkParam	[Fire Giant] Fireball			? Reference Type (refType)	1			BEHAVIOR_REF_TYPE	Bullet			? Poise Cost (consumeSA)	0.000	-	+	? Stamina Cost (stamina)	8	-	+	? Durability Cost (consumeDura	0	-	+	? Humanity Cost (heroPoint)	0		
Name	Enemy Bullet to Player																																																																
ID	400000040	-	+																																																														
? Behavior Variation ID (varid)	116	-	+																																																														
? Behavior Judge ID (behavior)	101	-	+																																																														
? Category (category)	1																																																																
BEHAVIOR_CATEGORY	PC Right-Hand																																																																
? State Behavior Type (ezState)	1																																																																
STATE_BEHAVIOR_TYPE	Player																																																																
? Reference ID (refId)	4760085	-	+																																																														
<Bullet!AtkParam_Pc!AtkParam	[Fire Giant] Fireball																																																																
? Reference Type (refType)	1																																																																
BEHAVIOR_REF_TYPE	Bullet																																																																
? Poise Cost (consumeSA)	0.000	-	+																																																														
? Stamina Cost (stamina)	8	-	+																																																														
? Durability Cost (consumeDura	0	-	+																																																														
? Humanity Cost (heroPoint)	0																																																																

Set the **Reference Type** to 1 (Bullet) and make it reference your new **Bullet** row. Keep in mind you only have to reference the **first bullet** of the chain.

Lastly, create a Bullet Behavior event (**ctrl-rightclick** to create an event in the timeline) in any animation you want, and make it reference your new **BehaviorParam_PC** row. In my case, **Behavior Judge ID = 4040**



And this just works

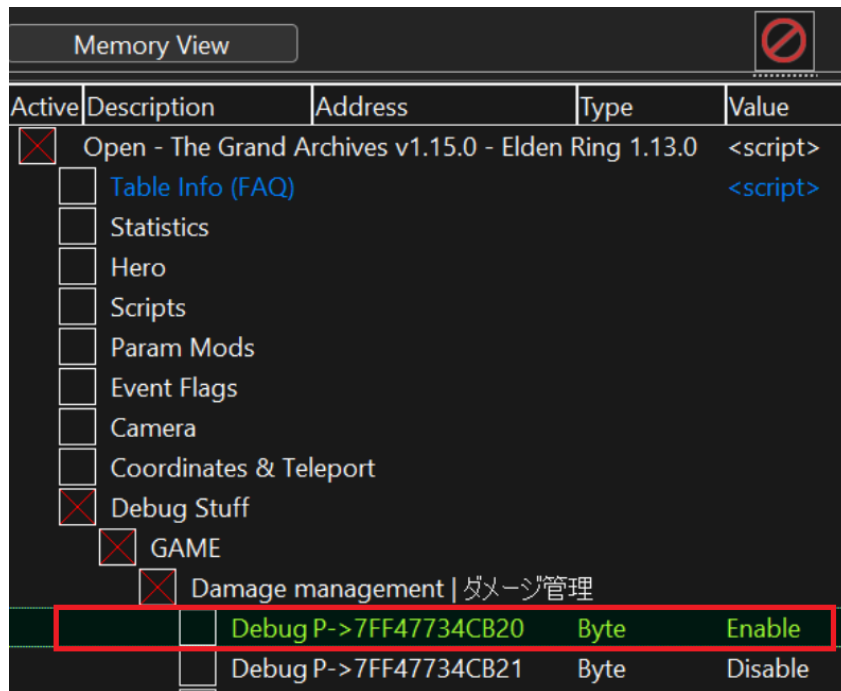


The only “issue” in my case was that both the projectile and the explosion dealt damage (since I modified the AtkParam for both of them), dealing 2x damage.

This can be fixed by simply checking the **Is Use Shared HitList** field in both bullets.

● How can I visualize hitboxes ?

1. Download [Cheat Engine](#)
2. Download the [TGA](#) cheat table
3. Start your game
4. Open the **TGA** table (this will open Cheat Engine), and navigate the checkboxes until this point



Double Click on the **Disable** and change it to **Enable** like the screenshot



5.

Yellow Box is Hit 0 (damage) Blue box is Hit 1 (collision)