PMaps

RESEARCH · APPLIED AI · 2026

EXPLORATORY PSYCHOMETRIC ALIGNMENT STUDY

DISC · AUDIO & TEXT INFERENCE

Inferring DISC behavioral dimensions from audio & text features.

Can speech and language signals recover the same behavioral profiles as psychometric traits? An exploratory study examining directional alignment between two independent paths to DISC.

DISC FRAMEWORK | 16PF-ALIGNED | SPEECH & LANGUAGE AI | TWO-STREAM DESIGN

755	2	4	24.37%	23
CANDIDATES ANALYSED	INDEPENDENT DISC STREAMS	DISC DIMENSIONS	DISC PROFILE AGREEMENT	TRAITS + AUDIO-TEXT FEATURES

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What's inside.

ABSTRACT

This study examines whether DISC behavioral dimensions can be inferred from audio and text features, and whether the resulting audio–text DISC profiles show directional alignment with DISC-like profiles derived from behavioral traits. Behavioral DISC scores were computed from standardized psychometric traits aligned with the 16PF framework using predefined DISC–trait groupings, while audio–text DISC scores were inferred independently from standardized speech and language features using a theory-guided weighted mapping with defined feature directionality.

Alignment was examined through (a) correlations between behavioral and audio–text DISC scores, (b) DISC profile agreement between the two methods, and (c) comparison of average audio–text feature patterns across behavioral DISC groups. Results indicate **modest but interpretable directional alignment** across DISC dimensions, a DISC agreement rate of **24.37%**, and clear feature-level patterns consistent with DISC-style communication descriptions. The study makes no predictive or causal claims and positions audio–text inference as a complementary, interpretable signal alongside preference-based psychometric assessment.

DISC · audio-text inference · 16PF · psychometric alignment · applied AI · speech & language

01 · INTRODUCTION

DISC as a common interpretive layer.

The DISC framework, originally developed from the work of psychologist William Moulton Marston, is a widely used behavioral model describing how individuals typically approach tasks, interact with others, and respond to their work environment. It categorizes behavioral style into four broad dimensions.

D

Dominance

Assertiveness and drive.

I

Influence

Sociability and expressiveness.

S

Steadiness

Calmness and cooperation.

C

Conscientiousness

Structure, accuracy, and rule orientation.

In organizational settings, DISC-like profiles are most commonly derived from questionnaire-based assessments. In this study, DISC profiles are **not** measured directly through a DISC questionnaire; instead, they are derived by mapping established psychometric traits — specifically traits aligned with the 16PF framework — into DISC dimensions, allowing DISC to function as a common interpretive layer.

