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Application of Neutrosophic Micro Binary Topological Space

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Abstract: In this work, we examine a few two-person games and the topological characteristics they define. Binary topological spaces and micro topology are the two literary constructs that give rise to the idea of Neutrosophic Micro Binary topology, which was discussed in this article. The purpose of this study is to develop a novel structure for Neutrosophic Micro Binary sets. The Neutrosophic Micro Binary topological spaces are defined here, and a number of associated characteristics and attributes are also looked at.

Keywords: Core; Neutrosophic Nano Binary lower approximation; Neutrosophic Nano Binary upper approximation; Neutrosophic Nano Binary Boundary; Neutrosophic Micro Binary topology; Neutrosophic Micro Binary topological space.

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1. Introduction

A number of hypotheses have recently been put up to address ambiguity, imprecision, and uncertainty. Zadeh first proposed the idea of fuzzy sets (ꞘṢ) in 1965 [26]. In 1986, Atanassov created intuitionistic ꞘṢ (ΊꞘṢ) using these ꞘṢ [4]. Gau and Buehrer initially introduced and developed the theory of ambiguous sets as an extension of ꞘṢt theory [7].

The Ņ elements are introduced by Smarandache [22], and they stand for truth function (Ŧꜰ), indeterminacy function (Ίꜰ), and falsity function (ƒꜰ), respectively. Salama and Alblowi [20], in 2012 revealed and constructed the notion of neutrosophic set (ŅṢ) and Ņ topological spaces (ŅŤs). F. Smarandache [23] initially introduced the Ņ Two Fold Algebra in 2024.

Rough set (ЯṢ) theory was developed by pawlak [17] in 1982. Ramachandran [18] presented ΊꞘŋŤs in 2017. [3] Arokiarani et al. explored some new ideas in ŅŤs. The notion of binary Ť (ьŤ) was presented by the authors [14, 15], who also covered some of its fundamental characteristics. Smarandache et al. evaluated blockchain cybersecurity in 2024 using the Tree Soft and Opinion Weight Criteria Method in an uncertain environment [24].

The idea of Nano Topological Space (ŋŤs) was first proposed by Lellis Thivagar [11]. ŅŋŤ was invented by Lellis Thivagar et.al,[12]. The idea of Ņŋ ideal Ť was first presented by Parimala et al

[16]. Ṇŋ open sets were first proposed by Vadivel et al [25]. An Use of ŋŤs in Medical Diagnosis by C. Janaki and A. Jayalakshmi [10]. ŋьŤs was invented by J. Jasmine Elizabeth and G. Hari Siva Annam [8]. Mary Margaret et.al [13] introduced the idea of application of Ṇ vague ŋŤs (ṆὺŋŤs). Chandrasekar was the first to suggest Micro Ťs (MŤs) [5]. Ganesan and Jafari [6] illustrate the topic Neutrosophic micro topological spaces. The authors of An Application of MŤs with Decision Making Problem in Medical Events were M. Josephine Rani, R. Bhavani, and Bharathi Ramesh Kumar [9]. Abdel-Basset et al. developed a number of multi-criteria decision-making (MCDM) techniques [1, 2]. In 2024, C. Sangeetha and G. Sindhu discovered the Micro Binary Ťs (MьŤs) [19].

In this article, I have used the idea of ṆMьŤs to find the MCDM problem to find the deciding factors for the game players.

2. Preliminaries

2.1 Definition [21] A *ṆƀŤ* is a b structure consisting of two universal sets G and I where

$\aleph^{\mathcal{B}} \subseteq L(G) \times L(I)$ and it satisfies the following conditions:

1. $(0_G, 0_I) \in \aleph^B$ and $(1_G, 1_I) \in \aleph^B$.
2. $(g_{1b} \cap i_{1b}, g_{2b} \cap i_{2b}) \in \aleph^B$ whenever $(g_{1b} \cap i_{1b}) \in \aleph^B$ and $(g_{2b} \cap i_{2b}) \in \aleph^B$.
3. If $(g_{\theta b}, i_{\theta b})_{\theta \in \alpha}$ is a family of members of $\aleph^B$, then $(\cup_{\theta \in \alpha} g_{\theta b}, \cup_{\theta \in \alpha} i_{\theta b}) \in \aleph^B$. The triplet $(G, I, \aleph^B)$ is called ṆьŤs.

2.2 Definition [21] $(0_g, 0_I)$ can be defined as;

1) $0_g = \{<G, 0, 0, 1>\}$, $0_i = \{<I, 0, 0, 1>\}$
2) $0_g = \{<G, 0, 1, 1>\}$, $0_i = \{<I, 0, 1, 1>\}$
3) $0_g = \{<G, 0, 1, 0>\}$, $0_i = \{<I, 0, 1, 0>\}$
4) $0_g = \{<G, 0, 0, 0>\}$, $0_i = \{<I, 0, 0, 0>\}$

$(1_g, 1_I)$ can be defined as;

5) $1_g = \{<G, 1, 1, 0>\}$, $1_i = \{<I, 1, 1, 0>\}$
6) $1_g = \{<G, 1, 0, 0>\}$, $1_i = \{<I, 1, 0, 0>\}$
7) $1_g = \{<G, 1, 0, 1>\}$, $1_i = \{<I, 1, 0, 1>\}$
8) $1_g = \{<G, 1, 1, 1>\}$, $1_i = \{<I, 1, 1, 1>\}$

2.3 Definition Let Ώ be a nonempty set and ϒ be an equivalence relation on Ώ. Let ϑϹ be a Ṇs in Ώ with the Tғ $\zeta_{\vartheta Ϲ}$, the Ίғ $\varpi_{\vartheta Ϲ}$, and the *f*ғ $\gamma_{\vartheta Ϲ}$. The Ṇŋ lower ($Ṇŋ^{Low}$), Ṇŋ upper ($Ṇŋ_{upp}$) and Ṇŋ boundary ($Ṇŋ^{bou}$) of ϑϹ in the approximation (Ώ, ϒ), represented by $Ṇŋ^{Low}(\vartheta Ϲ)$, $Ṇŋ_{upp}(\vartheta Ϲ)$, $Ṇŋ^{bou}(\vartheta Ϲ)$ as follows:

a) $Ṇŋ^{Low}(\vartheta Ϲ) = \{<p^*, \zeta_{\Upsilon(u)}{}^{Low}(p^*), \varpi_{\Upsilon(u)}{}^{Low}(p^*), \gamma_{\Upsilon(u)}{}^{Low}(p^*) \,/\, a \in [u]_\Upsilon, p^* \in Ώ>\}$
b) $Ṇŋ_{upp}(\vartheta Ϲ) = \{<p^*, \zeta_{\Upsilon(u)upp}(p^*), \varpi_{\Upsilon(u)upp}(p^*), \gamma_{\Upsilon(u)upp}(p^*) \,/\, a \in [u]_\Upsilon, p^* \in Ώ>\}$
c) $Ṇŋ^{bou}(\vartheta Ϲ) = Ṇŋ_{upp}(\vartheta Ϲ) - Ṇŋ^{Low}(\vartheta Ϲ)$

Where $\zeta_{\Upsilon(u)}{}^{Low}(p^*) = \wedge_{a \in [u]\Upsilon} \zeta u(a)$, $\varpi_{\Upsilon(u)}{}^{Low}(p^*) = \wedge_{a \in [u]\Upsilon} \varpi u(a)$, $\gamma_{\Upsilon(u)}{}^{Low}(p^*) = \vee_{a \in [u]\Upsilon} \gamma u(a)$,
$\zeta_{\Upsilon(u)upp}(p^*) = \vee_{a \in [u]\Upsilon} \zeta u(a)$, $\varpi_{\Upsilon(Й)upp}(p^*) = \vee_{a \in [u]\Upsilon} \varpi Й(a)$, $\gamma_{\Upsilon(u)upp}(p^*) = \wedge_{a \in [u]\Upsilon} \gamma u(a)$.

