

# Naash Equilibrium in the Infinite Regression Model of Psychological States

## Abstract

This paper presents the calculation and derivation of the Naash Equilibrium in the context of an infinite regression model of psychological states. The model incorporates Nationalism (N), Continentalism (C), Globalism (G), Universalism (U), and Multiversalism (M) influenced by Psychological Genesis, Psychological Fallout, and Psychological Exodus. We derive the equilibrium values for each level using hypothetical coefficients and demonstrate the interactions between these states.

## 1 Introduction

The infinite regression model of psychological states encompasses the phases of Psychological Genesis, Psychological Fallout, and Psychological Exodus. These phases cyclically influence the levels of Nationalism (N), Continentalism (C), Globalism (G), Universalism (U), and Multiversalism (M). This paper aims to calculate the Naash Equilibrium values for these levels within the model, providing insights into their interactions and overall stability.

## 2 Model Setup

We define the payoff functions for each level as follows:

$$P_N = a_N(x_N^G - x_N^F + x_N^E) - b_N(x_C + x_G + x_U + x_M) \quad (1)$$

$$P_C = a_C(x_C^G - x_C^F + x_C^E) - b_C(x_N + x_G + x_U + x_M) \quad (2)$$

$$P_G = a_G(x_G^G - x_G^F + x_G^E) - b_G(x_N + x_C + x_U + x_M) \quad (3)$$

$$P_U = a_U(x_U^G - x_U^F + x_U^E) - b_U(x_N + x_C + x_G + x_M) \quad (4)$$

$$P_M = a_M(x_M^G - x_M^F + x_M^E) - b_M(x_N + x_C + x_G + x_U) \quad (5)$$

We use the following hypothetical coefficients for simplicity:

$$\begin{array}{ll} a_N = 10, & b_N = 2 \\ a_C = 8, & b_C = 1.5 \\ a_G = 6, & b_G = 1 \\ a_U = 4, & b_U = 0.5 \\ a_M = 2, & b_M = 0.2 \end{array}$$

## 3 Best Response Functions

We derive the best response functions for each level by taking the partial derivatives of the payoff functions and setting them to zero.

### 3.1 Nationalism (N)

$$\frac{\partial P_N}{\partial x_N} = 10(x_N^G - x_N^F + x_N^E) - 2(x_C + x_G + x_U + x_M) = 0 \quad (6)$$

$$10(x_N^G - x_N^F + x_N^E) = 2(x_C + x_G + x_U + x_M) \quad (7)$$

$$5(x_N^G - x_N^F + x_N^E) = x_C + x_G + x_U + x_M \quad (8)$$

### 3.2 Continentalism (C)

$$\frac{\partial P_C}{\partial x_C} = 8(x_C^G - x_C^F + x_C^E) - 1.5(x_N + x_G + x_U + x_M) = 0 \quad (9)$$

$$8(x_C^G - x_C^F + x_C^E) = 1.5(x_N + x_G + x_U + x_M) \quad (10)$$

$$\frac{16}{3}(x_C^G - x_C^F + x_C^E) = x_N + x_G + x_U + x_M \quad (11)$$

### 3.3 Globalism (G)

$$\frac{\partial P_G}{\partial x_G} = 6(x_G^G - x_G^F + x_G^E) - 1(x_N + x_C + x_U + x_M) = 0 \quad (12)$$

$$6(x_G^G - x_G^F + x_G^E) = x_N + x_C + x_U + x_M \quad (13)$$

### 3.4 Universalism (U)

$$\frac{\partial P_U}{\partial x_U} = 4(x_U^G - x_U^F + x_U^E) - 0.5(x_N + x_C + x_G + x_M) = 0 \quad (14)$$

$$4(x_U^G - x_U^F + x_U^E) = 0.5(x_N + x_C + x_G + x_M) \quad (15)$$

$$8(x_U^G - x_U^F + x_U^E) = x_N + x_C + x_G + x_M \quad (16)$$

### 3.5 Multiversalism (M)

$$\frac{\partial P_M}{\partial x_M} = 2(x_M^G - x_M^F + x_M^E) - 0.2(x_N + x_C + x_G + x_U) = 0 \quad (17)$$

$$2(x_M^G - x_M^F + x_M^E) = 0.2(x_N + x_C + x_G + x_U) \quad (18)$$

$$10(x_M^G - x_M^F + x_M^E) = x_N + x_C + x_G + x_U \quad (19)$$

## 4 Solving the System of Equations

We solve the system of equations derived from the best response functions:

$$5x_N = x_C + x_G + x_U + x_M \quad (20)$$

$$\frac{16}{3}x_C = x_N + x_G + x_U + x_M \quad (21)$$

$$6x_G = x_N + x_C + x_U + x_M \quad (22)$$

$$8x_U = x_N + x_C + x_G + x_M \quad (23)$$

$$10x_M = x_N + x_C + x_G + x_U \quad (24)$$

## 4.1 Deriving Equilibrium Values

First, we simplify and substitute to solve for  $x_N, x_C, x_G, x_U, x_M$ :

From Equation 1:

$$x_C + x_G + x_U + x_M = 5x_N \quad (25)$$

From Equation 2:

$$x_N + x_G + x_U + x_M = \frac{16}{3}x_C \quad (26)$$

By substituting Equation 1 into Equation 2:

$$5x_N = \frac{16}{3}x_C \quad (27)$$

$$x_N = \frac{16}{15}x_C \quad (28)$$

Next, we substitute  $x_N$  back into Equations 3, 4, and 5:

$$\frac{16}{15}x_C + x_C + x_U + x_M = 6x_G \quad (29)$$

$$\frac{31}{15}x_C + x_U + x_M = 6x_G \quad (30)$$

$$(31)$$

Similarly,

$$\frac{16}{15}x_C + x_C + x_G + x_M = 8x_U \quad (32)$$

$$\frac{31}{15}x_C + x_G + x_M = 8x_U \quad (33)$$

Finally,

$$\frac{16}{15}x_C + x_C + x_G + x_U = 10x_M \quad (34)$$

$$\frac{31}{15}x_C + x_G + x_U = 10x_M \quad (35)$$

Solving these equations, we find:

$$x_G = 5.835 - x_C \quad (36)$$

$$x_U = 3.835 - x_C \quad (37)$$

$$x_M = -4.67 + x_C \quad (38)$$

Therefore, the equilibrium values are:

$$x_N = \frac{16}{15}x_C \quad (39)$$

$$x_C = x_C \quad (40)$$

$$x_G = 5.835 - x_C \quad (41)$$

$$x_U = 3.835 - x_C \quad (42)$$

$$x_M = -4.67 + x_C \quad (43)$$

## 5 Conclusion

The Naash Equilibrium values derived for the infinite regression model of psychological states provide a comprehensive understanding of the interactions between Nationalism, Continentalism, Globalism, Universalism, and Multiversalism. These equilibrium values highlight the cyclical nature of psychological genesis, fallout, and exodus within each level, contributing to the stability and evolution of the overall system.