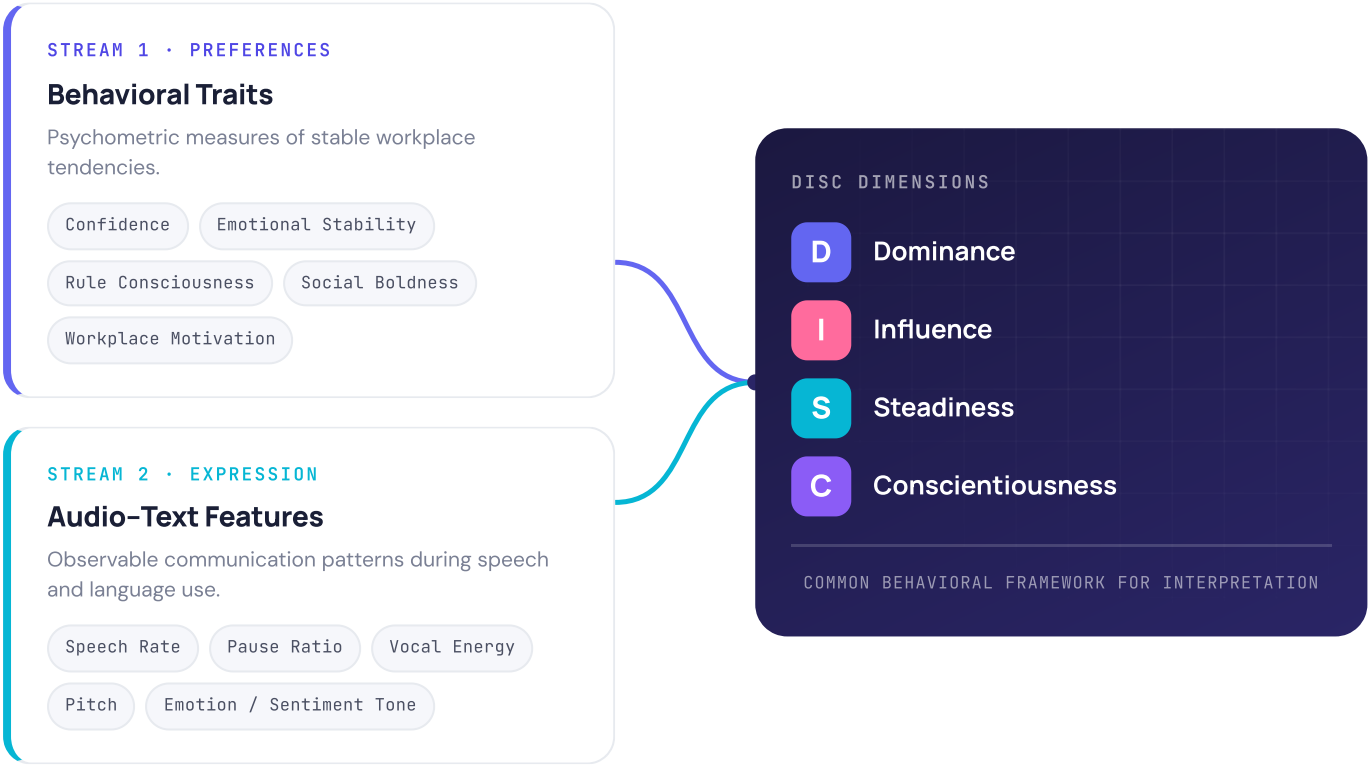
At the same time, workplace interactions increasingly occur through spoken communication — interviews, customer conversations, internal discussions. Advances in speech and language processing now make it possible to analyze how people communicate, including features such as speech pace, vocal energy, and pause behavior, as well as emotional and sentiment-related features such as overall tone and use of positive or negative language. These features do not measure personality directly; rather, they provide indicators of emotional expression, engagement, and communication style as they naturally occur.

> By studying their alignment, this research grounds AI-based behavioral inference in established psychological constructs — positioning audio-text analysis as a complementary, interpretable lens, not a replacement for psychometric assessment.

02 · BEHAVIORAL TRAITS & AUDIO-TEXT SIGNALS

Two paths to the same framework.

Behavioral traits describe how individuals tend to *prefer* acting at work, whereas audio–text features capture how those tendencies are *expressed* during real communication. Both sources are independently mapped to DISC dimensions as a common behavioral framework — illustrating alignment and interpretability across measurement approaches without implying causal, predictive, or hierarchical relationships.



BEHAVIORAL TRAITS — PREFERENCES

Represent stable workplace preferences measured through psychometric assessment. They describe how individuals tend to prefer acting and interacting at work.

AUDIO-TEXT FEATURES — EXPRESSION

Represent observable behavioral expression during communication — how preferences surface through speech, language, and emotional tone.

Figure 1 · Behavioral traits and audio-text features independently mapped to a shared DISC framework.

03 · METHOD

A two-stream, independent design.

DISC profiles were computed in two independent ways: a **behavioral DISC profile** derived from grouped psychometric trait scores, and an **audio–text DISC profile** inferred from speech and language features via a theory-guided weighted mapping. The two streams were processed separately so alignment could be evaluated without one method influencing the other. All cleaning, feature extraction, scoring, and analyses ran through a reproducible Python pipeline.