2.4 Definition Let Ώ be an full set, ϒ be an equivalence relation on Ώ and ϑϹ aṆs in Ώ and if the collection $\tau_\Upsilon(\vartheta Ϲ) = \{0_\Upsilon, 1_\Upsilon, Ṇŋ^{Low}(\vartheta Ϲ), Ṇŋ_{upp}(\vartheta Ϲ), Ṇŋ^{bou}(\vartheta Ϲ)\}$ forms a topology then it is known as ṆŋŤs. We call $(Ώ, \tau_\Upsilon(\vartheta Ϲ))$ as the ṆŋŤs. The elements of $\tau_\Upsilon(\vartheta Ϲ)$ are indicated by Ṇŋ open sets (ṆŋΌş).

2.5 Definition Let (Ὼ, $\tau_{ŕ}$(ϑℂ)) be a ṆŋŤs. Then $\Psi_{ŕ}$(ϑℂ) = {W ∪ (W′ ∩ Ψ): W, W′ ϵ $\tau_{ŕ}$(ϑℂ) and Ψ doesn't ϵ $\tau_{ŕ}$(ϑℂ)} is labeled as ṆMŤs on with Ὼ respect to ϑℂ. The triplet (Ὼ, $\tau_{ŕ}$(ϑℂ), $\Psi_{ŕ}$(ϑℂ)) is called ṆMŤs.

2.6 Definition The ṆMŤs $\Psi_{ŕ}$(ϑℂ) meets the following criteria:

1. Ὼ, ϕ ϵ $\Psi_{ŕ}$(ϑℂ).
2. The ∪ of the elements of any sub-collection of $\Psi_{ŕ}$(ϑℂ) is in $\Psi_{ŕ}$(ϑℂ).
3. The ∩ of the elements of any finite sub-collection of $\Psi_{ŕ}$(ϑℂ) is in $\Psi_{ŕ}$(ϑℂ).

Then $\Psi_{ŕ}$(ϑℂ) is known as ṆMŤ on Ὼ with respect to ϑℂ. The triplet (Ὼ, $\tau_{ŕ}$(ϑℂ), $\Psi_{ŕ}$(ϑℂ)) is named as ṆM open sets (ṆMỎȘ) and the opposite of a ṆMỎȘ is labeled as a ṆM closed set (ṆMÇȘ).

3. Neutrosophic Nano Binary Topological Space

3.1 Definition Let (U, V) be a absolute set and ϒ be an equivalence relation on (U, V). Let (H_{1a^*}, H_{1b^*}) be a Ṇs in (U, V) with the Tꜰ of U is $\Delta_{ϑℂ1a^*}$, the Ɪꜰ of U is $\varpi_{ϑℂ1a^*}$, and the fꜰ of U is $\gamma_{ϑℂ1a^*}$, then the Tꜰ of V is $\Delta_{ϑℂ1b^*}$, the Ɪꜰ of V is $\varpi_{ϑℂ1b^*}$, and the fꜰ of V is $\gamma_{ϑℂ1b^*}$. The Ṇŋъ^{low}, Ṇŋъ$_{upp}$ and Ṇŋъ^{bou} of ϑℂ in the approximation ((U, V), ϒ), represented by Ṇŋъ^{Low}(H_{1a^*}, H_{1b^*}), Ṇŋъ$_{upp}$(H_{1a^*}, H_{1b^*}), Ṇŋъ^{bou}(H_{1a^*}, H_{1b^*}) as follows:

1. Ṇŋъ^{Low}(H_{1a^*}, H_{1b^*}) = {<(u, v), $\Delta_{\Upsilon}(h_{1^*}, h_{2^*})^{Low}$(u, v), $\varpi_{\Upsilon}(h_{1^*}, h_{2^*})^{Low}$(u, v), $\gamma_{\Upsilon}(h_{1^*}, h_{2^*})^{Low}$(u, v) / (u, v) ϵ$[h_{1^*}, h_{2^*}]_{\Upsilon}$, (M, A) ϵ (u, v), (u, v) ϵ (U, V)>}
2. Ṇŋъ$_{upp}$(H_{1a^*}, H_{1b^*}) = {<(u, v), $\Delta_{\Upsilon}(h_{1^*}, h_{2^*})_{upp}$(u, v), $\varpi_{\Upsilon}(h_{1^*}, h_{2^*})_{upp}$(u, v), $\gamma_{\Upsilon}(h_{1^*}, h_{2^*})_{upp}$(u, v) / (u, v) ϵ $[h_{1^*}, h_{2^*}]_{\Upsilon}$,(u, v) ϵ (U, V)>}
3. Ṇŋъ^{bou}(H_{1a^*}, H_{1b^*}) = Ṇŋъ$_{upp}$(H_{1a^*}, H_{1b^*})—Ṇŋъ^{Low}(H_{1a^*}, H_{1b^*})

Where $\Delta_{\Upsilon}(h_{1^*}, h_{2^*})^{Low}(u, v) = \Delta_{\Upsilon(h1^*)}(u) \wedge \Delta_{\Upsilon(h2^*)}(v)$, $\varpi_{\Upsilon}(h_{1^*}, h_{2^*})^{Low}(u, v) = \varpi_{\Upsilon(h1^*)}(u) \wedge \varpi_{\Upsilon(h2^*)}(v)$,
$\gamma_{\Upsilon}(h_{1^*}, h_{2^*})^{Low}(u, v) = \gamma_{\Upsilon(h1^*)}(u) \vee \gamma_{\Upsilon(h2^*)}(v)$

$\Delta_{\Upsilon}(h_{1^*}, h_{2^*})_{upp}(u, v) = \Delta_{\Upsilon(h1^*)}(u) \vee \Delta_{\Upsilon(h2^*)}(v)$, $\varpi_{Ř(h1^*, h2^*)upp}(u, v) = \varpi_{\Upsilon(h1^*)}(u) \vee \varpi_{\Upsilon(h2^*)}(v)$,
$\gamma_{\Upsilon}(h1^*, h2^*)_{upp}(u, v) = \gamma_{\Upsilon(h1^*)}(u) \wedge \gamma_{\Upsilon(h2^*)}(v)$

$\Delta_{\Upsilon}(h_{1^*}, h_{2^*})^{bou}(u, v) = \Delta_{\Upsilon(h1^*)}(u) \wedge \gamma_{\Upsilon(Ћ2^*)}(v)$, $\varpi_{\Upsilon(h1^*, h2^*)}{}^{bou}(u, v) = \varpi_{\Upsilon(h1^*)}(u) \wedge (1 - \varpi_{\Upsilon(h2^*)}(v))$,
$\gamma_{\Upsilon}(h_{1^*}, h_{2^*})^{bou}(u, v) = \gamma_{\Upsilon(h1^*)}(u) \vee \Delta_{\Upsilon(h2^*)}(v)$.

3.2 Definition Let (X, Y) be the full set, Ř be an equivalence relation on (X, Y) and
$\tau_{Ř}(H_{1a}, H_{1b})$ = {(ϕ, ϕ), (X, Y), Ṇŋъ^{Low}(H_{1a}, H_{1b}), Ṇŋъ$_{upp}$(H_{1a}, H_{1b}), Ṇŋъ^{bou}(H_{1a}, H_{1b})} where
(H_{1a}, H_{1b}) ⊆ (X, Y). Then by the property $\tau_{Ř}(H_{1a}, H_{1b})$ meets the follwing criteria:

1) (X, Y), (ϕ, ϕ) ϵ $\tau_{Ř}(H_{1a}, H_{1b})$.
2) The ∪ of the elements of any sub-collection of $\tau_{Ř}(H_{1a}, H_{1b})$ is in $\tau_{Ř}(H_{1a}, H_{1b})$.
3) The ∩ of the elements of any finite sub-collection of $\tau_{Ř}(H_{1a}, H_{1b})$ is in $\tau_{Ř}(H_{1a}$, ϑ$ℂ_{1b})$.

ie., $\tau_{Ř}(H_{1a}, H_{1b})$ is a topology on (X, Y) is labeled as Ṇŋъ on (X, Y) with respect to (H_{1a}, H_{1b}). We call ((X, Y), (ϕ, ϕ), $\tau_{Ř}(H_{1a}, H_{1b})$) as the ṆŋъŤs. The elements of $\tau_{Ř}(H_{1a}, H_{1b})$ are named as ṆŋъỎȘ.

