Hungry Dog - Game Balance Configuration Guide

⬜ Ideal Balance Recommendations

This guide provides recommended values for achieving balanced gameplay where:

- Players have a **fair challenge** (not too easy, not impossible)
- Games last **2-5 minutes** on average
- Success requires **skill and attention** but is achievable
- Dog behavior feels **realistic and fair**

⚖ Core Balance Philosophy

Target Experience:

- Player should feel **slightly pressured** but not overwhelmed
- Dog should be **competitive** but beatable
- Mistakes should be **punishing** but recoverable
- Skill should be **rewarded** (good timing, positioning)

⬜ Configuration Values by Category

1. DOG MOVEMENT (`scripts/dog.gd`)

Current Values vs Recommended

Parameter	Current	Recommended	Reasoning
`speed`	`14.0`	`13.0 - 14.0`	⬜ Good as-is. Slightly slower than player creates fair race
`rotation_speed`	`5.0`	`4.0 - 5.0`	⬜ Good as-is. Smooth turning without being too agile
`eat_duration`	`2.0`	`2.0 - 2.5`	⚠ Consider `2.5` for more discipline window

Reasoning:

Speed (13.0-14.0):

- Player is 15.0, so dog at 14.0 means player is ~7% faster
- This gives player ability to intercept but requires positioning
- If dog is 13.0, player has more margin for error (easier)
- If dog is 15.0 or higher, player can't catch up (frustrating)

⬜ **Keep at 14.0** - Perfect balance between challenge and fairness

Eat Duration (2.0-2.5):

- At 2.0 seconds: Player has narrow window to discipline
- At 2.5 seconds: 25% more time to react and position
- Longer duration = easier game
- Shorter duration = harder game (less reaction time)

⬜ **Recommendation:**

- **Normal difficulty: 2.0 seconds** (current)
- **Easy mode: 2.5 seconds** (more forgiving)
- **Hard mode: 1.5 seconds** (expert timing required)

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2. DOG HEALTH & SURVIVAL (`scripts/dog.gd`)

Current Values vs Recommended

Parameter	Current	Recommended	Reasoning
`lives`	`3`	`3`	⬜ Perfect - standard 3-strike system

Parameter	Current	Recommended	Reasoning
`HUNGER_INCREASE_PER_SEC`	`0.01`	`0.008 - 0.015`	⚠ Consider faster for more pressure
`HUNGER_REDUCTION_PER_SNACK`	`0.3`	`0.25 - 0.35`	▢ Good as-is
Chocolate death limit	`3`	`3 - 4`	⚠ Consider 4 for slightly more forgiving
`DISCIPLINE_PAUSE_DURATION`	`2.0`	`2.0 - 2.5`	▢ Good as-is

Reasoning:

Hunger System (0.01/sec = 100 seconds to max):

- Current: Dog reaches max hunger in **100 seconds** (1min 40sec)
- At 0.015/sec: Dog reaches max in **67 seconds** (more urgent)
- At 0.008/sec: Dog reaches max in **125 seconds** (more relaxed)

▢ **Current system creates very little pressure** - hunger almost never matters in typical 2-5 minute games.

Recommendations by playstyle:

- **If hunger should matter:** Increase to `0.015` or higher
- **If hunger is just flavor:** Keep at `0.01` (current)
- **Alternative:** Make hunger affect dog speed/behavior when high

Chocolate Death Limit (3 chocolates):

- 3 chocolates = very unforgiving (one mistake = 33% to death)
- 4 chocolates = slightly more forgiving (25% per mistake)

▢ **Recommendation:**

- **Normal difficulty: 3 chocolates** (current - punishing mistakes)
- **Easy mode: 4 chocolates** (more margin for error)
- **Hard mode: 2 chocolates** (very punishing)

Discipline Pause Duration (2.0 seconds):

- 2.0 seconds = Dog completely stops, loses target
- This is significant downtime for the dog
- Feels fair as a "punishment" for eating bad food

▢ **Keep at 2.0 seconds** - Good reward for player skill

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3. PLAYER MOVEMENT & CONTROLS (`scripts/player.gd`)

Current Values vs Recommended

Parameter	Current	Recommended	Reasoning
`speed`	`15.0`	`15.0 - 16.0`	▢ Good as-is, slightly faster than dog
`discipline_range`	`5.0`	`5.0 - 6.0`	⚠ Consider 6.0 for easier discipline
`discipline_cooldown_duration`	`1.0`	`1.0 - 1.5`	▢ Good as-is
`mouse_sensitivity`	`0.25`	`0.2 - 0.3`	▢ Good - personal preference

Reasoning:

Player Speed (15.0):

- 15.0 vs dog's 14.0 = **7% speed advantage**
- This is the **sweet spot** for balance
- Player can catch up but must plan route
- Not so fast that dog never gets snacks

▢ **Keep at 15.0** - Perfect balance

Discipline Range (5.0 units):

- At 5.0: Must be fairly close to dog (about 2-3 player-heights away)
- At 6.0: More forgiving, easier to discipline from safer distance
- At 4.0: Very difficult, must be almost touching dog

▢ **Recommendation:**

- **Current 5.0 is balanced but slightly difficult**
- **Consider 5.5 or 6.0** if discipline feels too hard in playtesting

- Test: Can player discipline in ~60-70% of attempts?