FINAL DATASET	MEAN AGE	STREAMS	PIPELINE
755	32.9 yrs	2	Python
After cleaning & quality checks	SD 6.77 · early–mid career	Processed independently	Fully reproducible

GENDER DISTRIBUTION

Male — 72% Female — 28%

WORK EXPERIENCE (by representation)

1–3 years	Largest
More than 8 years	2nd
3–5 years	3rd
5–8 years	4th
Less than 1 year	Smallest

NATIONALITY (multinational)

Indian nationals	Largest
Pakistani nationals	2nd
Egyptian nationals	3rd
Other nationalities	remainder

WORKPLACE MOTIVATION

Job role / recognition	Most
Training & development	Fewer

Most participants were driven primarily by the nature of their job role or by recognition and rewards, with a smaller proportion emphasizing training and development.

REPORTED DESCRIPTIVELY

Experience, nationality, and motivation are reported by relative representation; exact proportions were not specified. Demographics provide organizational context and are not used in causal or predictive claims.

03.1 · MEASURES & CONSTRUCTS

Behavioral traits (16PF-aligned).

Behavioral traits were derived from a standardized psychometric framework aligned with the 16 Personality Factor (16PF) model — stable workplace tendencies related to confidence, emotional regulation, social interaction, and rule orientation. Rather than treating these as outcomes, they were theoretically mapped to DISC dimensions, mirroring the method used for audio–text features so DISC serves as a common behavioral framework.

01 **Confidence**
Belief in one's abilities and judgments in work-related situations.

02 **Social Boldness**
Comfort initiating interaction and expressing oneself socially.

03 **Workplace Motivation**
Drive, effort, and engagement toward work tasks.

04 **Warmth**
Friendliness and tendency to build positive relationships.

05 **Openness to Change**
Willingness to adapt to new ideas, methods, or situations.

06 **Group Orientation**
Preference for teamwork, cooperation, and collaboration.

07 **Emotional Stability**
Remaining calm, composed, and resilient under pressure.

08 **Compliance**
Tendency to follow rules, authority, and organizational norms.

09 **Perfectionism**
Focus on accuracy, quality, and high performance standards.

10 **Rule Consciousness**
Respect for procedures, structure, and formal guidelines.

11 **Abstractness**
Preference for conceptual thinking over concrete detail.

CONSTRUCT ROLE

These traits represent stable behavioral **preferences** measured through psychometric assessment — the first of the two streams mapped to DISC.

03.2 · MEASURES & CONSTRUCTS

Audio–text features (speech & language).

Audio–text features were extracted from recorded speech and corresponding transcripts to capture observable aspects of communication behavior. They are not personality measures; instead they reflect behavioral expression interpretable through DISC. Features were standardized prior to analysis, then mapped to DISC dimensions using predefined weights and directionality — independent of psychometric trait scores.

01 **Pitch (Hz)**
Average voice frequency — vocal expressiveness or control.

02 **Energy**
Vocal intensity or loudness — engagement or assertiveness.

03 **Jitter**
Stability of the voice signal; lower = smoother, controlled speech.

04 **Pause Ratio**
Proportion of silence — pacing and deliberation.

05 **Speech Rate (Audio)**
Speed of spoken delivery during communication.

06 **Speech Rate (Text)**
Verbal content delivered over time, based on transcripts.

07 **Average Sentence Length**
Typical length of sentences used during speech.

08 **Word Complexity**
Linguistic sophistication reflected in word choice.

09 **Vocabulary Richness**
Diversity of words used during communication.

10 **Emotion Tone**
Overall emotional expression present in speech or text.

11 **Positive Word Count**
Frequency of positively valenced or encouraging language.

12 **Negative Word Count**
Frequency of cautious, critical, or negatively valenced language.

CONSTRUCT ROLE

These features represent observable behavioral **expression** during communication — the second stream, inferred independently of psychometric traits.

04 · DISC SCORING & MAPPINGS

Mapping both streams to D · I · S · C.

Behavioral DISC scores were computed by standardizing trait scores, applying reverse scoring where conceptually required, then averaging the relevant traits within each dimension. Audio–text DISC scores were computed independently by standardizing speech and language features and aggregating them within each dimension using predefined weights — positive weights indicate alignment, negative weights indicate inverse associations.

D Dominance

ASSERTIVE · RESULTS-ORIENTED

BEHAVIORAL BASIS

Higher Confidence, Social Boldness & Workplace Motivation, with `lower Compliance (reverse)`.