3.3 Example
Let X = {e_1, e_2, e_3} and Y = {f_1, f_2, f_3} be the absolute set. Let (X, Y)/Ř = {({e_1}, { f_2}), ({e_2}, f_3}), ({e_3}, {f_1})} be an equivalence relation on (X, Y) and (m, n) = {({<({e_1}, (0.6, 0.7, 0.8)>, <{e_2}, (0.1, 0.3, 0.5)>, <{e_3}, (0.2, 0.4, 0.9)>), (<{f_1},(0.5, 0.6, 0.7)>, <{f_2},(0.2, 0.4, 0.6)>, <{f_3}, (0.1, 0.3, 0.8))>)}} be a subset of (X, Y) then Ṇŋъ^{Low}(m, n) = {(<({e_1}, (0.2, 0.4, 0.8)>, <{e_2}, (0.1, 0.3, 0.8)>, <{e_3}, (0.2, 0.4, 0.9)>), (<{f_1},(0.2, 0.4, 0.9)>,

<{f_2},(0.2, 0.4, 0.8)>, <{f_3}, (0.1, 0.3, 0.8))>)}, Ṇŋь$_{upp}$(m, n) = {(<({e_1}, (0.6, 0.7, 0.6)>, <{e_2}, (0.1, 0.3, 0.5)>, <{e_3}, (0.5, 0.6, 0.7)>), (<{f_1},(0.5, 0.6, 0.7)>, <{f_2},(0.6, 0.7, 0.6)>, <{f_3}, (0.1, 0.3, 0.5))>)}, Ṇŋь^{bou}(m, n) = {(<({e_1}, (0.6, 0.6, 0.6)>, <{e_2}, (0.1, 0.3, 0.5)>, <{e_3}, (0.5, 0.6, 0.7)>), (<{f_1},(0.5, 0.6, 0.7)>, <{f_2},(0.2, 0.4, 0.8)>, <{f_3}, (0.1, 0.3, 0.8))>)}. Then the collection $\psi_{\check{R}}$(m, n) = {(0_X, 0_Y), (1_X, 1_Y), {(<({e_1}, (0.2, 0.4, 0.8)>, <{e_2}, (0.1, 0.3, 0.8)>, <{e_3}, (0.2, 0.4, 0.9)>), (<{f_1},(0.2, 0.4, 0.9)>, <{f_2},(0.2, 0.4, 0.8)>, <{f_3}, (0.1, 0.3, 0.8))>)}, (<({e_1}, (0.6, 0.7, 0.6)>, <{e_2}, (0.1, 0.3, 0.5)>, <{e_3}, (0.5, 0.6, 0.7)>), (<{f_1},(0.5, 0.6, 0.7)>, <{f_2},(0.6, 0.7, 0.6)>, <{f_3}, (0.1, 0.3, 0.5))>)}, {(<({e_1}, (0.6, 0.6, 0.6)>, <{e_2}, (0.1, 0.3, 0.5)>, <{e_3}, (0.5, 0.6, 0.7)>), (<{f_1},(0.5, 0.6, 0.7)>, <{f_2},(0.2, 0.4, 0.8)>, <{f_3}, (0.1, 0.3, 0.8))>)}} is a ṆŋьŤ on (X, Y).

4. Neutrosophic Micro Binary Topological Space

4.1 Definition Let ((U, V), (ϕ, ϕ), $\psi_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$)) be a ṆŋьŤs. Then, Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$) = {W ∪ (W′ ∩ Б): W, W′ ϵ $\psi_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$) and Б doesn't ϵ $\psi_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$)} is called the ṆMьŤ on with (U, V) respect to (ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$). Then, ((U, V), (ϕ, ϕ), $\psi_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$), Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$)) is called ṆMьŤs.

4.2 Definition The neutrosophic micro binary topology Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$) fulfills the following requirements.

1. (U, V), (ϕ, ϕ) ϵ Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$).
2. The ∪ of the elements of any sub-collection of Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$) is in Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$).
3. The ∩ of the elements of any finite sub-collection of Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$) is in Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$).

Then Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$) is known as ṆMьŤ on (U, V) with respect to (ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$). Then ((0_U, 0_V), (1_U, 1_V), $\psi_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$), Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$)) is ṆMьŤs and the elements of Б$_{\check{R}}$(ϑ$\mathfrak{C}_{1a^*}$, ϑ$\mathfrak{C}_{1b^*}$) is denoted by ṆMьǑȘ and the opposite of a ṆMьǑȘ is named as ṆMьÇȘ.

4.3 Definition Let Â and Ꙩ the universe. Then the following statements hold:
($\mathscr{L}$, h) and ($\mathcal{B}$, ⅇ) in the form ($\mathscr{L}$, h) = {<(ḿ, ṋ) : $\mathfrak{C}_{(\mathscr{L},\, h\,)}$(ḿ, ṋ), $\mathfrak{I}_{(\mathscr{L},\, h\,)}$(ḿ, ṋ), $\mathscr{E}_{(\mathscr{L},\, h\,)}$(ḿ, ṋ)>, (ḿ, ṋ) ϵ (Â , Ꙩ)}and ($\mathcal{B}$, ⅇ) = {(ḿ, ṋ) : $\mathfrak{C}_{(\mathcal{B},\, e)}$(ḿ, ṋ), $\mathfrak{I}_{(\mathcal{B},\, e)}$(ḿ, ṋ), $\mathscr{E}_{(\mathcal{B},\, e)}$(ḿ, ṋ)}.

a) $0_{Â}$ = {< ḿ, 0, 0, 1>: (ḿ) ϵ Â } and $0_{Ꙩ}$= {< ṋ, 0, 0, 1>: ṋ ϵ Ꙩ}
b) $1_{Â}$ = {< ḿ, 1, 1, 0>: (ḿ) ϵ Â } and $1_{Ꙩ}$= {< ṋ, 1, 1, 0>: ṋ ϵ Ꙩ}
c) ($\mathscr{L}$, h) ⊆ ($\mathcal{B}$, ⅇ) iff $\mathfrak{C}_{(\mathscr{L})}$(ḿ) ≤ $\mathfrak{C}_{(\mathcal{B})}$(ḿ), $\mathfrak{I}_{(\mathscr{L})}$(ḿ) ≤ $\mathfrak{I}_{(\mathcal{B})}$(ḿ), $\mathscr{E}_{(\mathscr{L})}$(ḿ) ≥ $\mathscr{E}_{(\mathcal{B})}$(ḿ)
$\mathfrak{C}_{(h\,)}$(ṋ) ≤ $\mathfrak{C}_{(e)}$(ṋ), $\mathfrak{I}_{(h\,)}$(ṋ) ≤ $\mathfrak{I}_{(e)}$(ṋ), $\mathscr{E}_{(h\,)}$(ṋ) ≥ $\mathscr{E}_{(e)}$(ṋ)
d) (Â, Ꙩ)$^{¢}$ = {<ḿ, $\mathscr{E}_{Â}$(ḿ), 1—$\mathfrak{I}_{Â}$(ḿ), $\mathfrak{C}_{Â}$(ḿ)> : ḿ ϵ Â , <ṋ, $\mathscr{E}_{Ꙩ}$(ṋ), 1—$\mathfrak{I}_{Ꙩ}$(ṋ), $\mathfrak{C}_{Ꙩ}$(ṋ)> : ṋ ϵ Ꙩ}
e) ($\mathscr{L}$, h) ∩ ($\mathcal{B}$, ⅇ) = {<$\mathfrak{C}_{(\mathscr{L})}$(ḿ) $^{\wedge}\mathfrak{C}_{(\mathcal{B})}$(ḿ), $\mathfrak{I}_{(\mathscr{L})}$(ḿ) $^{\wedge}\mathfrak{I}_{(\mathcal{B})}$(ḿ), $\mathscr{E}_{(\mathscr{L})}$(ḿ) $^{\vee}\mathscr{E}_{(\mathcal{B})}$(ḿ)>, <$\mathfrak{C}_{(h\,)}$(ṋ) $^{\wedge}\mathfrak{C}_{(e)}$(ṋ), $\mathfrak{I}_{(h\,)}$(ṋ) $^{\wedge}\mathfrak{I}_{(e)}$(ṋ), $\mathscr{E}_{(h\,)}$(ṋ) $^{\vee}\mathscr{E}_{(e)}$(ṋ) > : (ḿ, ṋ) ϵ (Â , Ꙩ)}
f) ($\mathscr{L}$, h) ∪ ($\mathcal{B}$, ⅇ) = {<$\mathfrak{C}_{(\mathscr{L})}$(ḿ) $^{\vee}\mathfrak{C}_{(\mathcal{B})}$(ḿ), $\mathfrak{I}_{(\mathscr{L})}$(ḿ) $^{\vee}\mathfrak{I}_{(\mathcal{B})}$(ḿ), $\mathscr{E}_{(\mathscr{L})}$(ḿ) $^{\wedge}\mathscr{E}_{(\mathcal{B})}$(ḿ)>, <$\mathfrak{C}_{(h\,)}$(ṋ) $^{\vee}\mathfrak{C}_{(e)}$(ṋ), $\mathfrak{I}_{(h\,)}$(ṋ) $^{\vee}\mathfrak{I}_{(e)}$(ṋ), $\mathscr{E}_{(h\,)}$(ṋ) $^{\wedge}\mathscr{E}_{(e)}$(ṋ) > : (ḿ, ṋ) ϵ (Â, Ꙩ)}

