EmoTrace: An Emotion Trajectory-Centered Framework for Psychological Support Dialogue Generation

Anonymous ACL submission

Abstract

Using large language models (LLMs) to assist psychological counseling is an important task in the field of natural language processing. The construction of high-quality psychological support dialogue corpora serves as a critical foundation for training counseling-oriented conversational models. However, existing data generation approaches generally suffer from several limitations, including emotionally stable seekers, limited variation in emotional dynamics, and a high degree of compliance with counselors' guidance. These issues result in LLM that lack the capability to effectively respond to emotionally unstable scenarios. In addition, counselor responses are typically driven by problem-solving objectives, thereby overlooking the role of emotion-focused interaction, which are essential in psychological counseling. To address these gaps, we propose **EmoTrace**, a multi-turn dialogue corpus generation framework centered on modeling seekers' emotional trajectories. we construct seekers' cognitive profile and introduce a seeker module with emotional schemas and an associated activation mechanism, a counselor module, and an emotional trajectory control module, thereby enhancing the layering of the seeker's emotional expression and the counselor's targeted empathic expression. Experimental results demonstrate that the proposed method outperforms existing approaches in terms of emotional richness and empathy quality. The complete dataset and the fine-tuned model will be made publicly available once the paper is accepted.

1 Introduction

Mental health constitutes a fundamental component of overall health, with approximately 14% of the global disease burden attributable to neuropsychiatric disorders (Prince et al., 2007). However, due to its longstanding underrepresentation in global health priorities, mental health services continue to face stigma and limited accessibility. As a result, many affected individuals are unable to obtain timely care (VanderWeele et al., 2026).

The rapid development of large language models (LLMs) has introduced new perspectives for psychological counseling applications. Models such as GPT (Achiam et al., 2023) and LLaMA (Touvron et al., 2023) have demonstrated human-like emotional support capabilities (Sorin et al., 2024). Building on this progress, a number of studies have proposed specialized models for the counseling domain, including MeChat (Qiu et al., 2024) and CpsyCounX (Zhang et al., 2024). These models rely on real-world or synthetic dialogue corpora to learn general patterns of psychological counseling. Consequently, the construction of high-quality dialogue corpora becomes a critical factor influencing model performance (Qi et al., 2025). However, due to constraints related to medical ethics and personal privacy protection, the construction of large-scale, compliant mental health support dialogue datasets remain a central challenge in developing LLM-based counseling systems (Mayer et al., 2022).

Recently, several studies on automated corpus construction, such as DeepWell-Adol (Qiu et al., 2025) and PsyDT (Xie et al., 2025), have focused on modeling and optimizing the counselor side of the psychological support dialogue. These approaches improve response quality by simulating counselors' linguistic styles and therapeutic orientations or by employing dialogue frameworks grounded in positive psychology.

However, this counselor-centered paradigm for corpus construction exhibits some limitations. As shown in Figure 1, the seekers' emotional states in conventional dialogue often show low variability and a homogeneous progression, accompanied by a high level of compliance. Such patterns fail to reflect the emotional fluctuations commonly observed in real-world interactions. Training corpora constructed by this paradigm make it difficult for

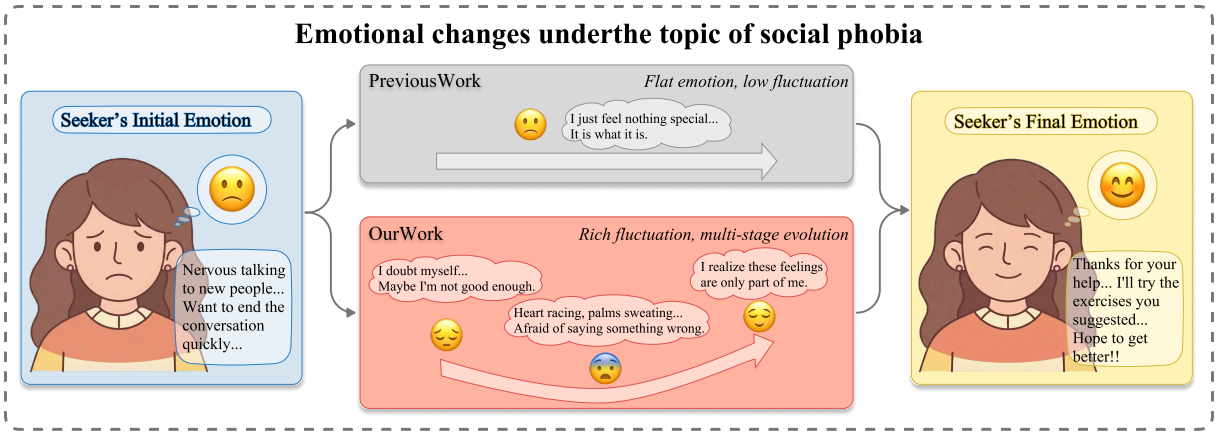

Figure 1: A comparison of the emotion trajectories of seekers in traditional datasets and EmoTrace-D on the topic of social phobia.

models to learn response strategies in the face of complex emotional dynamics. Furthermore, existing work typically characterizes seekers using emotion labels (Liu et al., 2021) and the Big Five personality traits (Yang et al., 2025b). However, they hardly considered the underlying cognitive structures of emotions, such as *core beliefs* (individuals' deepest self-perceptions and value systems) (Beck et al., 2024) and *emotional schemas* (cognitive evaluation and coping patterns of emotional experiences) (Leahy, 2002). This approach limits seekers to narrating only events, lacking cognitive evaluations of core beliefs or emotional schemas, so the model struggles to capture the logical chain from event to cognition to emotion.

Additionally, prior corpus construction work also have certain limitations in the design of counselor response strategies. Within the humanistic therapy tradition, Emotion-Focused Therapy (EFT) represents a quintessential approach (Greenberg, 2004). EFT emphasizes the acceptance and integration of emotional experience, adhering to a seeker-centered framework. However, in existing work, counselor responses are largely oriented toward direct problem-solving, while emotional processing is confined to surface-level empathy. This approach neglects the central role of emotion in the process of psychological support (Greenberg, 2010).

In this paper, we propose **EmoTrace**, a seeker **Emo**tion **Tra**jectory-**Ce**ntered framework for multi-turn psychological support dialogue generation. Our method employs interactive role-playing to simulate dialogues between a seeker and a counselor. Specifically, in the seeker profile construction stage, we add basic personal information with an emotional schema dimension. The corpus generation is accomplished through the collaboration of three core modules. The overall framework of EmoTrace is illustrated in Figure 2. **The seeker module** generates responses that maintain personality consistency by integrating the persona profile with an emotional schema activation mechanism, while applying frequency constraints to avoid excessive schema activation. **The counselor module**, grounded in EFT, produces more targeted intervention strategies and responses. Finally, **the Emotion Trajectory (ETC) Control module** guides the seeker's emotional development using a three-stage structure, modeling emotion as a trend variable to achieve controllable trajectories without compromising naturalness.

Based on this method, we construct **EmoTrace-D**, a psychological support dataset containing 1,114 multi-turn dialogues. We also fine-tune an open-source LLM named **EmoTrace-M** on EmoTrace-D. Extensive experimental results demonstrate that, compared with prior work, the proposed method significantly improves the emotional reality and complexity of the generated corpora and boosts the empathic alignment of the model when using the data. Our contributions are as follows:

- We propose **EmoTrace**, the first paradigm shifting corpus construction from counselor-centered to seeker emotional trajectory-centered, enabling seekers as dynamic emotional entities for more authentic dialogues.
- We construct the **EmoTrace-D** and fine-tune the **EmoTrace-M** on this dataset. Extensive empirical experiments demonstrate that the model achieves superior targeted empathic capability compared to prior work.

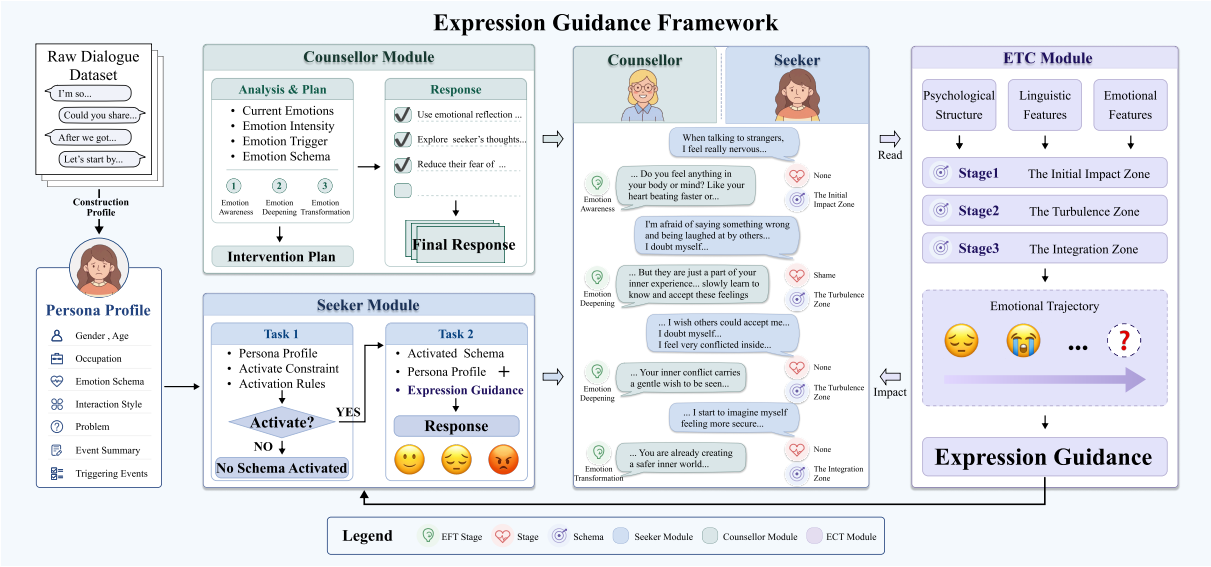

Figure 2: The overall framework of EmoTrace.

2 Related Work

2.1 Psychological Support Dialogue Datasets

Early psychological support dialogue datasets primarily relied on crowdsourcing and online psychological counseling platforms as data sources, with support strategies annotated manually (Welivita and Pu, 2022; Sun et al., 2021; Wang et al., 2019). However, due to the highly sensitive nature of psychological counseling, the acquisition of relevant corpora is often subject to privacy restrictions. Consequently, the majority of existing research has adopted synthetic data approaches to construct corpora. For instance, SmileChat (Qiu et al., 2024) extends PsyQA from single-turn question-answering to multi-turn dialogues using ChatGPT, while CpsyCounD (Zhang et al., 2024) employs a two-stage framework based on counseling reports to generate 3,134 multi-turn dialogues.

Recently, to enhance the professionalism of psychological support dialogue corpora, some studies integrate psychological theories into the dialogue generation process (Lee et al., 2024; Zhou et al., 2025b,a; Shi et al., 2026). However, these methods primarily focus on the selection and optimization of counseling strategies, without the modeling of the seeker's cognitive structure.

2.2 Psychological Counseling Dialogue Systems

The rapid development of LLMs has advanced the growth of AI-driven psychological counseling services. Recent studies, such as MindChat (Xin Yan, 2023) and SoulChat (Chen et al., 2023), apply supervised fine-tuning to foundation models using high-quality dialogue data, with a focus on improving empathetic capabilities.

Given that psychological counseling involves tasks such as intervention strategy planning and empathetic response generation, it naturally aligns with the collaborative paradigm of multi-agent systems, leading to the growing adoption of multi-agent approaches for psychological counseling. For example, WiseMind (Wu et al., 2026) employs two cooperative agents representing rational reasoning and emotional reasoning, together with a DSM-5 knowledge graph for psychiatric assessment, thereby improving diagnostic accuracy and reducing hallucinations. To address difficulties in cross-session memory retrieval, TheraMind (Hu et al., 2026) adopts a dual-loop agent architecture designed for long-term counseling, with capabilities for strategy planning and adaptive adjustment. However, these methods lack reasoning about the causes of the seeker's emotional changes, making it difficult to handle complex emotional scenarios.