AUDIO-TEXT EXPRESSION

Higher vocal energy, faster speech, fewer pauses — with lower jitter and emotional tone. Assertive, action-focused.

I Influence

SOCIABLE · EXPRESSIVE

BEHAVIORAL BASIS

Warmth, Social Boldness & Openness to Change — sociability, expressiveness, interpersonal engagement.

AUDIO-TEXT EXPRESSION

Higher pitch, vocal energy, emotional tone & faster delivery, with fewer pauses. Expressive and engaging.

S Steadiness

CALM · COOPERATIVE

BEHAVIORAL BASIS

Emotional Stability, Compliance & Group Orientation — calmness, cooperation, preference for stable environments.

AUDIO-TEXT EXPRESSION

Slower speech, greater pause usage, lower vocal energy & stable voice quality. Calm, measured, composed.

C Conscientiousness

STRUCTURED · PRECISE

BEHAVIORAL BASIS

Higher Perfectionism & Rule Consciousness, with `lower Abstractness & Openness (reverse)`.

AUDIO-TEXT EXPRESSION

Longer pauses, slower speech, lower energy & reduced pitch variation. Deliberate, controlled, detail-focused.

CONCEPTUAL ALIGNMENT

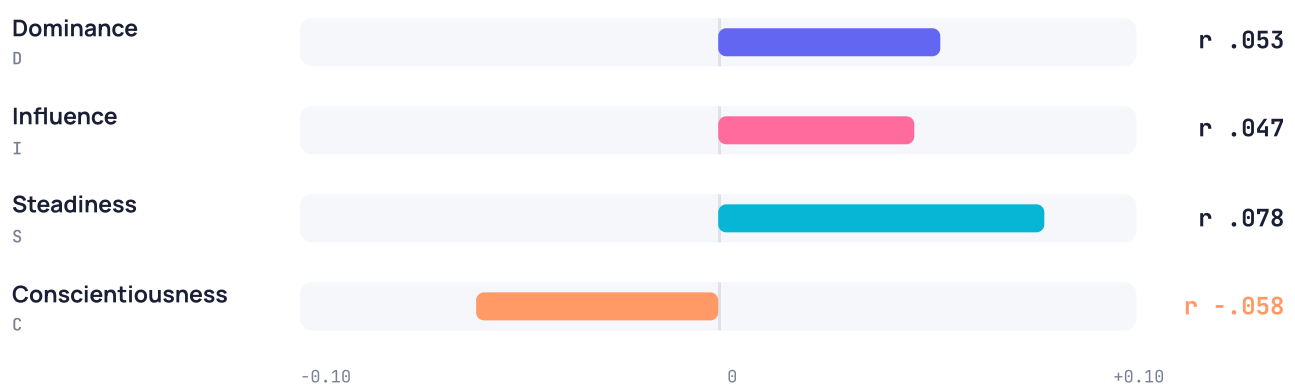
Both mappings represent the same DISC dimensions from complementary perspectives — preferences vs. expression. By aligning both to DISC theory while keeping them methodologically independent, the study enables a meaningful examination of directional alignment, consistency, and interpretability.

05 · ANALYSES & RESULTS

Modest but systematic alignment.

Three primary analyses were conducted: (1) Pearson correlations between behavioral and audio–text DISC scores per dimension; (2) DISC profile agreement, comparing each participant's highest-scoring dimension under each method; and (3) average audio–text feature values compared across behavioral DISC groups. Trait–feature correlations were also reviewed for interpretable links.

1 · CORRELATION BETWEEN BEHAVIORAL & AUDIO-TEXT DISC SCORES



Although small in magnitude, these correlations were **systematic rather than random**, indicating partial alignment between trait-derived DISC profiles and communication-based DISC inference across all four dimensions.

2 · DISC PROFILE AGREEMENT

24.37%

OVERALL DISC AGREEMENT RATE

When assigning a primary DISC profile based on the highest-scoring dimension under each method, a **meaningful subset of individuals** showed consistent DISC-style profiles across trait-based and audio–text representations — supporting partial convergence between the two perspectives.

05.3 · INTERPRETABILITY VIA FEATURE PATTERNS

Communication patterns match the theory.