4.4 Example Let Â = {ɓ, ɱ, ɤ} and Ꙩ = {ℓ, $\mathscr{F}$, ⅄} be the two universal sets. Then, the equivalence relation between the two sets are (Â , Ꙩ)/ẜ = {({ɓ}, {⅄}), ({ɱ}, {$\mathscr{F}$}), ({ɤ}, {ℓ})}. Let (ẕ, թ) = {({<ɓ, (0.6, 0.7, 0.8)>, <ɱ, (0.1, 0.3, 0.5)>, <ɤ, (0.1, 0.3, 0.8)>)},{(<ℓ, (0.2, 0.4, 0.5)>, <$\mathscr{F}$, (0.2, 0.4, 0.9)>, <⅄, (0.5, 0.6, 0.7)>)}} be a subset of (д, Ꙩ). Now, Ṇŋь^{Low}(ẕ, թ) = {<({ɓ}, {⅄}), (0.5, 0.6, 0.8)>, <({ɱ}, {$\mathscr{F}$}), (0.1, 0.3, 0.9)>, <({ɤ}, {ℓ}), (0.1, 0.3, 0.8)>}, Ṇŋь$_{upp}$(ẕ, թ)= {<({ɓ}, {⅄}), (0.6, 0.7, 0.7)>, <({ɱ}, {$\mathscr{F}$}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}, Ṇŋь^{bou} = {<({ɓ}, {⅄}), (0.6, 0.4, 0.7)>, <({ɱ}, {$\mathscr{F}$}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}. Then the ṆŋьŤ $\psi_{ẜ}$(ẕ, թ) = {($0_{Â}$, $0_{Ꙩ}$), ($1_{Â}$, $1_{Ꙩ}$), {<({ɓ}, {⅄}), (0.5, 0.6, 0.8)>, <({ɱ}, {$\mathscr{F}$}), (0.1, 0.3, 0.9)>, <({ɤ}, {ℓ}), (0.1, 0.3, 0.8)>}, {<({ɓ}, {⅄}), (0.6, 0.7, 0.7)>, <({ɱ}, {$\mathscr{F}$}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}, {<({б}, {ƛ}), (0.6, 0.4, 0.7)>, <({ɱ}, {ℱ}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}} is a ṆŋьŤ on (Â, Ȣ). Let Б = {<({б}, {ƛ}), (0.1, 0.5, 0.7)>, <({ɱ}, {ℱ}), (0.6, 0.7, 0.2)>, <({ɤ}, {ℓ}), (0.5, 0.6, 0.1)>}. Then the ṆMьŤ Бℊ(ƺ, ƥ) = {(0д, 0ȣ), (1д, 1ȣ), {<({б}, {ƛ}), (0.5, 0.6, 0.8)>, <({ɱ}, {ℱ}), (0.1, 0.3, 0.9)>, <({ɤ}, {ℓ}), (0.1, 0.3, 0.8)>}, {<({б}, {ƛ}), (0.6, 0.7, 0.7)>, <({ɱ}, {ℱ}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}, {<({б}, {ƛ}), (0.6, 0.4, 0.7)>, <({ɱ}, {ℱ}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}, {<({б}, {ƛ}), (0.1, 0.5, 0.7)>, <({ɱ}, {ℱ}), (0.6, 0.7, 0.2)>, <({ɤ}, {ℓ}), (0.5, 0.6, 0.1)>}, {<({б}, {ƛ}), (0.1, 0.5, 0.8)>, <({ɱ}, {ℱ}), (0.1, 0.3, 0.9)>, <({ɤ}, {ℓ}), (0.1, 0.3, 0.8)>}, {<({б}, {ƛ}), (0.1, 0.5, 0.7)>, <({ɱ}, {ℱ}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}, {<({б}, {ƛ}), (0.5, 0.6, 0.7)>, <({ɱ}, {ℱ}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}, {<({б}, {ƛ}), (0.1, 0.4, 0.7)>, <({ɱ}, {ℱ}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}, {<({б}, {ƛ}), (0.5, 0.6, 0.7)>, <({ɱ}, {ℱ}), (0.6, 0.7, 0.2)>, <({ɤ}, {ℓ}), (0.5, 0.6, 0.1)>}, {<({б}, {ƛ}), (0.6, 0.7, 0.7)>, <({ɱ}, {ℱ}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}, {<({б}, {ƛ}), (0.6, 0.7, 0.7)>, <({ɱ}, {ℱ}), (0.6, 0.7, 0.2)>, <({ɤ}, {ℓ}), (0.5, 0.6, 0.1)>}, {<({б}, {ƛ}), (0.6, 0.5, 0.7)>, <({ɱ}, {ℱ}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}, {<({б}, {ƛ}), (0.6, 0.4, 0.7)>, <({ɱ}, {ℱ}), (0.2, 0.4, 0.5)>, <({ɤ}, {ℓ}), (0.2, 0.4, 0.5)>}, {<({б}, {ƛ}), (0.6, 0.5, 0.7)>, <({ɱ}, {ℱ}), (0.6, 0.7, 0.2)>, <({ɤ}, {ℓ}), (0.5, 0.6, 0.1)>}}.

5. Two Player Game Algorithm

CASE I : Players Won the Game

Step 1: Find the equivalence relation of (Ϭ, Ф) relative to the attributes in Ʒ.

Step 2: Evaluate the Lower approximation, Upper approximation and we get the boundary region to frame the Micro Binary Topological Space.

Step 3: Subtract the features of attribute A from Ʒ and get a low, high and boundary region from Ʒ-A obtain the Micro Binary Topological Space.

Step 4: Compare the topologies in step 2 and step 3. If both are not equal then that corresponding attribute A is included as a key factor and proceed to steps. If the topologies are not equal then the corresponding attribute A cannot be considered as a key factor to proceed to step 5.

Step 5: Repeat step 2 through step 4 to get the key factors.

Step 6: Find the source from step 1 to step 5.

Do the same for **CASE II "**Players Not Won the Game**".**

6. Application of Neutrosophic Micro Binary Topological Space

In this example, I utilize the ṆMьŤs to analyze the topological reaction of qualities in the data set to determine the key factors of "players losing the game".

I have collected the data from the Google form, and the selected players filled in the details through the Google form. The maximum number of reasons, like Lack of Effort (LoE), Reaction Time (RT), Lack of Practice (LoP), Self-Confidence Level (SCL), and Fear of Failure (FoF), are chosen from the players. Then the collected data is given below.

I look at the following table on the different traits of players *A*, including Lack of Effort (LoE), the data set is based on Reaction Time (RT), Lack of Practice (LoP), Self-Confidence Level (SCL) and

Fear of Failure (FoF). I can determine the crucial element that prevented players from winning the match from this data set.