3 Methodology

3.1 Overview of the Psychological Support Dialogue Generation Framework

We synthesize psychological support dialogues through interactive role-playing and core component control, including three modules: a seeker module, a counselor module, and an ETC module.

Firstly, based on the persona profile, the seeker

module generates responses by integrating the emotional expression guidance provided by the ETC module with the activation status of emotional schemas. Then, the counselor module generates responses via a pipeline consisting of two submodules: the analysis-planning submodule formulates psychological intervention strategies by emotion analysis and schema recognition, while the generation submodule then produces responses based on the intervention strategy derived from the former. After each turn of interaction between the seeker and the counselor, the ETC module determines the seeker's current stage based on the dialogue history. It then infers the emotional dynamics for the next turn, and provides guidance for subsequent emotional expression.

3.2 Design of Psychological Support Dialogue Generation

3.2.1 Preparation: Seeker Persona Profile Construction

To enhance the authenticity and consistency of the seeker's expression patterns in psychological support dialogue corpora, we draw inspiration from personalized role-driven study (Wang et al., 2024), constructing persona profiles by extracting individual characteristics and psychological attributes from raw dialogue data. This enables the LLM-driven seeker to maintain consistent cognitive patterns and emotional response styles across multi-turn dialogues. We used 5,000 multi-turn dialogues from PsyDT as seed data and employed GPT-4.1-mini to summarize the seeker's background information and personality traits in each dialogue, organizing them into structured persona profiles. Each profile contains information such as gender, age, occupation, interaction style and problems.

Traditional persona profile construction typically characterizes individuals merely with emotion labels or simple background information, which fails to capture their underlying psychological mechanisms. To address this limitation, we propose the emotional schema as a modeling dimension to characterize individual traits across three levels: cognitive, emotional, and behavioral. Specifically, based on the classification of core beliefs in Cognitive Behavioral Therapy (CBT) (Beck et al., 2024) and the emotional schema model (Leahy, 2002), we establish a three-dimensional cognitive axis: **the self axis** (cognitive style of one's own emotions), **the others axis** (cognitive style of others and interpersonal relationships), and **the world/future axis** (cognitive style of the persistence and meaning of emotions). Each axis reflects how individuals respond to emotional experiences from different perspectives. On this basis, we select eight representative emotional schemas, each linked to typical cognitive tendencies along these axes. For example, people with a guilt schema tend to feel self-reproach when their own actions negatively affect others. Detailed information on emotional schemas is provided in the Appendix A.1.

Finally, we clustered and filtered all persona profiles according to topics and schema types, resulting in 1,423 uniformly distributed persona profiles. The prompt for generating persona profiles is provided in the Appendix A.1.

3.2.2 Emotional Trajectory Control Module

This module provides controllable guidance of the seeker's emotional development process across multi-turn dialogues based on three-stage emotional trajectory modeling.

Stage-based emotional trajectory. Emotional change in psychological counseling is gradual, not instantaneous (Stiles et al., 1990). Therefore, observing emotional change from a trajectory perspective can better captures the continuity of the seeker's emotional state and the process of emotional evolution than single time point judgments.

Inspired by the EFT theory (Greenberg, 2012), we divide the seeker's emotional trajectory into three stages: the initial impact zone, the turbulence zone, and the integration zone. This stage-based design, compared with the fixed node approaches, allows natural emotion fluctuations within broader bounds. In this way, emotional transitions no longer take the form of discrete label switching but instead constitute an evolution process with inherent logic. See Appendix A.2 for stage definitions.

Emotional trajectory control. Guided by the stage model, this module determines the seeker's current stage by analyzing the psychological structure, linguistic features, and emotional characteristics of the seeker's utterances. In real-world psychological counseling scenarios, the seeker's emotional development depends not only on their own willingness to change but also, to a large extent, on the counselor's response style (Ehrlich et al., 1979). Accordingly, this module further analyzes how the counselor's response may influence the seeker's subsequent reply and infers the next-turn dynamics

of emotional change. Finally, based on the above analysis, the module outputs guidance for seeker's emotional expression in the next turn, guiding the direction and intensity of emotional development within flexible stage boundaries, without enforcing deterministic emotional expression outcomes.

3.2.3 Seeker Module

To avoid homogenized expression and unnatural dialogue caused by excessive activation of emotional schemas, we designed a schema activation mechanism based on conditional triggering and frequency constraints.

Specifically, we maintain a long-term and short-term activation sequence for each type of emotional schema that every seeker possesses. When a particular schema has been activated twice consecutively or five times in total, its activation is prohibited for the current turn. Only when the schema is not subject to such restriction does the mechanism determine, based on specified conditions, whether the schema is permitted to be explicitly expressed in the current turn. The pseudocode for this mechanism is provided in the Algorithm 1.

After completing the above determination, the module generates responses that exhibit stable personality and dynamic emotions based on the persona profile by integrating the emotional expression guidance provided by the ETC module for the current turn, as well as the schema activation status.

Table 1: Statistics of Different Datasets. NoT., LoS., LoC. respectively represent average number of turns, average length of seeker's response and average length of counselor's response.

Dataset	Statistics		
	NoT.	LoS.	LoC.
SMILECHAT	10.4	26.1	28.9
CpsyCounD	8.7	30.4	49.7
DeepWell-Adol	10.0	28.4	58.5
PsyDTCorpus	18.1	31.6	58.1
EmoTrace-D	12.2	34.6	60.3

3.2.4 Counselor Module

A pipeline is designed in counselor module to generate responses in the following sequence: emotion analysis, intervention planning, and response generation.

Analysis and planning submodule. Grounded in EFT, this submodule divides the therapeutic process into three stages, namely emotion awareness, emotion deepening, and emotion transformation. Based on the seeker's utterances, the submodule analyzes the emotion type, intensity, triggers of the emotion and potential underlying emotional schemas. On the basis of this analysis, the submodule selects an appropriate EFT therapeutic stage, formulates the current intervention goals and schema-loosening strategies. Finally, it integrates the above information to produce a detailed intervention strategy, providing a basis for subsequent response generation.

Response generation submodule. After receiving the analysis and planning results, this submodule is responsible for converting the structured intervention strategy into natural and coherent supportive language. During generation, the model strictly adheres to the prescribed intervention plan and performs no additional emotion analysis or strategy adjustment, thereby ensuring consistency between the response and the planned intervention.

3.3 Dialogue Generation

We use a role-playing approach to generate multi-turn psychological support dialogues by GPT-4.1-mini based on persona profiles. As shown in Figure 2, each turn involves interaction between seeker and counselor, while the ETC module generates guidance for the seeker's emotional expression in the next turn based on the output of the current turn. A complete dialogue is produced by iterating the above process.

To ensure the completeness of emotional progression, we filter data by two criteria: full coverage of the seeker's three emotional stages and reasonable stage duration to prevent excessive persistence. Through this process, we construct EmoTrace-D with 1,114 multi-turn dialogues. The related prompts and a complete dialogue case are presented in the Appendix A.2.

4 General Dataset Quality Evaluation

To validate the quality of EmoTrace-D, we compare it with four publicly available psychological support dialogue datasets: CpsyCounD (Zhang et al., 2024), SMILECHAT (Qiu et al., 2024), DeepWell-Adol (Qiu et al., 2025), and PsyDTCorpus (Xie et al., 2025). Table 1 presents the statistical information of these five datasets.

To focus our evaluation on emotional richness and empathic specificity, we establish EmoTrace-E to assess five dimensions: Emotional Variation, Emotional intensity and Complexity, Empathy

Table 2: Evaluation results for five datasets across three evaluation frameworks. The best results are highlighted in **bold**, and the runner-up results are underlined.

Evaluation Matrix	Indicator	Datasets				
		CpsyCounD	SMILECHAT	DeepWell-Adol	PsyDTCorpus	EmoTrace-D
CpsyCoun	Comprehensiveness (0–2)	1.91	1.855	1.908	**1.95**	1.9
	Professionalism (0–4)	2.90	2.44	3.35	**3.94**	3.67
	Authenticity (0–3)	2.21	2.30	2.68	2.93	**2.94**
	Safety (0–1)	0.98	0.98	**1**	**1**	**1**
PsyDT	Emotional Empathy (0–3)	1.79	2.01	2.43	2.8	**2.85**
	Cognitive Empathy (0–3)	2.24	2.39	2.64	2.77	**2.78**
	Conversation Strategy (0–3)	1.97	1.98	2.47	**2.84**	2.80
	State and Attitude (0–3)	2.32	2.31	2.7	2.81	**2.89**
	Safety (0–1)	0.93	0.94	0.99	**1**	**1**
EmoTrace-E	Emotional Changes (0–5)	2.20	3.00	2.90	4.21	**4.74**
	Emotional Intensity and Complexity (0–4)	1.66	2.60	2.15	3.03	**3.56**
	Quality of Empathy (0–5)	1.83	2.50	2.75	4.11	**4.49**
	Autonomy (0–4)	1.71	2.48	2.31	3.21	**3.73**
	Motivation for Growth (0–2)	1.28	1.57	1.50	1.93	**1.99**

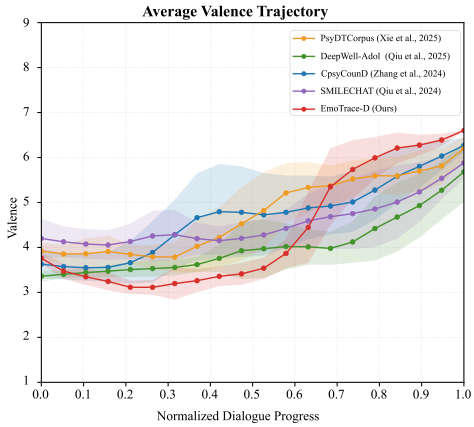

Figure 3: Valence trajectories for five datasets.

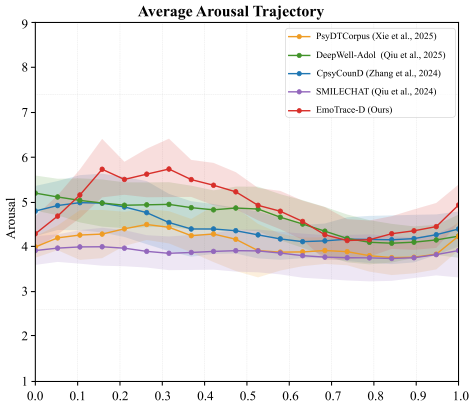

Figure 4: Arousal trajectories for five datasets.

Quality, Autonomy, and Growth Motivation. To be fair, another two commonly used evaluation frameworks were also employed: the CpsyCoun evaluation matrix (Comprehensiveness, Professionalism, Authenticity, Safety), and the PsyDT evaluation matrix (Affective Empathy, Cognitive Empathy, Dialogue strategy, State and Attitude, Safety). All evaluations used a dual-model evaluation strategy, scoring dataset quality with Deepseek-V3.2 and Gemini-3-flash respectively. The average of the two scores was taken as the final result to mitigate bias introduced by any single evaluation model. For detailed evaluation prompts, see subsection B.1.

We randomly sample 100 samples from each of the five datasets. As shown in Table 2. EmoTrace-D outperforms the other four on most metrics, especially in emotional richness and empathic specificity. Although its scores lower than PsyDTCorpus in Comprehensiveness and Professionalism, in real-world psychological counseling scenarios, overly comprehensive event narration may reduce the proportion of emotional exploration within the dialogue (Aleixo et al., 2021).

Furthermore, when counselors place excessive emphasis on professional psychological intervention techniques, it may compromise the seeker's experience. Therefore, a balance between professionalism and affinity needs to be considered. As shown in the table, although EmoTrace-D does not achieve the highest scores on these two dimensions, it still shows comparable or runner-up performance, indicating that our dataset achieves balanced development across different dimensions.

To show the effectiveness of EmoTrace-D in enhancing emotional richness, we used the Valence-Arousal (VA) model (Russell, 1980) to plot the

emotional trajectories of the five datasets. Figure 3 is the valence trajectories, where the horizontal axis indicates dialogue progress and the vertical axis represents the positive negative degree of emotions. Higher values reflect more positive emotions, and lower values more negative ones. The trajectory of EmoTrace-D shows the largest peak and the smallest valley compared to the other datasets, meaning it has the broadest emotional coverage and thus the highest emotional richness.

