# Theory Applied: Descriptor Usage and Functional Meaning
## Profile Pattern Diagnostics (PPD)

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### Abstract

This document specifies how the analytical tools defined in ***Theory.pdf*** are applied in practice across capability groups and analytical axes. No mathematical definitions or formulas are introduced here. Each descriptor is listed together with its permitted *functional meaning* under each context of use.

## 1. Global interpretive constraints

All descriptors retain the following properties across all applications:

- diagnostic rather than predictive
- non-composite
- non-ranking by default
- structure-preserving

Descriptors never change meaning. Only their **unit of analysis** and **interpretive role** vary.

## 2. Axis A — Within-candidate diagnostics

**Unit of analysis:** dimensions within a single candidate profile

**Permitted tools and functional meaning**

- **Mean** ($\mu$) — overall capability level within the profile
- **Population standard deviation** ($\sigma$) — balance versus unevenness across dimensions
- **Minimum value** ($m$) — absolute weakest capability signal
- **Bottleneck dimension** ($d_{\min}$) — identifies the specific limiting dimension
- **Maximum value** ($M$) — contextual upper-bound reference only
- **Range** ($\Delta$) — contrast between strongest and weakest dimensions
- **Adjacent difference energy** ($D$) — local volatility between neighbouring dimensions (only when ordering is meaningful)
- **Polarisation flag** — coexistence of pronounced strengths and weaknesses
- **Within-candidate standardised scores** ($z_i$) — attribution of relative strengths and weaknesses within the same profile

**Explicit exclusions**

- cohort mean ($\mu_c$)
- sample standard deviation across candidates ($s_c$)
- percentile ranks

## 3. Axis B — Across-candidate screening

**Unit of analysis:** candidates for a fixed dimension or capability group

**Permitted tools and functional meaning**

- **Cohort mean** ($\mu_c$) — programme-level average capability
- **Sample standard deviation** ($s_c$) — heterogeneity of preparation across candidates
- **Threshold breach rate** ($p_{\mathbf{breach}}$) — concentration of candidates below an operational minimum
- **Percentile rank** — relative cohort context (descriptive only)
- **Group aggregate score** ($G_{k,j}$) — average performance within a capability group
- **Group-level variability** ($s_{G_k}$) — dispersion of group-level performance across the cohort

**Explicit exclusions**

- balance gating
- bottleneck classification
- polarisation flags
- adjacent difference energy ($D$)
- within-candidate standardised scores ($z_i$)

## 4. Capability-specific application (Axis A)

### 4.1. Communication Skills

*Sequential, interdependent capability structure*

- **Mean** ($\mu$) — overall communicative level
- **Standard deviation** ($\sigma$) — uniform versus uneven communicative development
- **Minimum** ($m$) **/ bottleneck** ($d_{\min}$) — dominant communicative failure mode
- **Range** ($\Delta$) — strength–gap contrast
- **Adjacent difference energy** ($D$) — instability across neighbouring communication stages
- **Polarisation flag** — simultaneous strong and weak communication subskills
- **Z-scores** ($z_i$) — localisation of strengths and weaknesses

### 4.2. Cognitive Insights

*Unordered reasoning capabilities*

- **Mean** ($\mu$) — overall cognitive level
- **Standard deviation** ($\sigma$) — evenness of reasoning styles
- **Minimum** ($m$) **/ bottleneck** ($d_{\min}$) — weakest cognitive constraint
- **Range** ($\Delta$) — polarised versus uniform reasoning
- **Polarisation flag** — coexistence of strong and weak reasoning modes
- **Z-scores** ($z_i$) — attribution of relative cognitive strengths and weaknesses

### 4.3. Analytical & Quantitative Skills

*Objective, testable capability resolution*

- **Mean** ($\mu$) — quantitative readiness
- **Standard deviation** ($\sigma$) — consistency of quantitative thinking

- **Minimum** ($m$) **/ bottleneck** ($d_{\min}$) — specific failure risk (e.g. error under pressure)
- **Range** ($\Delta$) — specialist versus generalist signal
- **Adjacent difference energy** ($D$) — pipeline instability (only with explicit ordering)
- **Polarisation flag** — uneven quantitative capability profile
- **Z-scores** ($z_i$) — localisation of quantitative strengths and weaknesses

### 4.4. Problem Structuring & Framework Use

*Orthogonal, assessor-stable reasoning facets*

- **Mean** ($\mu$) — structuring maturity
- **Standard deviation** ($\sigma$) — uneven framework usage
- **Minimum** ($m$) **/ bottleneck** ($d_{\min}$) — missing reasoning component
- **Range** ($\Delta$) — partial framework competence
- **Polarisation flag** — uneven application of reasoning components
- **Z-scores** ($z_i$) — attribution of relative strengths and gaps

## 5. Risk-control categories

### 5.1. Execution & Task Reliability

- **Minimum** ($m$) — eliminative risk signal
- **Standard deviation** ($\sigma$) — inconsistency warning
- **Mean** ($\mu$) — contextual performance reference
- **Across-candidate breach rate** ($p_{\mathbf{breach}}$) — systemic reliability risk
- **Across-candidate variability** ($s_c$) — dispersion of reliability across the intake

### 5.2. Collaboration & Professional Interaction

- **Minimum** ($m$) — interpersonal failure mode
- **Standard deviation** ($\sigma$) — uneven interaction behaviour
- **Mean** ($\mu$) — descriptive interaction level
- **Across-candidate breach rate** ($p_{\mathbf{breach}}$) — team-level interaction risk
- **Across-candidate variability** ($s_c$) — consistency of interaction behaviour across the cohort

### Author's Note

All analytical tools, interpretive rules, and structural constraints described in this document were designed independently by the author. ChatGPT (OpenAI) was used to assist with drafting, LaTeX formatting and hyper condensing of material in above text.