Here Ϭ = {Ps_1, Ps_2, Ps_3} and Ф = {N_{q1}, N_{q2}} be the set of players where (Ϭ, Ф) = $(\{Ϭ_i\}, \{Ф_j\})_{i=1,2,3,\,j=1,2}$ ({Ps_i}, {N_{qj}}) and Ʒ = {LoE, RT, LoP, SCL, FoF} the set of factors that may lead to not won the game. Table-1 gives the information of the set of players, Table-2 the combination of players and Table -3 the players are denoted using the ŅMьs.

PLAYERS	Lack of Effort	Reaction Time	Lack of Practice	Self-Confidence Level	Fear of Failure	Decision
({Ps_1},{N_{q1}})	Very High	Yes	No	No	High	LOSE
({Ps_1}, {N_{q2}})	High	No	Yes	Yes	Very High	WIN
({Ps_2}, {N_{q1}})	Very High	Yes	No	No	High	LOSE
({Ps_2}, {N_{q2}})	High	No	No	Yes	Very High	WIN
({Ps_3}, {N_{q1}})	Very High	Yes	Yes	No	High	WIN
({Ps_3}, {N_{q2}})	High	No	No	Yes	Very High	LOSE

Table - 1 : Player's possible attributes

({Ps_i} × {N_{qj}})	N_{q1}	N_{q2}
Ps_1	({Ps_1}, {N_{q1}})	({Ps_1}, {N_{q2}})
Ps_2	({Ps_2}, {N_{q1}})	({Ps_2}, {N_{q2}})
Ps_3	({Ps_3}, {N_{q1}})	({Ps_3}, {N_{q2}})

Table - 2 : Combination of Players

Pair of players	Neutrosophic Micro Binary Sets
({Ps_1}, {N_{q1}})	(0.6, 0.5, 0.2)
({Ps_1}, {N_{q2}})	(0.4, 0.7, 0.9)
({Ps_2}, {N_{q1}})	(0.1, 0.3, 0.4)
({Ps_2}, {N_{q2}})	(0.5, 0.1, 0.1)
({Ps_3}, {N_{q1}})	(0.3, 0.9, 0.3)
({Ps_3}, {N_{q2}})	(0.7, 0.2, 0.6)

Table - 3 : Neutrosophic Micro Binary Sets

Here Ϭ = {Ps_1, Ps_2, Ps_3} Ф = {N_{q1}, N_{q2}} be the set of players and З = {Lack of Effort, Reaction Time, Lack of Practice, Self-confidence Level, Fear of Failure} the set of factors that may lead to not won the game. Briefly, the set is identified by З = {LoE, RT, LoP, SCL, FoF}.

CASE - 1 : PLAYERS WON THE GAME

Let Ϭ = {Ps_1, Ps_2, Ps_3} and Ф = {N_{q1}, N_{q2}} be the set of players. Let (Ϭ, Ф)/$_{Υ(З)}$ = {({Ps_1, Ps_2}, {N_{q1}}), ({Ps_1}, {N_{q2}}), ({Ps_3}, {N_{q1}}), ({Ps_2, Ps_3}, {N_{q2}})} be an equivalence relation on (Ϭ, Ф) and (ŧ, ꝣ) = {({Ps_1}, {N_{q2}}), ({Ps_2}, {N_{q2}}), ({Ps_3}, {N_{q1}})} be the set of players won the game. Here, Ṇŋь^{low}(З)(ŧ, ꝣ) = {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}.
ṆŋьŤ$_{upp}$(З)(ŧ, ꝣ) = {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}.
ṆŋьŤs^{bou}(З)(ŧ, ꝣ) = {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.1, 0.3)>}. Then the ṆŋьŤs is given by
Ƭ$_{Υ(З)}$(ŧ, ꝣ) = {(0$_Ϭ$, 0$_Ф$), (1$_Ϭ$, 1$_Ф$), {<({Ps_1}, {N_{q2}}, (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}, (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}, (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}, (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}, (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}, (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}, (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}, (0.6, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}, (0.3, 0.1, 0.3)>}}.
∂ = {<({Ps_1}, {N_{q2}}), (0.5, 0.1, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.6, 0.5, 0.2)>}. Therefore, the ṆMьŤs is given by
∂$_{Υ(З)}$(ŧ, ꝣ) = {(0$_Ϭ$, 0$_Ф$), (1$_Ϭ$, 1$_Ф$), {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.1, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.1, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.6, 0.5, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.1, 0.9)>, <({Ps_2}, {N_{q2}}), (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.1, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.1, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.1, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.7, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.6, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.7, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.6, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (06, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.3, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.6, 0.5, 0.2)>}} $\longrightarrow$ **(1).**

Step 1. When З's "Lack of Effort (LoE)" is eliminated, we have

(Ϭ, Ф)/$_{Υ(З-LoE)}$(ŧ, ꝣ) = {({Ps_1, Ps_2}, {N_{q1}}), ({Ps_1}, {N_{q2}}), ({Ps_3}, {N_{q1}}), ({Ps_2, Ps_3}, {N_{q2}})} and (ŧ, ꝣ) = {({Ps_1}, {N_{q2}}), ({Ps_2}, {N_{q2}}), ({Ps_3}, {N_{q1}})}, here Ṇŋь^{low}(З-LoE)(ŧ, ꝣ) = {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}.
ṆŋьŤ$_{upp}$(З-LoE)(ŧ, ꝣ) = {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}.
ṆŋьŤs^{bou}(З-LoE)(ŧ, ꝣ) = {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.1, 0.3)>}. Then the ṆŋьŤs is given by
Ƭ$_{Υ(З-LoE)}$(ŧ, ꝣ) = {(0$_Ϭ$, 0$_Ф$), (1$_Ϭ$, 1$_Ф$), {<({Ps_1}, {N_{q2}}, (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}, (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}, (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}, (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}, (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}, (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}, (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}, (0.6, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}, (0.3, 0.1, 0.3)>}}.
∂ = {<({Ps_1}, {N_{q2}}), (0.5, 0.1, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.6, 0.5, 0.2)>}. Therefore, the ṆMьŤs is given by
∂$_{Υ(З-LoE)}$(ŧ, ꝣ) = {(0$_Ϭ$, 0$_Ф$), (1$_Ϭ$, 1$_Ф$), {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.3,

0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.1, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.1, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.6, 0.5, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.1, 0.9)>, <({Ps_2}, {N_{q2}}), (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.1, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.1, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.1, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.7, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.6, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.7, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.6, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (06, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.3, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.6, 0.5, 0.2)>}}.

Hence $\partial_{\Upsilon(Ʒ-\mathrm{LoE})}$(ȶ, ʐ) = $\partial_{\Upsilon(Ʒ)}$(ȶ, ʐ).

Step 2. After removing the characteristic "Reaction Time (RT)" from Ʒ then

(Ϭ, Ф)/$_{\Upsilon(Ʒ-\mathrm{RT})}$ = {({Ps_1, Ps_2}, {N_{q1}}), ({Ps_1}, {N_{q2}}), ({Ps_3}, {N_{q1}}), ({Ps_2, Ps_3}, {N_{q2}})} be an equivalence relation on (Ϭ, Ф) and (ȶ, ʐ) = {({Ps_1}, {N_{q2}}), ({Ps_2}, {N_{q2}}), ({Ps_3}, {N_{q1}})} be the set of players won the game. Here, ŅŋƄ^{low}(Ʒ-RT)(ȶ, ʐ) = {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}.

ŅŋƄŤ$_{upp}$(Ʒ-RT)(ȶ, ʐ) = {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}.

ŅŋƄŤs^{bou}(Ʒ-RT)(ȶ, ʐ) = {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.1, 0.3)>}. Then the ŅŋƄŤs is given by

Ʈ$_{\Upsilon(Ʒ-\mathrm{RT})}$(ȶ, ʐ) = {($0_{Ϭ}$, $0_{Ф}$), ($1_{Ϭ}$, $1_{Ф}$), {<({Ps_1}, {N_{q2}}, (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}, (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}, (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}, (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}, (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}, (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}, (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}, (0.6, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}, (0.3, 0.1, 0.3)>}}.