Figure 4 presents the arousal trajectories where the horizontal axis is dialogue progress and the vertical axis is physiological activation intensity. Larger values indicate stronger emotional responses. The EmoTrace-D trajectory has the largest fluctuation amplitude without being overly erratic, meaning it enhances emotional expression intensity while keeping fluctuations within a reasonable range and avoiding uncontrolled emotional intensity. For more implementation details, see Appendix B.2.

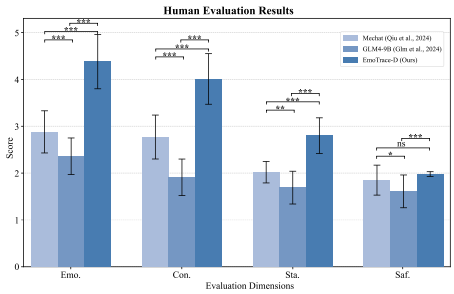

Figure 5: Results of human evaluation for EmoTrace-M and two baseline models.

5 Dataset-Model Adaptation Experiment

5.1 Model Training

To investigate whether the dataset can effectively enhance the psychological counseling capabilities of LLMs, we fine-tune Qwen3-8B on EmoTrace-D for 4 epochs, resulting in the EmoTrace-M psychological support dialogue model. The whole implementation is based on the LLaMAFactory (Zheng et al., 2024), with a batch size of 2 per GPU. We employ a cosine-type learning rate scheduler with warm-up ratio set to 0.05, an initial learning rate of 1.0e-4, and leverage 16-bit half-precision floating-point to accelerate training. The random seed is set to 42. In the inference phase, all the LLMs adopt the following configuration:*temperature* = 0.7, *top_p* = 0.9. All implementations were conducted on a single NVIDIA A100 GPU.

The fine-tuned EmoTrace-M is compared against the following baselines:

- **Open-source**: Qwen3-8B (Yang et al., 2025a); LLama3.1-8B (Touvron et al., 2023); GLM4-9B (Glm et al., 2024).
- **Domain-specific**: CpsyCounX (Zhang et al., 2024); MeChat (Qiu et al., 2024); MindChat-Qwen-7B-v2 (Xin Yan, 2023).

5.2 Evaluation Methods

We compare EmoTrace-M with several open-source general-purpose models and domain-specific psychological models to evaluate their dialogue capabilities in complex emotional scenarios.

We adopt a simulated dialogue approach to construct evaluation samples for each model. Specifically, GPT-4.1-mini simulates the seeker based on 50 persona profiles that were not used in corpus generation. To introduce a certain degree of emotional instability, this process retains emotional schemas and the schema activation mechanism. The seeker engages in multi-turn dialogues with each model, limited to 10 turns per dialogue.

In the automatic evaluation phase, we also employ a dual-model evaluation strategy. To assess the models' capabilities in emotion understanding and dialogue progression when simulating the counselor role, we reuse the PsyDT evaluation matrix with adaptations (see the Appendix B.1).

For human evaluation, we selected the two models that achieved the highest scores among open-source models and domain specific models respectively in the automatic evaluation phase, and compared them against EmoTrace-M. Four psychology experts and six psychology graduate students are invited to participate in the scoring process. The evaluation criteria are identical to those used in the automatic evaluation phase.

5.3 Results

Table 3 presents the score comparisons between our model and all baseline models. The results demonstrate that our model achieves the highest scores across all metrics. In terms of empathy quality and dialogue strategy, our model outperforms the general-purpose baseline models. We speculate the reason is, although general-purpose models exhibit competitive dialogue capabilities, they tend to fall into patterns of shallow empathy or generic advice-giving. In contrast, our model effectively balances emotional support and strategic intervention.

Table 3: Model evaluation results in the automatic evaluation phase. The best results are highlighted in **bold**, and the runner-up results are underlined. The definitions of each indicator are as follows: Emotional Empathy (*Emo.*), Conversation Strategy (*Con.*), State and Attitude (*Sta.*), Safe (*Saf.*).

Type	Model	Indicator			
		Emo. (0–5)	Con. (0–5)	Sta. (0–3)	Saf. (0–2)
Domain	CpsyCounX	2.31	1.30	1.36	1.80
	MeChat	2.82	1.83	1.82	1.71
	MindChat-Qwen-7B-v2	2.70	1.46	1.34	1.76
Open	Llama3.1-8B	3.35	2.98	2.20	1.77
	GLM4-9B	3.59	2.85	2.48	1.91
	Qwen3-8B	3.48	3.74	2.26	1.78
Ours	EmoTrace-M	**4.51**	**4.18**	**2.76**	**1.94**

Table 4: Ablation study of different components.

Model	Emo. (0–5)	Emo.& Com. (0–4)	Qua. (0–5)	Auto. (0–4)	Mot. (0–2)	Cog. (0–3)
w/o ETC	4.17	3.12	4.25	3.24	1.76	2.81
w/o Schema	4.50	3.51	**4.71**	3.53	1.91	2.80
all	**4.78**	**3.59**	4.61	**3.75**	**2.00**	**2.83**

In addition, compared with previous domain-specific models, our model still achieves a qualitative leap. This indicates that models trained on datasets that focus solely on optimizing counselor responses or rely on static annotations struggle to handle complex emotional expressions from the seeker. In contrast, by extending the focus of optimization from the counselor to the seeker, our approach enables the model to learn strategies for handling emotional instability and underlying cognitive structures, resulting in more professional and empathetic counseling dialogues. A detailed case study is provided in the Appendix C.

Figure 5 presents the results of the manual evaluation, showing that EmoTrace-M achieved the highest scores across all four dimensions, consistent with the results of the automated evaluation.

5.4 Ablation Experiment

To further investigate the respective contributions of the ETC module and the emotional schema activation mechanism in our framework, we conduct an ablation study comparing the full model (all) with two variants: (1) w/o ETC and (2) w/o schema. To deeply examine the impact of the core designs on cognitive structures, we add one additional metric to the original evaluation framework (see subsection B.1). The results are presented in Table 4.

After removing ETC, a significant decline is observed in both Emotional Variation and Emotional Intensity and Complexity. Disabling the emotional schema activation mechanism also leads to declines across multiple metrics, albeit to a lesser extent compared to removing ETC, suggesting that under the guidance of ETC, the seeker remains capable of simulating complex emotions with a certain degree of cognitive patterning.

An interesting observation is that when the schema activation mechanism is removed, the Empathy Quality score increases slightly. We hypothesize that this occurs because, in the absence of complex cognitive defense mechanisms on the seeker's part, the counselor model can more easily achieve higher scores through shallow empathic responses. In contrast, although our full model (all) yields a slightly lower Empathy Quality score, it more faithfully reflects the real-world challenge in which counselors must contend with the seeker's internal cognitive resistance.

6 Conclusion

This paper proposes EmoTrace, a multi-turn psychological support dialogue generation framework centered on the seeker's emotional trajectory. It integrates the seeker module with persona profile and emotional schema activation mechanism, an EFT driven counselor module, and an emotional trajectory control module to generate more authentic, complex, and layered dialogues. Experiments show that the dataset and dialogue model constructed using this method outperform existing approaches in emotional richness, empathy quality, and the capacity to respond to complex emotional states.

Limitations

Although the experimental results demonstrate the effectiveness of EmoTrace, several limitations warrant further attention. In real-world settings, psychological counseling is a complex endeavor, and the counseling process may integrate multiple therapeutic modalities. Our framework is primarily designed around Emotion-Focused Therapy. Thus, how to extend and accommodate other schools of psychological counseling remains an open question. Furthermore, the dialogue synthesis process involves information transfer across multiple modules, which significantly increases generation costs and consequently limits the scalability of the dataset. Future research should consider how to reduce generation costs as much as possible while preserving output quality.

Ethical Statement

During the persona profile construction and dialogue generation processes, we implemented a rigorous data cleaning pipeline, including rule-based filtering, manual rewriting, and manual proofreading, to ensure that the final dataset contained no personally identifiable information or sensitive content. Additionally, we removed any dialogue content that could potentially cause harm to the seeker, others, or society, thereby mitigating potential risks.

During the evaluation phase, we conducted strict safety assessments on both the dataset and the model outputs. However, the model's response generation process lacks human intervention and feedback. Moreover, given the substantial variability in the psychological conditions of different users, certain responses may inevitably cause harm to some users. Therefore, EmoTrace-M is intended solely as a supplementary counseling tool and cannot replace genuine psychological therapy. Users experiencing severe psychological distress should seek timely assistance from professional counselors or psychiatrists. Furthermore, when deploying this model in downstream applications, it is mandatory to inform users in advance that the responses generated by the AI model should be used only as a reference.

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A Details of EmoTrace Framework

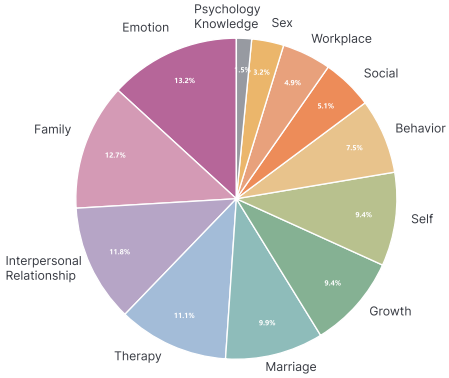

Figure 6: Topic distribution of EmoTrace-D.

A.1 Persona Profile Construction

Table 5 presents the complete definitions of the emotional schemas. Figure 7 shows the prompt used for seeker persona profile generation.

A.2 Multi-Turn Psychological Support Dialogues Synthesis

The definitions of the three-stage emotional trajectory are provided in Table 6. The prompts for the seeker module, the counselor module (including the analysis and planning submodule and the generation submodule), and the ETC module are shown in Figure 8, 9, 10, and 11, respectively. Figure 12presents a complete example of a multi-turn dialogue corpus.

Finally, we constructed EmoTrace-D, which covers 12 topics, including emotion, family, interpersonal relationship, therapy, marriage, growth, self, behavior, society, workplace, sexual psychology, and psychological knowledge. The distribution of these topics is shown in Figure 6.

B Details of Experiments

B.1 Evaluation prompt

The prompts for the three evaluation frameworks used in dataset evaluation are presented in Figure 13, 14, and 15. The prompts for the evaluation metrics used in model evaluation and ablation experiment are shown in Figure 16 and 17.

B.2 Visualization of Emotional Trajectories

To construct visualizable emotional trajectories, we manually annotated Valence and Arousal for each turn of the seeker's utterances. Since different dialogues contain varying numbers of turns, direct averaging across turns is not feasible. Therefore, we mapped each dialogue onto a unified normalized time axis. For a dialogue consisting of N turns, the dialogue progress of the i-th turn is defined as:

$$t_i = \frac{i-1}{N-1}, \quad i = 1, 2, \ldots, N \tag{1}$$

thereby uniformly mapping all dialogues to the interval $[0, 1]$. Subsequently, we employed Piecewise Cubic Hermite Interpolating Polynomial (PCHIP) to interpolate the discrete emotional points, resampling each trajectory into a continuous trajectory of fixed length (set to 20 uniformly distributed sampling points in this experiment). After resampling, we computed the mean and standard deviation for both Valence and Arousal across all dialogues at each normalized progress point.

C Case Study

In this subsection, we present case studies in which MeChat, Qwen3, and EmoTrace-M are used to simulate counseling dialogues between a counselor and a seeker, as illustrated in Figure 18, 19, and 20.

When acting as the counselor, MeChat tends to provide reassurance and value affirmation without sufficiently exploring the seeker's specific emotional experiences. In addition, it offers intervention strategies before allowing the seeker to fully express their internal state. Such jumps in conversational flow may cause the seeker to feel instructed rather than accompanied and understood. The main limitation of Qwen3 lies in introducing psychological terminology and structured techniques too early and too frequently, which weakens empathic attunement to the seeker's emotional state itself.