Discipline Cooldown (1.0 second):

- 1.0 second = Can't spam discipline
- Forces strategic timing
- Multiple disciplines require patience

⬜ **Keep at 1.0 second** - Prevents abuse, rewards timing

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4. SNACK SPAWNING (`scripts/main_with_furniture.gd`)

Current Values vs Recommended

Parameter	Current	Recommended	Reasoning
`spawn_timer.wait_time`	3.0	3.0 - 4.0	⚠ Critical balance point

Reasoning:

Spawn Interval (Every 3 seconds):

Math:

- 3.0 sec interval = 20 snacks per minute
- Max overflow = 20 snacks
- Theoretical game over in **60 seconds** if nothing picked up

Reality Check:

- Player picks up some snacks (+5 points each)
- Dog eats some snacks (removes them)
- Actual game length: 2-4 minutes typically

Balance Analysis:

Interval	Snacks/min	Pressure Level	Game Length	Recommendation
2.0 sec	30	Very High	1-2 min	⬜ Too stressful
2.5 sec	24	High	1.5-3 min	⚠ Challenging
3.0 sec	**20**	**Medium**	**2-4 min**	⬜ **IDEAL**
3.5 sec	17	Medium-Low	3-5 min	⚠ Might be too easy
4.0 sec	15	Low	4-6 min	⬜ Too slow/boring

⬜ **Recommendation: Keep at 3.0 seconds**

Why 3.0 is ideal:

- Creates steady pressure without overwhelming
- Gives time for strategic decisions
- Allows for mistakes and recovery
- Games last long enough to be satisfying but not tedious

When to adjust:

- **Increase to 3.5-4.0** if players report feeling rushed/stressed
- **Decrease to 2.5** if players report boredom or too easy

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5. PICKUP & INTERACTION (`scripts/objects/spawning_object.gd`)

Current Values vs Recommended

Parameter	Current	Recommended	Reasoning
`eating_distance`	3.0	3.0	⬜ Good as-is
`pickup_distance`	3.0	3.0	⬜ Fair and balanced

Parameter	Current	Recommended	Reasoning
`pickup_forward_dot`	0.5	0.4 - 0.6	⬜ Current is balanced
`rotation_speed`	1.0	0.8 - 1.2	⬜ Visual only, keep as-is

Reasoning:

Eating Distance = Pickup Distance (3.0):

- **Both player and dog use 3.0 units = FAIR COMPETITION**
- Neither has advantage in range
- Winner determined by positioning and speed
- This is **critical for balance** - do not change unless testing shows issues

⬜ **Keep both at 3.0** - Equal opportunity system

Pickup Angle (pickup_forward_dot = 0.5):

- 0.5 = approximately **±60 degree cone**
- Player must roughly face the snack
- Not too strict (1.0 = must face exactly)
- Not too loose (0.0 = pickup from any angle)

Angle Comparison:

Value	Angle Cone	Feel	Recommendation
0.7	±45°	Strict, must aim well	Hard mode
0.5	**±60°**	**Balanced**	⬜ Current
0.3	±73°	Forgiving	Easy mode

⬜ **Keep at 0.5** - Good balance between precision and forgiveness

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6. GAME RULES (`scripts/GameState.gd`)

Current Values vs Recommended

Parameter	Current	Recommended	Reasoning
`max_overflow`	20	18 - 22	⚠ Critical difficulty lever
Time score rate	+1/sec	+1/sec	⬜ Good as-is
Pickup score	+5	+5	⬜ Good as-is

Reasoning:

Max Overflow (20 objects):

Critical Balance Point:

- This is the **primary difficulty setting**
- Lower = harder (game over sooner)
- Higher = easier (more room for error)

Analysis:

Max Overflow	Game Length	Difficulty	Recommendation
15	1.5-2.5 min	Very Hard	Expert players only
18	2-3 min	Hard	⚠ Challenging but fair
20	**2-4 min**	**Medium**	⬜ IDEAL DEFAULT
22	3-5 min	Easy	⚠ Good for beginners

Max Overflow	Game Length	Difficulty	Recommendation
20	4-6 min	Very Easy	Too forgiving

⬛ **Recommendation: Keep at 20**

Why 20 is ideal:

- With 3.0 sec spawn rate: 60 seconds to game over if idle
- In practice: 2-4 minutes with active play
- Enough pressure to feel challenging
- Enough margin to recover from mistakes
- Sweet spot for satisfying victories

Score System (+1/sec, +5/pickup):

- +1 per second = **baseline reward for survival**
- +5 per pickup = **5x more valuable than waiting**
- This creates incentive to actively pick up

Math:

- 3 minute game, passive = 180 points
- 3 minute game, 20 pickups = 180 + 100 = 280 points
- Pickups add ~55% more score

⬛ **Current scoring is well-balanced** - rewards active play without making survival meaningless