Average audio–text feature patterns across behavioral DISC groups were directionally consistent with DISC-style communication descriptions — supporting the interpretability of audio–text-based DISC inference under established DISC theory.

D Dominance-oriented

Higher energy, faster speech, and fewer pauses.

↑ energy · ↑ speech rate · ↓ pauses

I Influence-oriented

Higher emotional tone and more positive language use.

↑ emotion tone · ↑ positive words

S Steadiness-oriented

Slower speech, greater pause usage, and calmer delivery.

↓ speech rate · ↑ pauses · calm delivery

C Conscientiousness-oriented

More deliberate pacing and lower emotional expressiveness.

deliberate pacing · ↓ expressiveness

Trait-feature consistency

Trait-level correlations provided additional interpretive support. Audio–text features may align more directly with specific behavioral tendencies, which in turn contribute to broader DISC-style profiles.

≈ 6%

Pause Ratio ↔ Emotional Stability

A small positive association — individuals with higher emotional stability tended to exhibit more measured speech pacing.

Similar directional relationships were observed between interpersonal traits such as **Warmth** and emotion-related language features.

06 · DISCUSSION

Alignment that is interpretable, not equivalent.

The objective was to demonstrate that DISC dimensions can be inferred from audio and text features, and that these inferred profiles show directional alignment with DISC-like profiles derived from behavioral traits. Overall, the results support alignment in a manner that is interpretable, consistent, and grounded in DISC theory.

PSYCHOMETRIC PERSPECTIVE

Behavioral traits reflect relatively stable preferences, whereas audio–text features capture expression during communication. Perfect equivalence is neither expected nor required — the value lies in consistent directional patterns under a shared framework.

APPLIED AI PERSPECTIVE

Weighted, theory-guided feature mappings offer a transparent, interpretable approach to translating communication signals into DISC-style profiles. Used alongside psychometric assessment, this can support exploratory behavioral insight.

The observed correlations, profile agreement, and feature-level patterns across DISC groups collectively support alignment that is meaningful under a shared behavioral framework.

07 · CONCLUSION

THE TAKEAWAY

A complementary, interpretable behavioral signal.

DISC dimensions inferred from audio and text showed modest but systematic alignment with trait-derived DISC profiles, alongside clear, interpretable communication patterns across DISC groups. The study makes no predictive or causal claims — it positions audio–text inference as a complementary signal for understanding behavioral expression alongside traditional psychometric assessment.

08 · LIMITATIONS

What this study does — and doesn't — claim.

Different aspects of behavior

DISC profiles from 16PF-aligned traits and from audio–text features capture different things — stable preferences vs. expressed communication.

Context sensitivity

Audio–text features are inherently context-sensitive and may vary across interaction settings, whereas psychometric traits reflect more stable tendencies.

Linear mappings

Both DISC profiles were derived using theory-guided linear mappings, which support interpretability but may not capture more complex behavioral dynamics.

09 · ABOUT THE AUTHORS

AK

Akshada Khopade

STATISTICIAN & PEOPLE ANALYTICS · PMAPS

A Statistician and People Analytics Specialist applying statistical testing, psychometric methods, and predictive analytics to behavioral and cognitive assessments, as well as audio/text-based data, for talent evaluation and performance prediction. Her research centers on developing rigorous, data-driven approaches to enhance human assessment and support evidence-based organizational decision-making.

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Chaitali Joshi

LEAD PSYCHOLOGIST · PMAPS

An Organizational Psychologist with academic training in psychological assessment and applied psychometrics. Her work focuses on assessment design, factor-analytic validation, and the application of personality frameworks to evidence-based hiring and talent evaluation — informed by her engagement with professional bodies such as the American Psychological Association.

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PMAPS RESEARCH

APPLIED AI · BEHAVIORAL SCIENCE

Hear behavior, grounded in psychometrics.

PMaps pairs validated psychometric assessment with interpretable audio–text inference — a complementary lens on how behavioral style is expressed in real communication.

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EXPLORE PMAPS RESEARCH

755	4	24.37%	2
CANDIDATES	DISC DIMENSIONS	PROFILE AGREEMENT	INDEPENDENT STREAMS