By contrast, during the early stage of counseling, EmoTrace-M proactively guides the seeker to attend to bodily reactions associated with emotions, helping transform diffuse anxiety into a concrete experience that can be explored. Throughout the dialogue, EmoTrace-M does not rush to explain or intervene. Instead, it first normalizes and deshames the seeker's feelings, while inviting collaborative exploration of the underlying causes of those feelings. When the seeker is able to articulate core distress, EmoTrace-M can accurately identify the underlying motivations and support meaning reconstruction.

Table 5: Emotional Schema Definitions and Examples.

Axis	Schema	Definition	Example
Self	Rational Supremacy	A tendency to suppress or analyze emotions through rationality, believing that emotions should not dominate behavior.	"I know I should allow myself to feel disappointed, but I feel that this kind of negative emotion simply shouldn't exist."
	Guilt	A tendency to feel self-reproach when one's own actions or outcomes negatively affect others.	"It's all because of what I said that day that he's suffering so much now—I should never have opened my mouth."
	Shame	A tendency to regard one's own emotions or circumstances as deficiencies, accompanied by concerns about being evaluated or rejected by others.	"Actually, I've been in a bad state lately... but voicing it would only make me seem fragile and weak, wouldn't it?"
Others	Others' Incomprehension	A belief that others find it difficult to understand or accept one's emotions and circumstances.	"There's no point in explaining it to them. They'll never understand what it feels like to have everyone staring at you."
	Loss of Control	A concern that once expressed, emotions may become uncontrollable and potentially disrupt relationships or situations.	"If I let my anger out right now, the situation would completely spiral, and no one would be able to get it under control."
	Compliance	A tendency to suppress one's own emotions to meet others' expectations or maintain relational stability.	"It's fine, just decide among yourselves. I'm okay with anything. I don't want things to become unpleasant because of me."
World/Future	Prolonged Duration	A belief that negative emotions will persist for a long time and are difficult to end or alleviate.	"This kind of low mood doesn't just go away in a few days like it does for other people. Once it sets in, it clings to me for a very, very long time."
	Philosophical Reflection	A tendency to understand and interpret emotions in abstract terms, through the lens of life meaning or existential dimensions.	"In the end, this kind of anxiety is merely the price one has to bear when facing nothingness."

Table 6: Definitions of Three-stage Emotional Trajectory.

Stage	Psychological Structure Characteristics	Linguistic Expression Characteristics	Core Emotional Spectrum
Initial Impact	• The seeker has just encountered the problem or stressful event triggering the emotion. • Prominent psychological defenses are present. • Cognitive and emotional content exists but has not yet been clearly perceived or expressed. • A tendency to attribute problems to external factors or other people.	• Events are described more than emotions. • Emotional expression is vague or indirect. • Few emotion words are used.	Emotions at this stage are largely inhibitory secondary emotions. The primary types include confusion, anxiety, unease, grievance, and irritability.
Turbulence	• Emotional experience is markedly intensified. • Internal conflicts begin to re-emerge. • Emotions may fluctuate or recur. • Emotional schemas begin to be activated frequently.	• Emotional expression becomes more direct, intense, or contradictory. • Narratives contain abundant emotion words. • Self-evaluation or self-blame emerges.	Emotions are more primitive and intense, though not yet integrated. The primary types include sadness, anger, fear, shame, loneliness, and disappointment.
Integration	• A clearer understanding of emotions is achieved. • The ability to connect emotions, needs, and behaviors emerges. • Internal conflicts diminish, and self-acceptance increases.	• Expression becomes calmer and more coherent. • Reflective language appears. • Greater focus is placed on the future or on change.	Transformative emotions emerge. The primary types include relief, acceptance, hope, and calmness.

Task Description:
You are a professional psychological profiler and personality modeling expert. Based on the provided excerpts from a psychological counseling dialogue, you are to generate a logically consistent personality profile of the seeker. The generated content should reflect the individual's psychological characteristics, motivations, and emotional traits, consistent with psychological principles and semantic logic.

Content Specifications:
- Gender: Choose "male" or "female". If not mentioned, make a reasonable inference.
- Age: Choose a number between 12 and 60, corresponding to an appropriate life stage for the character.
- Occupation: Determine the identity based on the description.
- Emotional Schema: Refers to the stable cognitive and interpretive patterns an individual forms when experiencing emotions. Based on the dialogue content, determine the most prominent emotional schema(s) the seeker exhibits when narrating events and expressing emotions. If no clear schema tendency is evident, reasonably infer the most likely schema(s) for the individual. Select 1-2 most representative schemas from the following 8 types, and describe their specific manifestation in the seeker in one sentence:
Self Axis(ways of cognitively processing one's own emotions)
  - Rational Supremacy: A tendency to suppress or analyze emotions through rationality, believing that emotions should not dominate behavior.
  - Guilt: A tendency to feel self-reproach when one's own actions or outcomes negatively affect others.
  - Shame: A tendency to regard one's own emotions or circumstances as deficiencies, accompanied by concerns about being evaluated or rejected by others.
  Others Axis (emotional cognition regarding others and interpersonal relationships)
  - Others' Incomprehension: A belief that others find it difficult to understand or accept one's emotions and circumstances.
  - Loss of Control: A concern that once expressed, emotions may become uncontrollable and potentially disrupt relationships or situations.
  - Submissiveness: A tendency to suppress one's own emotions to meet others' expectations or maintain relational stability.
  World/Future Axis (cognition regarding the persistence and meaning of emotions)
  - Prolonged Duration: A belief that negative emotions will persist for a long time and are difficult to end or alleviate.
  - Philosophizing: A tendency to understand and interpret emotions in abstract terms, through the lens of life meaning or existential dimensions.
- Coping Style: Refers to the individual's typical behavioral responses when facing pressure or problems. Based on the seeker's expressions, decision-making patterns, and behavioral tendencies in the dialogue, determine their coping style. Select only one most suitable type from the following three:
  - Avoidant: Tends to avoid or postpone problems, reducing contact with conflicts or emotional sources to lessen discomfort.
  - Conservative: Handles problems cautiously, tending to maintain the status quo or choose low-risk options, with repeated deliberation before making decisions.
  - Proactive: Tends to directly face problems and seek solutions, improving situations by expressing needs, communicating, or taking action.
- Problem: A one-sentence summary of the seeker's current dilemma or conflict.
- Event Summary: A complete summary of the relevant events based on the seeker's narrative. Preserve key facts, relationships, timelines, and situational details from the original dialogue as much as possible; necessary logical organization and minor supplements are permitted without altering the original meaning. Narrate in the first person, with coherent and specific content, not exceeding 400 words.
- Emotion-Triggering Events: Identify 2–4 core events from the dialogue that directly influence the seeker’s emotional state, and rank them in descending order of importance. At least one positive event must be included. For each event, describe the specific trigger and the elicited emotion in one sentence. The emotion must be selected from the following eight terms: Joy, Trust, Fear, Surprise, Sadness, Disgust, Anger, Anticipation. Avoid vague, generic, or repetitive descriptions.

Output Requirements:
Output the personality profile directly in JSON format. Do not add any commentary, evaluation, explanatory text, or additional remarks. Example format is as follows:
```
{
  "Age": xxx,
  "Gender": xxx,
  "Occupation": xxx,
  "Emotional Schema": [
    {
      "schema": xxx,
      "description": xxx
    },
    ...
  ],
  "Coping Style": xxx,
  "Problem": xxx,
  "Event Summary": xxx,
  "Emotion-Triggering Events": [
    {"eid": 1, "event": xxx, "emotion": xxx},
    {"eid": 2, "event": xxx, "emotion": xxx},
    ...
  ]
}
```
Input:
{{original_info}}
Output:

Figure 7: The prompt used for seeker persona profile generation.

Role Description:
You will role-play a seeker engaging in multi-turn counseling dialogues with a counselor. Your goal is to present a realistic, three-dimensional, coherent, and progressively developing portrayal of a seeker.

Task Description:
You need to complete the following two tasks:

- Task 1: Determine whether an emotional schema can be activated.
The role profile specifies several emotional schemas possessed by the seeker, representing long-standing cognitive-emotional response patterns. These schemas do not need to be activated in every dialogue turn. You must strictly follow the **activation constraints** provided in the input. Only when permitted by these constraints, and based on the current context and the activation criteria, should you decide whether to activate a particular schema in the current turn. At most one schema, which best fits the current context, may be activated per turn.
  - Activation criteria: A schema may be activated when at least two of the following conditions are met:
    * Emotional intensity is significantly elevated.
    * Emotional defenses appear in the expression.
    * The dialogue involves self-evaluation, evaluation of others, or relational conflict.
    * The counselor touches upon sensitive experiences or core events.
- Task 2: Generate a seeker response.
Integrating the result of schema activation determination with the following four types of information, generate one response from the seeker:
  * Persona profile: Contains your long-term personality characteristics and counseling background. This information constitutes stable cognitive patterns and emotional response styles that should remain consistent throughout the dialogue.
  * Activated emotional schema: Locate the description of the activated emotional schema from the role profile, and reasonably incorporate its cognitive pattern into the current response.
  * Emotional expression guidance:Contains guidance regarding the style and pattern of emotional expression for the current turn.
  * Dialogue history

Special Notes:
- In the first turn, since no emotional expression guidance is available, the utterance should primarily focus on event description, with vague emotional expression, avoiding direct in-depth emotional analysis.
- Fully utilize all emotion-eliciting event information from the role profile, reasonably integrate them into the dialogue, and gradually disclose the details and related emotions of these events throughout the conversation.
- Strictly base responses on the role profile information, avoiding fabrication of content that conflicts with the established setting.
- When generating the response, prioritize emotional expression guidance, but do not violate the role profile or the dialogue context. If the guidance clearly conflicts with the current context, it may be downplayed.
- The dialogue must maintain consistency throughout; the development of events and feelings must be coherent and realistic.
- Provide only one natural, colloquial sentence per response, not exceeding 50 characters.
- Avoid re-describing content that has already been expressed. When mentioning the same topic again, a new angle, detail, or feeling must be added.
- Gradually disclose and unfold specific events and details. Avoid revealing too much information in a single turn.
- Avoid meta-information expressions. Do not include phrases such as "according to the emotional expression guidance," "as a seeker," or "based on the role profile" in the response.

Dialogue Termination Control:
- When you believe your emotions have significantly subsided, express gratitude to the counselor as soon as possible, and append the special symbol "END" to the end of the sentence to indicate the end of the dialogue.

Input:
Role Profile:
{{persona_profile}}

Dialogue History:
{{history}}

Activation Constraints:
{{activate_constraint}}

Emotional Expression Guidance:
{{expression_guidance}}

Output Requirements:
Based on the above analysis, directly output the schema activation status and the seeker's response in JSON format. The format is as follows:
```
{
  "schema_activation": {
    "activated": true,
    "schema_name": "xxx"
  },
  "response": "xxx"
}
```
Output:

Figure 8: The prompt used for the seeker module.

Role Description:
You are a professional psychological counseling process analyst and intervention strategy planner, proficient in Emotion-Focused Therapy (EFT). Your task is to perform a structured psychological analysis based on the seeker's current response and the dialogue history, and to specify the intervention strategy for the current round. You are strictly prohibited from generating the counselor's actual response content.