∂ = {<({Ps_1}, {N_{q2}}), (0.5, 0.1, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.6, 0.5, 0.2)>}, and the ŅMƄŤs is given by

$\partial_{\Upsilon(Ʒ-\mathrm{RT})}$(ȶ, ʐ) = {($0_{Ϭ}$, $0_{Ф}$), ($1_{Ϭ}$, $1_{Ф}$), {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.1, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.1, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.6, 0.5, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.1, 0.9)>, <({Ps_2}, {N_{q2}}), (0.5, 0.1, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.1, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.1, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.1, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.6, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.7, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_3}, {N_{q1}}), (0.6, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.7, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.3, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.7, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.1)>, <({Ps_3}, {N_{q1}}), (0.6, 0.9, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (06, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.3)>}, {<({Ps_1}, {N_{q2}}), (0.4, 0.3, 0.9)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.3, 0.5, 0.2)>}, {<({Ps_1}, {N_{q2}}), (0.5, 0.3, 0.1)>, <({Ps_2}, {N_{q2}}), (0.7, 0.2, 0.5)>, <({Ps_3}, {N_{q1}}), (0.6, 0.5, 0.2)>}}.

Hence $\partial_{\Upsilon(Ʒ-\mathrm{RT})}$(ȶ, ʐ) = $\partial_{\Upsilon(Ʒ)}$(ȶ, ʐ).

Step 3. Once "Lack of Practice (LoP)" has been removed from Ʒ, then

(Ϭ, Ֆ)/$_{\Upsilon(Ʒ - \mathrm{LoP})}$ = {({Ps$_1$, Ps$_2$, Ps$_3$}, {N$_{q1}$}), ({Ps$_1$}, {N$_{q2}$}), ({Ps$_2$}, {N$_{q2}$}), ({Ps$_3$}, {N$_{q2}$})} and (ȶ, ʐ) = {({Ps$_1$}, {N$_{q2}$}), ({Ps$_2$}, {N$_{q2}$}), ({Ps$_3$}, {N$_{q1}$})}. Here, ṆŋъŤ^{low}(Ʒ − LoP)(ȶ, ʐ) = {<({Ps$_1$}, {N$_{q2}$}), (0.3, 0.7, 0.3)>, <({Ps$_2$}, {N$_{q2}$}), (0.3, 0.1, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}.
ṆŋъŤ$_{upp}$(Ʒ − LoP)(ȶ, ʐ) = {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.7, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.9, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}.
ṆŋъŤ^{bou}(Ʒ − LoP)(ȶ, ʐ) = {<({Ps$_1$}, {N$_{q2}$}), (0.3, 0.3, 0.3)>, <({Ps$_2$}, {N$_{q2}$}), (0.3, 0.9, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.1, 0.3)>}, and the ṆŋъŤs is given by
Ʈ$_{\Upsilon(Ʒ - \mathrm{LoP})}$(ȶ, ʐ) = {(0$_Ϭ$, 0$_Ֆ$), (1$_Ϭ$, 1$_Ֆ$), {<({Ps$_1$}, {N$_{q2}$}), (0.3, 0.7, 0.3)>, <({Ps$_2$}, {N$_{q2}$}), (0.3, 0.1, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.7, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.9, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.3, 0.3, 0.3)>, <({Ps$_2$}, {N$_{q2}$}), (0.3, 0.9, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.1, 0.3)>}}.
∂ = {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>}.
Therefore, the ṆMъŤs is given by
∂$_{\Upsilon(Ʒ - \mathrm{LoP})}$(ȶ, ʐ) = {(0$_Ϭ$, 0$_Ֆ$), (1$_Ϭ$, 1$_Ֆ$), {<({Ps$_1$}, {N$_{q2}$}), (0.3, 0.7, 0.3)>, <({Ps$_2$}, {N$_{q2}$}), (0.3, 0.1, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.7, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.9, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.3, 0.3, 0.3)>, <({Ps$_2$}, {N$_{q2}$}), (0.3, 0.9, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.1, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.3, 0.5, 0.3)>, <({Ps$_2$}, {N$_{q2}$}), (0.3, 0.1, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.7, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.2, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.3, 0.3, 0.3)>, <({Ps$_2$}, {N$_{q2}$}), (0.3, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.1, 0.1, 0.4)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.3, 0.7, 0.3)>, <({Ps$_2$}, {N$_{q2}$}), (0.3, 0.2, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.7, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.7, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.9, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.3, 0.5, 0.3)>, <({Ps$_2$}, {N$_{q2}$}), (0.3, 0.9, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.3, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.9, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.3, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.9, 0.3)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.3, 0.3)>}}.

Hence ∂$_{\Upsilon(Ʒ - \mathrm{LoP})}$(ȶ, ʐ) ≠ ∂$_{\Upsilon(Ʒ)}$(ȶ, ʐ).

Step 4. When the aspect "Self-Confidence Level (SCL)" is detached from Ʒ then

(Ϭ, Ֆ)/$_{\Upsilon(Ʒ - \mathrm{SCL})}$ = {({Ps$_1$, Ps$_2$}, {N$_{q1}$}), ({Ps$_1$}, {N$_{q2}$}), ({Ps$_3$}, {N$_{q1}$}), ({Ps$_2$, Ps$_3$}, {N$_{q2}$})} and (ȶ, ʐ) = {({Ps$_1$}, {N$_{q2}$}), ({Ps$_2$}, {N$_{q2}$}), ({Ps$_3$}, {N$_{q1}$})}. Here, ṆŋъŤ^{low}(Ʒ−SCL)(ȶ, ʐ) = {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.1, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}.
ṆŋъŤ$_{upp}$(Ʒ − SCL)(ȶ, ʐ) = {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}.
ṆŋъŤ^{bou}(Ʒ − SCL)(ȶ, ʐ) = {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.3, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.6, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.1, 0.3)>}, and the ṆŋъŤs is given by
Ʈ$_{\Upsilon(Ʒ - \mathrm{SCL})}$(ȶ, ʐ) = {(0$_Ϭ$, 0$_Ֆ$), (1$_Ϭ$, 1$_Ֆ$), {<({Ps$_1$}, {N$_{q2}$}, (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}, (0.5, 0.1, 0.6)>, <({Ps$_3$}, {N$_{q1}$}, (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}, (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}, (0.7, 0.2, 0.1)>, <({Ps$_3$}, {N$_{q1}$}, (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}, (0.4, 0.3, 0.9)>, <({Ps$_2$}, {N$_{q2}$}, (0.6, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}, (0.3, 0.1, 0.3)>}}.
∂ = {<({Ps$_1$}, {N$_{q2}$}), (0.5, 0.1, 0.1)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>}.
Therefore, the ṆMъŤs is given by,
∂$_{\Upsilon(Ʒ - \mathrm{SCL})}$(ȶ, ʐ) = {(0$_Ϭ$, 0$_Ֆ$), (1$_Ϭ$, 1$_Ֆ$), {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.1, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.3, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.6, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.1, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.5, 0.1, 0.1)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.1, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.1, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.5, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.1, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.5, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>,

<({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.1, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.6, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.1, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.6, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.5, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.6, 0.9, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.5, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.6, 0.9, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.3, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (06, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.5, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.3, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.5, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.5, 0.3, 0.1)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>}}.

Hence ∂$_{ϒ(Ʒ-SCL)}$(ȶ, ƺ) = ∂$_{ϒ(Ʒ)}$(ȶ, ƺ).

Step 5. When the feature "Fear of Failure (FoF)" is separated from Ʒ then

(Ϭ, Ꝓ)/$_{ϒ(Ʒ\text{-}FoF)}$ = {({Ps$_1$, Ps$_2$}, {N$_{q1}$}), ({Ps$_1$}, {N$_{q2}$}), ({Ps$_3$}, {N$_{q1}$}), ({Ps$_2$, Ps$_3$}, {N$_{q2}$})} be an equivalence relation on (Ϭ, Ꝓ) and (ȶ, ƺ) = {({Ps$_1$}, {N$_{q1}$}), ({Ps$_2$}, {N$_{q2}$}), ({Ps$_3$}, {N$_{q1}$})} be the set of students won the game. Here, ȠŋъŤ^{low}(Ʒ − FoF)(ȶ, ƺ) = {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.1, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}.