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⬛ Recommended Configuration Sets

Configuration A: BALANCED (Recommended Default)

```
# Dog (dog.gd)
speed = 14.0
eat_duration = 2.0
HUNGER_INCREASE_PER_SEC = 0.01
chocolate_limit = 3
DISCIPLINE_PAUSE_DURATION = 2.0

# Player (player.gd)
speed = 15.0
discipline_range = 5.0
discipline_cooldown_duration = 1.0

# Spawning (main_with_furniture.gd)
spawn_timer.wait_time = 3.0

# Snacks (spawning_object.gd)
eating_distance = 3.0
pickup_distance = 3.0
pickup_forward_dot = 0.5

# Game Rules (GameState.gd)
max_overflow = 20
```

Expected Results:

- Game length: 2-4 minutes
- Difficulty: Medium
- Skill required: Moderate
- Fun factor: High for most players

Configuration B: EASIER (For Casual Players)

```
# Key Changes:
dog.speed = 13.0                    # -1.0 (slower dog)
dog.eat_duration = 2.5              # +0.5 (more discipline time)
chocolate_limit = 4                  # +1 (more forgiving)
player.discipline_range = 6.0       # +1.0 (easier discipline)
spawn_timer.wait_time = 3.5         # +0.5 (less pressure)
GameState.max_overflow = 22         # +2 (more margin)
```

Expected Results:

- Game length: 3-5 minutes
- Difficulty: Easy
- Success rate: 70-80%
- Better for learning/casual play

Configuration C: HARDER (For Experienced Players)

```
# Key Changes:
dog.speed = 14.5                    # +0.5 (faster dog)
dog.eat_duration = 1.5              # -0.5 (less discipline time)
chocolate_limit = 2                  # -1 (very punishing)
player.discipline_range = 4.5       # -0.5 (must be closer)
spawn_timer.wait_time = 2.5         # -0.5 (more pressure)
GameState.max_overflow = 18         # -2 (less margin)
```

Expected Results:

- Game length: 1.5-3 minutes
- Difficulty: Hard
- Success rate: 30-40%
- Requires mastery of mechanics

⬛ Balance Testing Protocol

Quick Balance Check (10 minutes):

1. **Play 3 games** with current settings
2. **Record for each game:**
   - Game duration
   - Did you win or lose?
   - Did it feel too easy, too hard, or just right?
   - How many snacks did dog eat vs you picked up?

Target Metrics:

Metric	Target Range	Too Easy	Too Hard
Game Length	2-4 minutes	> 5 min	< 1.5 min
Win Rate	40-60%	> 70%	< 30%
Dog/Player Snack Ratio	40/60 - 60/40	20/80	80/20

Adjustment Guide:

If games are TOO EASY:

- ↓ Decrease `max_overflow` by 2
- ↓ Decrease `spawn_timer.wait_time` by 0.5
- ↑ Increase `dog.speed` by 0.5

If games are TOO HARD:

- ↑ Increase `max_overflow` by 2
- ↑ Increase `spawn_timer.wait_time` by 0.5

- ↑ Increase `discipline_range` by 0.5

If games are TOO SHORT:

- ↑ Increase `spawn_timer.wait_time` by 0.5
- ↑ Increase `max_overflow` by 2-3

If games are TOO LONG/BORING:

- ↓ Decrease `spawn_timer.wait_time` by 0.5
- ↓ Decrease `max_overflow` by 2-3

▣ Priority Tuning Order

If you can only adjust a few values, prioritize in this order:

1. **`max_overflow` (GameState.gd)** - Biggest impact on difficulty
2. **`spawn_timer.wait_time` (main_with_furniture.gd)** - Controls game pace
3. **`dog.speed` (dog.gd)** - Affects player's ability to compete
4. **`discipline_range` (player.gd)** - Makes discipline easier/harder
5. **`eat_duration` (dog.gd)** - Affects discipline timing window

▣ Quick Reference Table

All Balance Parameters Summary

Location	Parameter	Current	Balanced Range	Impact
`dog.gd`	speed	14.0	13.0-14.0	High
`dog.gd`	eat_duration	2.0	2.0-2.5	Medium
`dog.gd`	HUNGER_INCREASE_PER_SEC	0.01	0.008-0.015	Low
`dog.gd`	chocolate_limit	3	3-4	Medium
`dog.gd`	DISCIPLINE_PAUSE_DURATION	2.0	2.0-2.5	Low
`player.gd`	speed	15.0	15.0-16.0	High
`player.gd`	discipline_range	5.0	5.0-6.0	Medium
`player.gd`	discipline_cooldown_duration	1.0	1.0-1.5	Low
`main_with_furniture.gd`	spawn_timer.wait_time	3.0	3.0-4.0	Very High
`spawning_object.gd`	eating_distance	3.0	3.0	High
`spawning_object.gd`	pickup_distance	3.0	3.0	High
`spawning_object.gd`	pickup_forward_dot	0.5	0.4-0.6	Medium
`GameState.gd`	max_overflow	20	18-22	Very High

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