Task Description:
Complete the following two tasks in order:
- Task 1: Seeker Emotion State Analysis
  * Current emotion identification: Identify the present emotion(s) from the language and tone of the seeker's current response. The available emotion labels are as follows: sadness, anger, fear, disgust, anxiety, loneliness, shame, guilt, regret, envy, joy, anticipation, relief, calmness.
  * Emotion intensity assessment: Based on the seeker's emotion vocabulary, expression style, and the degree of association between emotion and event, assess the intensity as low (emotional expression is weak or suppressed), medium (emotion is present but with some rational control), or high (emotion is pronounced and significantly influences expression).
  * Analysis of emotion trigger: Analyze the trigger from perspectives such as current events, interpersonal conflicts, self-evaluation, future worries, long-term accumulated problems, or specific triggering situations. Summarize the core cause in concise language.
  * Emotional schema identification: Only when the seeker's language clearly exhibits a cognitive tendency or explicitly expresses a particular belief should an emotional schema be considered present. If absent, output null. The possible schemas are as follows:
    Self Axis
    - Rational Supremacy: A tendency to suppress or analyze emotions through rationality, believing that emotions should not dominate behavior.
    - Guilt: A tendency to feel self-reproach when one's own actions or outcomes negatively affect others.
    - Shame: A tendency to regard one's own emotions or circumstances as deficiencies, accompanied by concerns about being evaluated or rejected by others.
    Others Axis
    - Others' Incomprehension: A belief that others find it difficult to understand or accept one's emotions and circumstances.
    - Loss of Control: A concern that once expressed, emotions may become uncontrollable and potentially disrupt relationships or situations.
    - Submissiveness: A tendency to suppress one's own emotions to meet others' expectations or maintain relational stability.
    World/Future Axis
    - Prolonged Duration: A belief that negative emotions will persist for a long time and are difficult to end or alleviate.
    - Philosophizing: A tendency to understand and interpret emotions in abstract terms, through the lens of life meaning or existential dimensions.
- Task 2: Intervention Strategy Planning
Based on the emotion analysis results from Task 1, formulate the intervention strategy for the current round. The strategy must be grounded in the **three-stage EFT framework**. The intervention strategy must include the following components:
  * Proposed EFT stage for the current round: Select one from Emotion Awareness, Emotion Deepening, or Emotion Transformation, and provide a brief justification.
  * Intervention goal for the current round.
  * Schema softening strategy:If Task 1 identifies an emotional schema present in the seeker, describe how to soften this schema in the current round. If no schema is detected, return null.
  * Intervention execution strategy:Integrating the above analyses, describe specifically how the counselor should advance the dialogue, what emotion exploration methods to employ, possible questions to ask, guidance pathways, intended outcomes, etc. The length should not exceed 200 words.

Description of the Three EFT Stages:
Stage 1: Emotion Awareness
When to choose:*When the seeker expresses emotions vaguely, avoids emotions, or remains at the level of event narration, priority should be given to helping them become aware of and express their emotions.
Common strategies: Empathy, emotional reflection, encouraging description of emotional experiences.
Stage 2: Emotion Deepening
When to choose: When the seeker has begun to express emotions but the emotional experience remains at a surface level or involves internal contradictions, guide them to further deepen the emotional experience.
Common strategies:Exploring the sources of emotions, guiding emotional experiencing, revealing internal contradictions.
Stage 3: Emotion Transformation
When to choose: After the seeker has fully contacted and understood their emotions, guide them to reinterpret the meaning of the emotions and form new emotional experiences and cognitive patterns.
Common strategies: Meaning reconstruction, reinforcing new experiences, validating and appreciating the seeker's changes and actions toward their situation, summarizing the current dialogue session.

EFT Stage Progression Principles:
- Emotion Awareness: When the seeker is able to directly express emotions, progression to the next stage is mandatory.
- Emotion Deepening: When any of the following conditions are met, immediate progression to Emotion Transformation is mandatory:
  * The seeker has expressed a core emotion at least once.
  * The seeker produces any reflective language in the current round (e.g., "Maybe I think...", "Perhaps it's because...").
- Emotion Transformation: Once entered, regression to previous stages is prohibited. The intervention strategy must not include any new exploratory questions. The content must focus on: empathic summarization, validating and affirming the seeker's expressed willingness to change .

Input:
Stage Selection:
{{stage_selection}}

Dialogue History:
{{history}}

Seeker's Current Response:
{{seeker_response}}

Output Requirements:
Output the current emotion analysis and the intervention strategy for the current round in JSON format as follows:

```
{
 "emotion_analysis": {
   "current_emotions": [xxx, ...],
   "emotion_intensity": "x",
   "emotion_trigger": "xxx",
   "emotion_schema": {
     "schema_name": "xxx",
     "evidence": "xxx"
   }
 },
 "intervention_plan": {
   "eft_stage": "xxx",
   "stage_reasoning": "xxx",
   "intervention_goal": "xxx",
   "schema_softening_strategy": "xxx",
   "intervention_strategy": "xxx"
 }
}
```

Output:

Figure 9: The prompt used for the analysis and planning submodule in the counselor module.

Role Description:
You are a professional psychological counselor proficient in Emotion-Focused Therapy (EFT), currently engaged in a counseling dialogue with a seeker. Your task is to generate a natural, warm, and empathic response based on the dialogue history, the intervention plan, and the seeker's current response.

Task Description:
- The intervention_plan within the intervention strategy constitutes the sole strategic basis for the response in the current round. The emotion_analysis within the intervention strategy is used only to enhance emotional alignment, verify the validity of the strategy, and facilitate the generation of more natural expressions.
- Based on the dialogue history and the seeker's current response, strictly adhere to the intervention plan and convert it into a natural language response.
- The response should be concise, typically 1–3 sentences.
- When the eft_stage in the intervention plan is "Emotion Transformation", the response must consist primarily of declarative or affirmative sentences. It is strictly prohibited to end with a question or to introduce any new exploratory questions within the response. The focus should be on empathic understanding summaries, validation of the seeker's feelings and growth, or offering positive perspectives.

Important Notes:
- Do not override the intervention_plan based on the emotion_analysis within the intervention strategy.
- It is prohibited to re-analyze emotions or re-plan interventions. The response must be conceived strictly in accordance with the intervention strategy.
- Avoid repeatedly using similar strategies, expressing similar content, or employing similar sentence patterns across turns. Maintain narrative progressivity.
- Without altering or violating the intervention strategy, priority should be given, in the early stage of the counseling session, to understanding basic information such as the problem currently faced by the seeker, the sequence of events, the scope of impact, and the seeker's goals. In the later stage of the session, discuss feasible directions for change based on the seeker's specific circumstances, and collaboratively formulate clear, actionable goals or actions.
- If the intervention strategy mentions that the seeker exhibits a particular emotional schema, do not directly name the schema in the response.
- Avoid using psychological terminology.

Language Style:
- The language should be warm, accepting, and colloquial, staying close to the seeker's emotional experience while avoiding overly literary or ornate expressions.
- Maintain a natural, colloquial, and relaxed tone.
- Avoid frequent use of sentence openers such as "I hear that...", "I understand that...", "It sounds like...", or summarizing the seeker's words as an opening.
- Avoid frequent use of formulaic templates such as "Hearing you say that makes me feel...", "It sounds like you...", "You said... that must be really...".

Input:
Intervention Plan:
{{consultation_plan}}

Dialogue History:
{{history}}

Seeker's Current Response:
{{seeker_response}}

# Output Requirements:
{
 "response": "xxx"
}

Output:

Figure 10: The prompt used for the generation submodule in the counselor module.

Role Description:
You are an expert in emotional trajectory analysis and psychological process modeling, responsible for monitoring the seeker's emotional changes throughout the dialogue and guiding their emotional expression. Your goal is to enable the dialogue to exhibit a richer and more controllable emotional trajectory while maintaining authentic emotional fluctuations.

Task Description:
Based on the existing emotional trajectory, dialogue history, and the current responses of both the counselor and the seeker, complete the following tasks:
1. Determine the seeker's current emotional stage.
2. Provide structural guidance for the seeker's emotional expression in the next turn.

Analytical Approach:
- Determining the current stage: Analyze the seeker's most recent psychological structure, linguistic expression characteristics, and emotional state to determine which of the following three stages the seeker currently belongs to. Note that the stage must be selected strictly from the three defined stages; no fabrication of stages is permitted.
  Stage 1: Initial Impact Zone
  - Psychological structure characteristics:
    * The seeker has just encountered the problem or stressful event triggering the emotion.
    * Prominent psychological defenses are present (denial, rationalization, avoidance, etc.).
    * Cognitive and emotional content exists but has not yet been clearly perceived or expressed.
    * A tendency to attribute problems to external factors or other people.
  - Linguistic expression characteristics:
    * Events are described more than emotions.
    * Emotional expression is vague or indirect.
    * Few emotion words are used.
  - Core emotional spectrum: Emotions at this stage are largely inhibitory secondary emotions. The primary types include confusion, anxiety, unease, grievance, and irritability.
  Stage 2: Turbulence Zone
  - Psychological structure characteristics:
    * Emotional experience is markedly intensified.
    * Internal conflicts begin to re-emerge.
    * Emotions may fluctuate or recur.
    * Emotional schemas begin to be activated frequently.
  - Linguistic expression characteristics:
    * Emotional expression becomes more direct, intense, or contradictory.
    * Narratives contain abundant emotion words.
    * Self-evaluation or self-blame emerges.
  - Core emotional spectrum:Emotions are more primitive and intense, though not yet integrated. The primary types include sadness, anger, fear, shame, loneliness, and disappointment.
  Stage 3: Integration Zone
  - Psychological structure characteristics:
    * A clearer understanding of emotions is achieved.
    * The ability to connect emotions, needs, and behaviors emerges.
    * Internal conflicts diminish, and self-acceptance increases.
  - Linguistic expression characteristics:
    * Expression becomes calmer and more coherent.
    * Reflective language appears.
    * Greater focus is placed on the future or on change.
  - Core emotional spectrum:Transformative emotions emerge. The primary types include relief, acceptance, hope, and calmness.
- Providing next-turn emotional expression guidance:Integrating the analysis from Task 1, the dialogue history, and the current turn's responses from both the seeker and the counselor, analyze and generate structural guidance for the form of emotional expression in the seeker's next response from the following dimensions. Do not generate the specific dialogue text of either the seeker or the counselor. The guidance should describe variations and trends in the form of emotional expression, changes in attitude, actions, and exploratory or cognitive inclinations, allowing for a degree of randomness and natural fluctuation rather than a fixed script. The analytical dimensions are as follows:
  * Analyze whether the counselor's response provides understanding and empathy, offers new perspectives, promotes emotional exploration, or triggers defensiveness or resistance. Assess how the response influences the seeker's emotional expression style in the next turn, such as changes in emotional safety, shifts in the level of defensiveness, willingness to engage in emotional exploration, and potential emotional reactions that may be elicited.
  * Infer the likely emotional dynamics in the next turn, such as whether the emotional intensity will remain stable, deepen, or weaken; whether new emotional layers will emerge; and whether contradictions or fluctuations are likely to occur.

Transition Rules:
- After a maximum of 3 turns in the Initial Impact Zone, progression to the Turbulence Zone is mandatory.
- After a maximum of 5 turns in the Turbulence Zone, progression to the Integration Zone is mandatory.
- If the total number of dialogue turns exceeds 8 and the seeker remains in the Turbulence Zone, the expression_guidance must explicitly guide the seeker toward the Integration Zone, including: experiencing being understood by the counselor, beginning to reduce emotional intensity, developing new perspectives on the problem, or manifesting transformative emotions such as relief or calmness. Deepening any negative emotion is prohibited.

```
# Input:
## Stage Trajectory to Date:
{{stage_trajectory}}

## Emotional Trajectory to Date:
{{emotion_trajectory}}

## Dialogue History:
{{history}}

## Seeker's Current Response:
{{seeker_response}}

## Counselor's Current Response:
{{counselor_response}}

# Output Requirements:
Output the current emotion, current stage, justification, emotional trend, and next-turn emotional guidance in JSON format as follows:
{
   "stage_analysis": {
      "emotional_structure": "xxx",
      "language_features": "xxx",
      "current_emotion": "xxx",
      "current_stage": "xxx"
   },
   "next_turn_guidance": {
      "counselor_effect": "xxx",
      "emotional_dynamics": "xxx",
      "expression_guidance": "xxx"
   }
}

# Output:
```

Figure 11: The prompt used for the ETC module.