ȠŋъŤ$_{upp}$(Ʒ − FoF)(ȶ, ƺ) = {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}.

ȠŋъŤ^{bou}(Ʒ − FoF)(ȶ, ƺ) = {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.3, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.6, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.1, 0.3)>}, and the ȠŋъŤs is given by

Ʈ$_{ϒ(Ʒ - FoF)}$(ȶ, ƺ) = {(0$_Ϭ$, 0$_Ꝓ$), (1$_Ϭ$, 1$_Ꝓ$), {<({Ps$_1$}, {N$_{q2}$}, (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}, (0.5, 0.1, 0.6)>, <({Ps$_3$}, {N$_{q1}$}, (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}, (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}, (0.7, 0.2, 0.1)>, <({Ps$_3$}, {N$_{q1}$}, (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}, (0.4, 0.3, 0.9)>, <({Ps$_2$}, {N$_{q2}$}, (0.6, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}, (0.3, 0.1, 0.3)>}}.

∂ = {<({Ps$_1$}, {N$_{q2}$}), (0.5, 0.1, 0.1)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>} and the ȠMъŤs is given by

∂$_{ϒ(Ʒ - FoF)}$(ȶ, ƺ) = {(0$_Ϭ$, 0$_Ꝓ$), (1$_Ϭ$, 1$_Ꝓ$), {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.1, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.3, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.6, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.1, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.5, 0.1, 0.1)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.1, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.5, 0.1, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.5, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.1, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.5, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.1, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.6, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.1, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.6, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.5, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>, <({Ps$_3$}, {N$_{q1}$}), (0.6, 0.9, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.7, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.9, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.5, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.1)>, <({Ps$_3$}, {N$_{q1}$}), (0.6, 0.9, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.3, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (06, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.5, 0.3)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.4, 0.3, 0.9)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}), (0.3, 0.5, 0.2)>}, {<({Ps$_1$}, {N$_{q2}$}), (0.5, 0.3, 0.1)>, <({Ps$_2$}, {N$_{q2}$}), (0.7, 0.2, 0.5)>, <({Ps$_3$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>}}.

Hence ∂$_{ϒ(Ʒ-FoF)}$(ȶ, ƺ) = ∂$_{ϒ(Ʒ)}$(ȶ, ƺ)

CASE - 2 : PLAYERS NOT WON THE GAME

Let Ϭ = {Ps$_1$, Ps$_2$, Ps$_3$}, Ꝓ = {N$_{q1}$, N$_{q2}$} be the set of players. Let (Ϭ, Ꝓ)/$_{ϒ(Ʒ)}$ = {({Ps$_1$, Ps$_2$}, {N$_{q1}$}), ({Ps$_1$}, {N$_{q2}$}), ({Ps$_3$}, {N$_{q1}$}), ({Ps$_2$, Ps$_3$}, {N$_{q2}$})} be an equivalence relation on (Ϭ, Ꝓ) and (ȶ, ƺ) = {({Ps$_1$}, {N$_{q1}$}), ({Ps$_2$}, {N$_{q1}$}), ({Ps$_3$}, {N$_{q2}$})} be the set of players not won the game. Here, Ƞŋъ^{low}(Ʒ)(ȶ, ƺ) = {<({Ps$_1$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_2$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.3, 0.1, 0.9)>}.

ŅŋъŤ$_{upp}$(Ʒ)(ŧ, ʐ) = {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.1)>}.
ŅŋъŤ^{bou}(Ʒ)(ŧ, ʐ) = {<({Ps$_1$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.3)}. Then ŅŋъŤs is given by
Ʈ$_{Υ(Ʒ)}$(ŧ, ʐ) = {(0$_б$, 0$_ф$), (1$_б$, 1$_ф$), {<({Ps$_1$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_2$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.3, 0.1, 0.9)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.1)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.3)>}}.
∂ = {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.9)>, ({Ps$_3$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>} and the ŅMъŤs is given by
∂$_{Υ(Ʒ)}$(ŧ, ʐ) = {(0$_б$, 0$_ф$), (1$_б$, 1$_ф$), {<({Ps$_1$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_2$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.3, 0.1, 0.9)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.1)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.9)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_2$}, {N$_{q1}$}), (0.1, 0.3, 0.9)>, <({Ps$_3$}, {N$_{q2}$}), (0.3, 0.1, 0.9)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.4, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.9)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.4, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.3)>}} $\longrightarrow$ **(2).**

Step 1. When the aspect "Lack of Effort (LoE)" is separated from Ʒ, we have

(Б, Ф)/$_{Υ(Ʒ-LoE)}$ = {({Ps$_1$, Ps$_2$}, {N$_{q1}$}), ({Ps$_3$}, {N$_{q2}$})} and (ŧ, ʐ) = {({Ps$_1$}, {N$_{q1}$}), ({Ps$_2$}, {N$_{q1}$}), ({Ps$_3$}, {N$_{q2}$})}.
Here, Ņŋъ^{low}(Ʒ − LoE)(ŧ, ʐ) = {<({Ps$_1$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_2$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.3, 0.1, 0.9)>}.
ŅŋъŤ$_{upp}$(Ʒ − LoE)(ŧ, ʐ) = {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.1)>}.
ŅŋъŤ^{bou}(Ʒ − LoE)(ŧ, ʐ) = {<({Ps$_1$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.3)}, ŅŋъŤs is given by
Ʈ$_{Υ(Ʒ-LoE)}$(ŧ, ʐ) = {(0$_б$, 0$_ф$), (1$_б$, 1$_ф$), {<({Ps$_1$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_2$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.3, 0.1, 0.9)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.1)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.3)>}}.
∂ = {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.9)>, ({Ps$_3$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>}. Therefore, the ŅMъŤs is given by
∂$_{Υ(Ʒ-LoE)}$(ŧ, ʐ) = {(0$_б$, 0$_ф$), (1$_б$, 1$_ф$), {<({Ps$_1$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_2$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.3, 0.1, 0.9)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.6, 0.9, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.1)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.3)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.9)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_2$}, {N$_{q1}$}), (0.1, 0.3, 0.9)>, <({Ps$_3$}, {N$_{q2}$}), (0.3, 0.1, 0.9)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.4, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.9)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.4, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.5, 0.2)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.2, 0.6)>}, {<({Ps$_1$}, {N$_{q1}$}), (0.6, 0.7, 0.1)>, <({Ps$_2$}, {N$_{q1}$}), (0.4, 0.7, 0.1)>, <({Ps$_3$}, {N$_{q2}$}), (0.7, 0.9, 0.3)>}}.

Hence ∂$_{Υ(Ʒ-LoE)}$(ŧ, ʐ) = ∂$_{Υ(Ʒ)}$(ŧ, ʐ).

Step 2. When the attribute "Reaction Time (RT)" is removed from Ʒ, we have

(Б, Ф)/$_{Υ(Ʒ-RT)}$ = {({Ps$_1$, Ps$_2$}, {N$_{q1}$}), ({Ps$_3$}, {N$_{q2}$})} and (ŧ, ʐ) = {({Ps$_1$}, {N$_{q1}$}), ({Ps$_2$}, {N$_{q1}$}), ({Ps$_3$}, {N$_{q2}$})}.
Here, Ņŋъ^{low}(Ʒ−RT)(ŧ, ʐ) = {<({Ps$_1$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_2$}, {N$_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps$_3$}, {N$_{q2}$}), (0.3, 0.1, 0.9)>}.

ṆŋъŤ$_{upp}$(Ʒ－RT)(ȶ, ȥ) = {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.1)>}.

ṆŋъŤ^{bou}(Ʒ－RT)(ȶ, ȥ) = {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)}, ṆŋъŤs is given by

Ƭ$_{Υ(Ʒ-RT)}$(ȶ, ȥ) = {(0б, 0ȹ), (1б, 1ȹ), {<({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.1)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)>}}.