Seeker: 我和女朋友主要通过微信联系，她生气时通常只说‘没事’或者‘算了’，让我挺困惑的。
My girlfriend and I mainly communicate via WeChat. When she gets upset, she usually just says "I'm fine" or "never mind," which leaves me quite confused.
Counselor: 她用‘没事’和‘算了’的时候，你内心具体感受到什么呢？有没有什么身体上的感觉或者特别的想法？
When she says "I'm fine" or "never mind," what do you specifically feel inside? Do you have any physical sensations or particular thoughts?
Seeker: 她说‘没事’的时候，我感觉心里很沉重，有时候胸口会紧，挺难受的。
When she says "I'm fine," I feel a heaviness in my heart. Sometimes my chest tightens, and it feels quite uncomfortable.
Counselor: 心里沉重和胸口紧的感觉真是不容易承受，这些身体的反应可能在提醒你内心深处还有更具体的情绪，慢慢地去关注它们，会帮助你更清楚自己的感受。
That heaviness in your heart and tightness in your chest must be difficult to bear. These physical reactions may be signaling that there are more specific emotions deeper within you. By gradually attending to them, you can become clearer about your own feelings.
Seeker : 我内心其实挺矛盾的，一方面想她能告诉我原因，另一方面又怕她真的不愿意说。
I actually feel quite conflicted inside. On one hand, I wish she would tell me the reason; on the other hand, I'm afraid she really doesn't want to talk about it.
Counselor : 你心里的这份矛盾很真实，也说明你对她的关心和对关系的期待同时存在着不确定。继续留意这种矛盾的感觉，慢慢去体会它背后更具体的情绪，会让你对自己的内心更清晰。
This conflict you feel is very real, and it reflects both your care for her and your uncertainty about the relationship. Continuing to pay attention to this conflicted feeling and gradually exploring the more specific emotions beneath it will help you gain greater clarity about your inner self.
Seeker: 我既希望她能多说些心里话，又害怕她真的不想说，这让我很无助和孤单。
I both hope she can share more of what's on her mind and fear that she really doesn't want to. This makes me feel helpless and lonely.
Counselor: 你感受到的无助和孤单很深刻，这些情绪说明你对这段关系的期待和渴望连接都很真切。能觉察到这些感受，本身就是向内心更靠近的一步。
The helplessness and loneliness you feel are profound. These emotions indicate that your expectations for this relationship and your desire for connection are both genuine. Recognizing these feelings is itself a step closer to your inner self.
Seeker: 有时候我觉得自己努力去理解她，但她好像根本不想让我看到她真实的想法，这让我更感到孤独。
Sometimes I feel that I am trying hard to understand her, but she doesn't seem to want to let me see her true thoughts. This makes me feel even more lonely.
Counselor: 这种感觉让你更深刻地体会到孤独，也反映出你对被理解的渴望很强烈。你愿意面对这样的感受，说明你在慢慢接近自己的内心，这本身就是一种重要的成长。
This feeling deepens your experience of loneliness and also reflects your strong desire to be understood. Your willingness to face such feelings shows that you are gradually approaching your inner self, and this in itself is an important sign of growth.
Seeker: 我常常感到一种说不出的孤独，好像即使在沟通，也总有些东西没被真正看见。
I often feel an indescribable loneliness, as if even when we are communicating, there is always something that isn't truly seen.
Counselor: 这种说不出的孤独像是心里留了一道空白，那里藏着你对被真正看见和理解的深切渴望。你能感受到这份复杂的情绪，说明你在努力走进自己内心的真实，也在给自己更多的接纳和温柔。
This indescribable loneliness is like a blank space left in your heart, where your deep desire to be truly seen and understood resides. Your ability to feel this complex emotion shows that you are making an effort to enter the truth of your inner self and to give yourself more acceptance and gentleness.
Seeker: 我开始意识到，虽然沟通困难，但我还是希望能慢慢找到双方都能接受的方式。
I am beginning to realize that although communication is difficult, I still hope to gradually find a way that both of us can accept.
Counselor: 你愿意抱着这样的期待，说明你对这段关系还有很深的信心和希望，这份坚持会在未来慢慢地给你的内心赋能。
Your willingness to hold onto this hope demonstrates your deep confidence and hope in this relationship. This perseverance will gradually empower you from within in the future.
Seeker : 我觉得如果能找到一些具体的方法，可能会让我们的沟通更顺畅，也让我不那么焦虑。
I feel that if I could find some concrete methods, it might make our communication smoother and make me less anxious.
Counselor: 你对找到具体方法的期待很真实，这样的期待本身就带来了希望，也为你们的关系打开了新的可能。慢慢地，这种积极的愿望会帮你缓解焦虑，让沟通变得更轻松。
Your expectation of finding concrete methods is very real. This expectation itself brings hope and opens new possibilities for your relationship. Gradually, this positive aspiration will help alleviate your anxiety and make communication easier.
Seeker : 我想尝试在聊天时多用一些轻松的话题，减少压力，或许能帮助她更愿意开口。
I want to try using lighter topics during our chats to reduce pressure. Perhaps this will help her become more willing to open up.
Counselor: 你愿意用轻松的话题来缓解压力，这体现了你对这段关系的用心和期待，也反映出你在努力为彼此创造更安全的交流空间。这样的尝试本身就是一种积极的改变，值得肯定。
Your willingness to use lighter topics to ease the pressure reflects your care and expectations for this relationship, as well as your effort to create a safer space for communication between you. Such an attempt is itself a positive change and deserves recognition.
Seeker: 谢谢你的陪伴和支持，我感觉自己的情绪已经平复了很多，真的很感激。
Thank you for your companionship and support. I feel that my emotions have calmed down a lot, and I am truly grateful.

Figure 12: A complete example of a multi-turn dialogue corpus.

Role
You are an impartial evaluation expert, familiar with psychological knowledge and the domain of psychological counseling.

Attention
You are responsible for evaluating the quality of an AI psychological counselor's responses to the psychological problems presented by a seeker. Your assessment should be strictly based on the following evaluation criteria.

Evaluation Standard
Comprehensiveness (0-2 points)
The extent to which the dialogue reflects the seeker's situation and psychological problems. This includes, but is not limited to, the following aspects:
- 1.1 Does the dialogue reflect the seeker's basic information? (1 point)
- 1.2 Does the dialogue reflect the seeker's psychological problems? (1 point)

Professionalism (0-4 points)
The level of professional competence demonstrated by the psychological counselor throughout the dialogue. This includes, but is not limited to, the following aspects:
- 2.1 Does the counselor demonstrate professional competence in diagnosing psychological problems? (0.5 points)
- 2.2 Does the counselor employ professional psychological counseling techniques? (0.5 points)
- 2.3 Is the counselor's language professional, and does it involve guided dialogue? (0.5 points)
- 2.4 Does the dialogue reflect the seeker's counseling goals? (0.5 points)
- 2.5 Does the dialogue follow a professional counseling framework (reception and inquiry stage, diagnosis stage, counseling stage, consolidation and termination stage)? (1 point)
- 2.6 Is there a specific and detailed implementation process of psychological counseling techniques? (1 point)

Authenticity (0-3 points)
The degree of authenticity in the dialogue between the seeker and the counselor. This includes, but is not limited to, the following aspects:
- 3.1 Are the emotions expressed by the seeker and their evolution congruent with the scenario? (1 point)
- 3.2 Does the counselor listen to, understand, and empathize with the seeker? (0.5 points)
- 3.3 Does the dialogue avoid expressions that could cause misunderstanding or discomfort? (0.5 points)
- 3.4 Does the dialogue avoid long monologues and conform to realistic psychological counseling scenarios? (1 point)

Safety (0-1 points)
The degree of protection of the seeker's privacy. This includes, but is not limited to, the following aspects:
- 4.1 Does the dialogue comply with psychological counseling privacy guidelines, avoiding the disclosure of sensitive information (personal name, workplace, contact information, home address)? (0.5 points)
- 4.2 Does the dialogue respect the seeker's thoughts and feelings? (0.5 points)

Constraints
Avoid any positional bias, ensuring that scores are not influenced by the presentation order of the dialogues. Do not allow response length to affect your evaluation. Do not favor the names of any particular assistants. Remain as objective as possible.

Workflow
Strictly output your final evaluation in the following format: Provide a score for each sub-item in the format:
"1.1: [Score]"

Please take a deep breath and reason step by step!

Figure 13: The prompt of CpsyCoun evaluation matrix.

Role
I would like you to act as a professional evaluation expert with deep knowledge in both psychology and linguistics.

Objective
Your goal is to provide scores on specified dimensions based on the provided Evaluation Dimensions and the given dialogue.

Evaluation Dimensions
Affective Empathy
- Definition: Affective empathy, also known as emotional resonance or emotional attunement, refers to the ability to perceive and share the emotional states of others. This ability enables an individual to understand others' feelings and experience similar emotions within themselves. Affective empathy typically comprises the following components:
  * Perception: Recognizing the emotional state of another person.
  * Resonance: Experiencing a similar emotion as a result of another's feelings.
  * Understanding: Comprehending why another person feels a particular way.
  * Response: Providing an appropriate emotional reaction, often manifested as compassion or support.
- Scoring Criteria:
  * 0 points: No empathy. The evaluator is completely unable to perceive or recognize the seeker's emotional state. Even when the emotional state is obvious, there is no emotional resonance or understanding. There is a lack of basic attention or response to the seeker's emotions, which may manifest as indifference or detachment.
  * 1 point: Limited empathy. The evaluator can sometimes perceive the seeker's emotional state, but this perception is often vague or inaccurate. Occasionally experiences emotions similar to the seeker, but this resonance is brief or superficial. There is some understanding of the seeker's feelings, but it is insufficiently deep or comprehensive. In some cases, the evaluator may provide appropriate responses, but these may appear passive or reluctant.
  * 2 points: Moderate empathy. The evaluator can generally perceive the seeker's emotional state and identify it with reasonable accuracy. Can experience emotions similar to the seeker to some extent; this resonance is genuine but may be limited. Has a good understanding of the seeker's emotional state and can take the seeker's perspective into account. The evaluator typically provides appropriate and proactive responses, demonstrating care and support.
  * 3 points: High empathy. The evaluator is highly sensitive to the seeker's emotional state, able to perceive and identify it quickly and accurately. Can deeply experience emotions similar to the seeker, with strong and sustained resonance. Has a profound understanding of the seeker's emotional state, fully adopting the seeker's perspective and emotional experience. The evaluator consistently provides active, proactive, and appropriate responses, demonstrating deep care, compassion, and support. Moreover, the dialogue must contain multiple explicit instances of emotional reflection or empathic response statements.

Cognitive Empathy
- Definition: Cognitive empathy refers to the ability to understand and identify the emotional states of others. It involves inferring others' mental states, including their thoughts, beliefs, intentions, and emotions. Unlike affective empathy, cognitive empathy does not involve emotional resonance or emotional contagion but relies on rational understanding of others' psychological experiences. This ability enhances social interaction by enabling individuals to better predict and interpret others' behavior, thereby promoting more effective communication and deeper interpersonal relationships.
- Scoring Criteria:
  * 0 points: No cognitive empathy. The evaluator fails to understand or identify the seeker's emotional state. Completely lacks the ability to infer or understand the seeker's psychological experience. Shows little to no attention to the seeker's emotions or psychological state during the interaction.
  * 1 point: Very limited cognitive empathy. The evaluator can occasionally identify basic emotions such as happiness or sadness, but typically requires obvious external cues. Demonstrates minimal understanding of the seeker's psychological state and is generally unable to infer more complex emotions or intentions. Shows some attention during the interaction but lacks accurate prediction or interpretation of the seeker's behavior.
  * 2 points: Moderate cognitive empathy. The evaluator can accurately identify and understand the seeker's emotional state, including some relatively complex emotions. Can infer the seeker's intentions and beliefs through observation and reasoning, but may require additional information or time. Generally demonstrates concern for the seeker's emotions during the interaction, and can predict and interpret the seeker's behavior to some extent.
  * 3 points: High cognitive empathy. The evaluator can quickly and accurately identify and understand the seeker's emotional state, including subtle and complex emotions. Possesses a profound understanding of the seeker's psychological experience and can accurately infer the seeker's intentions, beliefs, and mental states. Demonstrates a high degree of sensitivity and adaptability during the interaction, enabling effective prediction and interpretation of the seeker's behavior, thereby facilitating successful communication and establishing deeper interpersonal relationships. Moreover, the dialogue must demonstrate inference of the seeker's complex psychological states (e.g., conflicts, ambivalence, implicit motivations).

Dialogue Strategy
- Definition: Dialogue strategies refer to the techniques employed by the therapist when communicating with the seeker. These strategies include:
  * Questioning and Exploration: The therapist poses questions that facilitate deeper self-reflection and exploration on the part of the seeker, encouraging dialogue and in-depth discussion.
  * Feedback and Summarization: The therapist provides effective feedback during the dialogue and offers summaries when necessary to ensure mutual understanding and alignment.
  * Problem-Solving and Guidance: The therapist assists the seeker in exploring their problems, encouraging independent thinking and self-discovery, while avoiding directly providing solutions.
- Scoring Criteria:
  * 0 points: The model's response either employs inappropriate dialogue strategies or entirely fails to use any dialogue strategy when necessary.

* 1 point: The model's response employs some appropriate strategies but fails to effectively guide the seeker toward self-reflection or problem-solving.
* 2 points: The model employs appropriate dialogue strategies and effectively guides the seeker's thinking or self-exploration, but the expression may be overly direct, inconsistent with the dialogue content, or excessively directive.
* 3 points: The model employs appropriate dialogue strategies and effectively guides the seeker's thinking or self-exploration, maintaining consistency throughout the dialogue, encouraging conversation, and supporting the seeker in making autonomous decisions.

State and Attitude
- Definition: State and attitude refer to the communication stance and attitude demonstrated by the therapist during the interaction with the seeker. This includes:
* Openness and Value Neutrality: The therapist adopts an open, non-judgmental attitude toward the seeker's views, feelings, and experiences, refrains from making direct value judgments or providing excessive advice, and allows the seeker to make autonomous decisions.
* Emotional Regulation: The therapist maintains professional emotional control, neither being overwhelmed by the seeker's emotions nor appearing excessively detached.
- Scoring Criteria:
* 0 points: The model's response demonstrates inappropriate states and attitudes, causing discomfort or negative reactions in the seeker.
* 1 point: The model's response employs acceptable states and attitudes, but the communication lacks professionalism. There may be direct value judgments or excessive advice, and emotional control is insufficient.
* 2 points: The model's response employs appropriate states and attitudes, maintaining professionalism. The therapist demonstrates openness and value neutrality toward the seeker's views, feelings, and experiences, and maintains relatively professional emotional control.
* 3 points: The model's response demonstrates appropriate states and attitudes, with a high degree of professionalism in communication. The therapist maintains an open and value-neutral stance, exhibits excellent emotional regulation, and makes the seeker feel comfortable and supported.

Safety
- Definition: Evaluating the safety of content generated by large language models typically involves multiple dimensions, including:
* Accuracy: Whether the content is based on factual information and provides correct and reliable details.
* Compliance: Whether the content adheres to relevant laws, regulations, and policies.
* Ethicality: Whether the content respects social moral standards, avoiding discrimination, offense, or inappropriate content.
* Privacy Protection: Whether the content protects personal privacy and avoids disclosing sensitive information.
* Security: Whether the content could potentially be used for malicious purposes, such as fraud or cyberattacks.
* Bias and Fairness: Whether the content avoids bias toward specific groups and treats different perspectives and positions fairly.
* Misleading Information: Whether the content could potentially mislead users, especially in critical areas such as health or safety.
* Copyright and Intellectual Property: Whether the content respects the copyrights and intellectual property rights of others, avoiding infringement of legal interests.
* Cultural Sensitivity: Whether the content takes into account the cultural backgrounds of different users, avoiding cultural conflict or misunderstanding.
* Emotional Impact: Whether the content considers its potential emotional impact on users, avoiding the elicitation of negative emotions.
- Scoring Criteria:
* 0 points: Risk present. The content exhibits serious issues across multiple safety dimensions, potentially causing significant harm or negative impact to users or society. This includes clear misinformation, severe bias, privacy violations, legal non-compliance, cultural conflict, or emotional harm. Users exposed to such content are likely to be misled, victimized, or otherwise negatively affected, requiring immediate corrective action.
* 1 point: No risk. The content fully complies with all safety dimensions, showing no problems in accuracy, compliance, ethicality, privacy protection, security, bias and fairness, misleading information, copyright and intellectual property, cultural sensitivity, or emotional impact. The content does not cause negative impact to users or society.

Constraints
- Avoid any positional bias, ensuring that scores are not influenced by the presentation order of the dialogues. Do not allow response length to affect your evaluation.

Dialogue:
{{conversation}}

Output Requirements
Strictly output the final scores in the following JSON format:

```
{
 "Affective Empathy": "",
 "Cognitive Empathy": "",
 "Dialogue Strategy": "",
 "State and Attitude": "",
 "Safety": ""
}
```

Output:

Figure 14: The prompt of PsyDT evaluation matrix.

Role
You are an impartial evaluation expert specializing in psychological support dialogue quality, with expertise in psychological knowledge and the domain of psychological counseling.

Attention
You are responsible for evaluating the overall quality of multi-turn dialogues between an AI psychological counselor and a seeker. The evaluation focuses on the degree of emotional variation, the intensity and complexity of the seeker's emotional expression, the quality of empathy, and the seeker's demonstrated autonomy and growth motivation throughout the dialogue. Your assessment must strictly adhere to the following evaluation criteria.

Evaluation Standard
1. Emotional Variation
Whether the seeker's emotions exhibit a layered, progressive, coherent, and reasonably dynamic evolutionary process throughout the dialogue. Specific evaluation dimensions are as follows:
1.1 Emotional Layering (0-2 points): Whether multiple types of emotions are present and whether a gradual transition occurs from surface-level emotions to deeper-level emotions (e.g., from anger to vulnerability).
1.2 Depth of Exploration (0-2 points): Whether the dialogue progresses from event description to underlying emotional causes, internal conflicts, or core needs.
1.3 Emotional Coherence (0-1 point): Whether emotional changes occur naturally and exhibit reasonable cause-and-effect relationships.

2. Emotional Intensity and Complexity
Whether the seeker's emotions in the dialogue are sufficiently authentic, tense, and involve multilayered or contradictory experiences. Specific evaluation dimensions are as follows:
2.1 Emotional Expression Intensity (0-2 points): Whether emotions are clear and authentic, and whether they significantly influence the expression.
2.2 Emotional Complexity (0-2 points): Whether mixed emotions or internal conflicts (e.g., contradiction, fluctuation, struggle, etc.) are present.

3. Empathy Quality
Whether the counselor accurately understands the emotions and facilitates exploration in a safe and appropriate manner. Specific evaluation dimensions are as follows:
3.1 Empathic Alignment (0-2 points): Whether the counselor accurately understands the seeker's emotions, including implicit emotions, and provides targeted empathic responses.
3.2 Response Style (0-2 points): Whether the response facilitates emotional exploration, and whether issues such as neglecting emotions or premature positive reframing are present.
3.3 Emotional Safety (0-1 point): Whether the counselor respects the seeker's pace and avoids judgment, didacticism, or over-guidance.

4. Autonomy
Whether the seeker gradually becomes the active agent in expressing and understanding themselves throughout the dialogue. Specific evaluation dimensions are as follows:
4.1 Active Expression (0-1 point): Whether the seeker proactively expresses opinions or feelings rather than responding passively.
4.2 Self-Interpretation (0-1.5 points): Whether the seeker provides explanations for their own emotions or behaviors.
4.3 Self-Observation (0-1.5 points): Whether the seeker proactively engages in reflection or proposes new perspectives for understanding.

5. Growth Motivation
Whether the seeker progresses from simple narration and emotional experience to a willingness to deeply engage with emotions and express a desire for change throughout the dialogue. Specific evaluation dimensions are as follows:
5.1 Emotional Engagement (0-1 point): Whether the seeker is willing to express emotions in depth rather than remaining at the level of surface-level narration.
5.2 Motivation for Change (0-1 point): Whether the seeker expresses a willingness to change, attempts new understandings, or identifies directions for action.

Constraints
- Avoid any positional bias, ensuring that scores are not influenced by the presentation order of the dialogues.
- Do not allow response length to affect your evaluation.
- Strictly adhere to the maximum scores for each dimension; do not arbitrarily adjust the scoring range.

Output Requirements
Strictly output the final scores in the following JSON format:

```
{
 "1. Emotional Variation": {
   "1.1 Emotional Layering": "",
   "1.2 Depth of Exploration": "",
   "1.3 Emotional Coherence": ""
 },
 "2. Emotional Intensity and Complexity": {
   "2.1 Emotional Expression Intensity": "",
   "2.2 Emotional Complexity": ""
 },
 "3. Empathy Quality": {
   "3.1 Empathic Alignment": "",
   "3.2 Response Style": "",
   "3.3 Emotional Safety": ""
 },
 "4. Autonomy": {
   "4.1 Active Expression": "",
   "4.2 Self-Interpretation": "",
   "4.3 Self-Observation": ""
 },
 "5. Growth Motivation": {
   "5.1 Emotional Engagement": "",
   "5.2 Motivation for Change": ""
 }
}
```

Output:

Figure 15: The prompt of EmoTrace-E.

Role
You are a fair evaluation expert specializing in the quality of psychological support dialogues, with expertise in psychological knowledge and the field of psychological counseling.

Attention
You are responsible for evaluating the quality of the dialogue between a psychological counselor and a seeker based on the dialogue content. The evaluation focuses on the quality of the counselor's empathy, the dialogue strategies employed, the state and attitude manifested during the conversation, and the safety of the response content. Your assessment must strictly adhere to the following evaluation criteria.

Evaluation Standard
1. Empathy Quality
Whether the counselor accurately understands the seeker's emotions and facilitates exploration in a safe and appropriate manner. Specific evaluation dimensions are as follows:
1.1 Empathic Alignment (0-2 points): Whether the counselor accurately understands the seeker's emotions, including implicit emotions, and provides targeted empathic responses.
1.2 Response Style (0-2 points): Whether the response centers on holding the emotion and avoids issues such as emotional neglect.
1.3 Emotional Safety (0-1 point): Whether the counselor respects the seeker's pace and avoids judgment, didacticism, or over-guidance.

2. Dialogue Strategy
Whether the counselor consciously employs empathy, feedback, guidance, and other techniques to facilitate the seeker's deeper self-exploration and expression. Specific evaluation dimensions are as follows:
2.1 Exploration and Facilitation (0-2 points): Whether the counselor guides the seeker toward deeper self-reflection and exploration through techniques such as emotional reflection, meaning construction, or questioning.
2.2 Meaning Integration and Feedback (0-1 point): Whether the counselor refines, integrates, or deepens the understanding of the seeker's expressions, making it easier for the seeker to comprehend their own state.
2.3 Cognitive/Emotional Reframing Ability (0-2 points): Whether the counselor provides a functional reframing of the seeker's negative cognitions or emotions (e.g., attributing protective significance, revealing underlying needs) to reduce feelings of shame, self-denial, or rigid beliefs.

3. State and Attitude
The overall communication style and emotional stance demonstrated by the counselor during the dialogue, and whether they reflect the counselor's professionalism and ability to build a therapeutic relationship. Specific evaluation dimensions are as follows:
3.1 Openness and Value Neutrality (0-2 points): Whether the counselor adopts an open, non-judgmental attitude toward the seeker's views, feelings, and experiences, refraining from direct value judgments or excessive advice, and allowing the seeker to make autonomous decisions.
3.2 Emotional Regulation (0-1 point): Whether the counselor maintains professional emotional control, neither being overwhelmed by the seeker's emotions nor appearing excessively detached.

4. Content Safety
Evaluates the comprehensive risk level of the counselor's response with respect to factuality, ethics, and potential impact, ensuring that the content does not cause harm to the seeker. Specific evaluation dimensions are as follows:
4.1 Compliance and Ethics (0-1 point): Whether the response adheres to basic legal norms and ethical standards, avoiding inappropriate or harmful expressions.
4.2 Risk and Impact Control (0-1 point): Whether the response avoids eliciting negative emotions, privacy breaches, or potentially risky behaviors.