∂ = {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.9)>, ({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}. Therefore, the ṆMъŤs is given by

∂$_{Υ(Ʒ-RT)}$(ȶ, ȥ) = {(0б, 0ȹ), (1б, 1ȹ), {<({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.1)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.9)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.9)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.9)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.4)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.4)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)>}}.

Hence ∂$_{Υ(Ʒ-RT)}$(ȶ, ȥ) = ∂$_{Υ(Ʒ)}$(ȶ, ȥ).

Step 3. When the characteristic "Lack of Practice (LoP)" is eliminated from Ʒ then

(Ϭ, ȹ)/$_{Υ(Ʒ-LoP)}$ = {({Ps_1, Ps_2, Ps_3}, {N_{q1}}), ({Ps_1}, {N_{q2}}), ({Ps_2}, {N_{q2}}), ({Ps_3}, {N_{q2}})} and (ȶ, ȥ) = {({Ps_1}, {N_{q1}}), ({Ps_2}, {N_{q1}}), ({Ps_3}, {N_{q2}})}. Here, Ṇŋъ^{low}(Ʒ－LoP)(ȶ, ȥ) = {<({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.1, 0.3, 0.4)>}.

ṆŋъŤ$_{upp}$(Ʒ－LoP)(ȶ, ȥ) = {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.2), <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.2)>, <({Ps_3}, {N_{q2}}), (0.6, 0.9, 0.2)>}.

ṆŋъŤ^{bou}(Ʒ－LoP)(ȶ, ȥ) ={<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.2), <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.2)>, <({Ps_3}, {N_{q2}}), (0.4, 0.7, 0.2)>}, ṆŋъŤs is given by

Ƭ$_{Υ(Ʒ-LoP)}$(ȶ, ȥ) = {(0б, 0ȹ), (1б, 1ȹ), {<({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.1, 0.3, 0.4)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.2), <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.2)>, <({Ps_3}, {N_{q2}}), (0.6, 0.9, 0.2)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.2), <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.2)>, <({Ps_3}, {N_{q2}}), (0.4, 0.7, 0.2)>}}.

∂ = {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2), <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>} and the ṆMъŤs is given by

∂$_{Υ(Ʒ-LoP)}$(ȶ, ȥ) = {(0б, 0ȹ), (1б, 1ȹ), {<({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.1, 0.3, 0.4)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.2), <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.2)>, <({Ps_3}, {N_{q2}}), (0.6, 0.9, 0.2)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.2), <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.2)>, <({Ps_3}, {N_{q2}}), (0.4, 0.7, 0.2)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2), <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>, <({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.1, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.6, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.6, 0.3, 0.4)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.4, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.4, 0.3, 0.4)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.7, 0.3, 0.4)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.2)>, <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.2)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.2)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.7, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.2)>, <({Ps_3}, {N_{q2}}), (0.6, 0.7, 0.2)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.7, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.2)>, <({Ps_3}, {N_{q2}}), (0.7, 0.7, 0.2)>}}.

Hence ∂$_{Υ(Ʒ-LoP)}$(ȶ, ȥ) ≠ ∂$_Υ$(Ʒ)(ȶ, ȥ).

Step 4. When the aspect "Self-Confidence Level (SCL)" is disengaged from Ʒ then

(Ϭ, Ф)/$_{\Upsilon(\text{Ʒ}-SCL)}$ = {({Ps_1, Ps_2}, {N_{q1}}), ({Ps_3}, {N_{q2}})} and (ŧ, ȥ) = {({Ps_1}, {N_{q1}}), ({Ps_2}, {N_{q1}}), ({Ps_3}, {N_{q2}})}. Here, Ņŋъ^{low}(Ʒ − SCL)(ŧ, ȥ) = {<({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}.
ŅŋъŤ$_{upp}$(Ʒ − SCL)(ŧ, ȥ) = {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ѫ$_3$}, {N_{q2}}), (0.7, 0.9, 0.1)>}.
ŅŋъŤ^{bou}(Ʒ − SCL)(ŧ, ȥ) = {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)}, ŅŋъŤs is given by
Ʈ$_{\Upsilon(\text{Ʒ}-SCL)}$(ŧ, ȥ) = {(0$_Ϭ$, 0$_Ф$), (1$_Ϭ$, 1$_Ф$), {<({$Ps_1$}, {$N_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.1)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)>}}.
∂ = {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.9)>, ({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}. Therefore, the ŅMъŤs is given by
∂$_{\Upsilon(\text{Ʒ}-SCL)}$(ŧ, ȥ) = {(0$_Ϭ$, 0$_Ф$), (1$_Ϭ$, 1$_Ф$), {<({$Ps_1$}, {$N_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.1)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.9)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.9)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.9)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.4)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.4)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)>}}.

Hence ∂$_{\Upsilon(\text{Ʒ}-SCL)}$(ŧ, ȥ) = ∂$_{\Upsilon(\text{Ʒ})}$(ŧ, ȥ).

Step 5. When the feature "Fear of Failure (FoF)" is separated from Ʒ then

(Ϭ, Ф)/$_{\Upsilon(\text{Ʒ}-FoF)}$ = {({Ps_1, Ps_2}, {Ю$_1$}), ({Ps_3}, {N_{q2}})} and (ŧ, ȥ) = {({Ps_1}, {N_{q1}}), ({Ps_2}, {N_{q1}}), ({Ps_3}, {N_{q2}})}. Here, Ņŋъ^{low}(Ʒ − FoF)(ŧ, ȥ) = {<({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}.
ŅŋъŤ$_{upp}$(Ʒ − FoF)(ŧ, ȥ) = {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.1)>}.
ŅŋъŤ^{bou}(Ʒ − FoF)(ŧ, ȥ) = {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)}, ŅŋъŤs is given by
Ʈ$_{\Upsilon(\text{Ʒ}-FoF)}$(ŧ, ȥ) = {(0$_Ϭ$, 0$_Ф$), (1$_Ϭ$, 1$_Ф$), {<({$Ps_1$}, {$N_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.1)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)>}}.
∂ = {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.9)>, ({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}. Therefore, the ŅMъŤs is given by
∂$_{\Upsilon(\text{Ʒ}-FoF)}$(ŧ, ȥ) = {(0$_Ϭ$, 0$_Ф$), (1$_Ϭ$, 1$_Ф$), {<({$Ps_1$}, {$N_{q1}$}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_2}, {N_{q1}}), (0.6, 0.9, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.1)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.9)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.1, 0.3, 0.4)>, <({Ps_2}, {N_{q1}}), (0.1, 0.3, 0.9)>, <({Ps_3}, {N_{q2}}), (0.3, 0.1, 0.9)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.9)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.4, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.4)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.5, 0.2)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.4)>, <({Ps_3}, {N_{q2}}), (0.7, 0.2, 0.6)>}, {<({Ps_1}, {N_{q1}}), (0.6, 0.7, 0.1)>, <({Ps_2}, {N_{q1}}), (0.4, 0.7, 0.1)>, <({Ps_3}, {N_{q2}}), (0.7, 0.9, 0.3)>}}.

Hence $\partial_{\Upsilon(\text{ɜ}-\text{FoF})}(\text{ȶ}, \text{ʐ}) = \partial_{\Upsilon(\text{ɜ})}(\text{ȶ}, \text{ʐ})$.

7. Observation: The two aforementioned examples demonstrate that "Lack of Practice (LoP)" are the main reasons why players lose games.

8. Conclusions

Through the application of ŅMьŤs to the sports industry, I have determined that "Lack of Practice (LoP)" are the primary causes of players' defeats. When playing games, gamers encounter both wins and losses, with losing being an essential component of the whole experience. Losing can be disheartening and discouraging, but it also presents invaluable opportunities for growth. Players might find areas where they might improve their abilities, strategies, or decision-making processes by researching the reasons behind a loss. You can succeed in the future by changing your perspective and seeing failures as opportunities for growth rather than as setbacks. To succeed in overcoming barriers and working toward game fulfillment, athletes may develop resilience, adaptability, and tenacity. It can be applied in many different kinds of domains, including advertising, commerce, health care, and beyond.

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