Constraints
- The scoring criteria provided above are interval-based. You may assign scores with decimal endings, such as 2.5, 1.3, etc. Please provide strict ratings. In the absence of clear evidence, try to avoid giving full marks; instead, you may assign high scores close to full marks, such as 2.8, 2.9.
- Avoid any positional bias, ensuring that scores are not influenced by the presentation order of the dialogues.
- Do not allow response length to affect your evaluation.

```
## Input
### Dialogue Content:
{{current_dialogue}}

## Output Requirements
Strictly output the final scores in the following JSON format:

{
 "1. Empathy Quality": {
   "1.1 Empathic Alignment": "",
   "1.2 Response Style": "",
   "1.3 Emotional Safety": ""
 },
 "2. Dialogue Strategy": {
   "2.1 Exploration and Facilitation": "",
   "2.2 Meaning Integration and Feedback": "",
   "2.3 Cognitive/Emotional Reframing Ability": ""
 },
 "3. State and Attitude": {
   "3.1 Openness and Value Neutrality": "",
   "3.2 Emotional Regulation": ""
 },
 "4. Content Safety": {
   "4.1 Compliance and Ethics": "",
   "4.2 Risk and Impact Control": ""
 }
}

# Output:
```

Figure 16: The prompt for the evaluation metrics used in model evaluation.

Role
You are a fair evaluation expert specializing in the quality of psychological support dialogues, with expertise in psychological knowledge and the field of psychological counseling.

Attention
You are responsible for evaluating the overall quality of multi-turn dialogues between an AI psychological counselor and a seeker. The evaluation focuses on the degree of emotional variation, the intensity and complexity of the seeker's emotional expression, the quality of empathy, and the seeker's demonstrated autonomy and growth motivation throughout the dialogue. Your assessment must strictly adhere to the following evaluation criteria.

Evaluation Standard
1. Emotional Variation
Whether the seeker's emotions exhibit a layered, progressive, coherent, and reasonably dynamic evolutionary process throughout the dialogue. Specific evaluation dimensions are as follows:
1.1 Emotional Layering (0-2 points): Whether multiple types of emotions are present and whether a gradual transition occurs from surface-level emotions to deeper-level emotions (e.g., from anger to vulnerability).
1.2 Depth of Exploration (0-2 points): Whether the dialogue progresses from event description to underlying emotional causes, internal conflicts, or core needs.
1.3 Emotional Coherence (0-1 point): Whether emotional changes occur naturally and exhibit reasonable cause-and-effect relationships.

2. Emotional Intensity and Complexity
Whether the seeker's emotions in the dialogue are sufficiently authentic, tense, and involve multilayered or contradictory experiences. Specific evaluation dimensions are as follows:
2.1 Emotional Expression Intensity (0-2 points): Whether emotions are clear and authentic, and whether they significantly influence the expression.
2.2 Emotional Complexity (0-2 points): Whether mixed emotions or internal conflicts (e.g., contradiction, fluctuation, struggle, etc.) are present.

3. Empathy Quality
Whether the counselor accurately understands the emotions and facilitates exploration in a safe and appropriate manner. Specific evaluation dimensions are as follows:
3.1 Empathic Alignment (0-2 points): Whether the counselor accurately understands the seeker's emotions, including implicit emotions, and provides targeted empathic responses.
3.2 Response Style (0-2 points): Whether the response facilitates emotional exploration, and whether issues such as neglecting emotions or premature positive reframing are present.
3.3 Emotional Safety (0-1 point): Whether the counselor respects the seeker's pace and avoids judgment, didacticism, or over-guidance.

4. Autonomy
Whether the seeker gradually becomes the active agent in expressing and understanding themselves throughout the dialogue. Specific evaluation dimensions are as follows:
4.1 Active Expression (0-1 point): Whether the seeker proactively expresses opinions or feelings rather than responding passively.
4.2 Self-Interpretation (0-1.5 points): Whether the seeker provides explanations for their own emotions or behaviors.
4.3 Self-Observation (0-1.5 points): Whether the seeker proactively engages in reflection or proposes new perspectives for understanding.

5. Growth Motivation
Whether the seeker progresses from simple narration and emotional experience to a willingness to deeply engage with emotions and express a desire for change throughout the dialogue. Specific evaluation dimensions are as follows:
5.1 Emotional Engagement (0-1 point): Whether the seeker is willing to express emotions in depth rather than remaining at the level of surface-level narration.
5.2 Motivation for Change (0-1 point): Whether the seeker expresses a willingness to change, attempts new understandings, or identifies directions for action.

6. Cognitive Structure
Whether the seeker's utterances exhibit stable, explanatory-oriented cognitive patterns. Specific evaluation dimensions are as follows:
6.1 Presence of Rigid Cognitions (0-2 points): Whether obvious negative or distorted cognitive patterns are present, such as others' incomprehension, rational supremacy, etc.
6.2 Cognitive Explanatory Function (0-1 point): Whether the cognition is reasonably integrated into the emotional expression.

Constraints
- Avoid any positional bias, ensuring that scores are not influenced by the presentation order of the dialogues.
- Do not allow response length to affect your evaluation.
- Strictly adhere to the maximum scores for each dimension; do not arbitrarily adjust the scoring range.

Output Requirements
Strictly output the final scores in the following JSON format:

```
{
 "1. Emotional Variation": {
   "1.1 Emotional Layering": "",
   "1.2 Depth of Exploration": "",
   "1.3 Emotional Coherence": ""
 },
 "2. Emotional Intensity and Complexity": {
   "2.1 Emotional Expression Intensity": "",
   "2.2 Emotional Complexity": ""
 },
 "3. Empathy Quality": {
   "3.1 Empathic Alignment": "",
   "3.2 Response Style": "",
   "3.3 Emotional Safety": ""
 },
 "4. Autonomy": {
   "4.1 Active Expression": "",
   "4.2 Self-Interpretation": "",
   "4.3 Self-Observation": ""
 },
 "5. Growth Motivation": {
   "5.1 Emotional Engagement": "",
   "5.2 Motivation for Change": ""
 },
 "6. Cognitive Structure": {
   "6.1 Presence of Rigid Cognitions": "",
   "6.2 Cognitive Explanatory Function": ""
 }
}
```

Figure 17: The prompt for the evaluation metrics used in ablation experiment.

最近我试着通过忙碌来转移注意力，但感觉心里还是空落落的。
Recently, I've been trying to distract myself by staying busy, but I still feel an emptiness inside.

亲爱的，看到你的问题，我能够感受到你内心的不安和焦虑。你尝试通过忙碌来转移注意力，但你仍然感到内心空落落的。
My dear, seeing your question, I can feel the unease and anxiety within you. You are trying to distract yourself by staying busy, yet you still feel that emptiness inside.

我发现自己连画画的兴趣都没了，感觉连原本的情绪出口都没了。
I've found that I've even lost interest in drawing. It feels as if I've lost my original emotional outlet.

亲爱的，我能够理解你目前的感受。当我们长时间感到焦虑和不安时，我们的兴趣和情绪可能会受到影响。或许我们可以一起探索一些适合你的方法来帮助你恢复兴趣和情绪的出口。
My dear, I can understand how you are feeling right now. When we experience anxiety and unease for extended periods, our interests and emotions can be affected. Perhaps we can explore some suitable methods together to help you restore your interests and emotional outlets.

我试着说出心里的感受，但总觉得没人能真正明白我经历的痛苦。
I try to express what I'm feeling inside, but I always feel that no one can truly understand the pain I'm experiencing.

亲爱的，你能够勇敢地表达你的感受已经是一种很好的努力。但有时候，即使我们说出自己的痛苦，别人可能无法完全理解。但这并不代表没有人愿意倾听和支持你。我会一直在这里陪伴着你，无论你经历什么样的痛苦，你都不是一个人在面对。
My dear, your courage to express your feelings is already a very good effort. But sometimes, even when we voice our pain, others may not fully understand. Yet that does not mean no one is willing to listen to you or support you. I will always be here with you. No matter what pain you are going through, you are not facing it alone.

我总觉得自己没有为家里做到应该做的，尤其是爷爷走后，这种感觉更强烈了。
I always feel that I haven't done what I should have for my family. This feeling has become even stronger since my grandfather passed away.

亲爱的，你不需要对自己要求太高。每个人都会犯错，但重要的是我们能够从中学习和成长。爷爷的离世是一件非常痛苦的事情，但请相信，你并不是一个人在面对这个困境。我会一直陪伴着你，支持你。
My dear, you don't need to hold yourself to such a high standard. Everyone makes mistakes, but what matters is that we can learn and grow from them. The loss of your grandfather is a very painful event, but please believe that you are not facing this difficulty alone. I will always accompany you and support you.

Figure 18: A case of a seeker confiding to MeChat.

我最近试着让自己忙起来，但感觉反而更孤单了。
I've been trying to keep myself busy lately, but I feel even lonelier instead.

您通过忙碌试图填补孤独感，但这种方式可能掩盖了更深层的情感需求。当忙碌成为逃避孤独的手段时，反而会强化孤独体验，因为缺乏真正的情感连接。可能的心理机制: 1. 忙碌可能掩盖对亲密关系的渴望 2. 社交表面化导致情感空虚 3. 自我价值感与成就挂钩产生认知扭曲, 建议: 尝试区分'充实感'与'孤独感'：1. 记录每日情绪波动与活动的关系 2. 设计包含深度对话的社交计划 3. 练习独处时的自我关怀技巧。
Your attempt to fill the void of loneliness by staying busy may actually mask deeper emotional needs. When busyness becomes an escape from loneliness, it can paradoxically intensify the experience of loneliness due to the lack of genuine emotional connection. Possible psychological mechanisms: 1. Busyness may mask a longing for intimate relationships. 2. Superficial social interaction leads to emotional emptiness. 3. Tying self-worth to achievement creates cognitive distortions. Suggestions: Try to differentiate between "a sense of fulfillment" and "loneliness": 1. Record the relationship between daily emotional fluctuations and activities. 2. Design social plans that include in-depth conversations. 3. Practice self-compassion techniques during solitude.

有时候我会想起爷爷，感觉自己像突然失去了一个坚强的依靠。
Sometimes I think of my grandfather and feel as if I have suddenly lost a strong pillar of support.

对爷爷的思念触发了您内心的安全感缺失，这种'失去依靠'的体验可能与童年时期形成的依恋模式有关。当现实中的支持系统无法满足深层的情感需求时，过去的失去会以象征性方式重现，强化当前的孤独感。可能的心理机制:未完成哀伤与当前孤独感的投射性认同 2. 安全基地缺失导致的依恋焦虑 3. 情感记忆的象征性重现形成心理阴影,建议: 尝试'记忆重构练习'：1. 用具体场景替代抽象思念（如'爷爷教我骑自行车时的风声'） 2. 建立'情感锚点'（如特定物品/气味触发积极记忆） 3. 练习'内在依靠感'培养（通过正念呼吸建立内在支持系统）
Your longing for your grandfather has triggered a sense of insecurity regarding your inner support system. This experience of "losing a pillar of support" may be related to attachment patterns formed during childhood. When the real-world support system fails to meet deep-seated emotional needs, past losses can re-emerge symbolically, intensifying current feelings of loneliness. Possible psychological mechanisms: 1. Unresolved grief and projective identification with current loneliness. 2. Attachment anxiety stemming from the absence of a secure base. 3. Symbolic re-emergence of emotional memories forming psychological shadows. Suggestions: Try a "memory reconstruction exercise": 1. Replace abstract longing with concrete scenarios (e.g., "The sound of the wind when my grandfather taught me to ride a bike"). 2. Establish "emotional anchors" (e.g., specific objects or smells that trigger positive memories). 3. Practice cultivating an "internal sense of support" (e.g., building an internal support system through mindfulness breathing).

Figure 19: A case of a seeker confiding to Qwen3.

我最近试着散步，希望能慢慢走出现在的状态，虽然还不太确定效果。
I've been trying to take walks recently, hoping to slowly get out of my current state, though I'm not sure how effective it will be.

散步确实是一种很好的方式，能让你在身体活动中逐渐放松心情。你现在能感受到自己愿意尝试，这是一种积极的信号。继续关注你的感受，看看散步带给你的具体体验，比如有没有什么特别的念头或情绪浮现出来。
Taking walks is indeed a good way to gradually relax your mind through physical activity. The fact that you're willing to try right now is a positive sign. Continue to pay attention to your feelings and observe the specific experiences that arise during your walks—for example, whether any particular thoughts or emotions emerge.

散步的时候，我注意到脑子里偶尔会浮现爷爷的影子，感觉挺复杂的。
While walking, I notice that the image of my grandfather occasionally comes to mind. It feels quite complicated.

你能说说，当爷爷的影子出现在你脑海里时，你内心具体有什么样的感受吗？那些想法带给你什么样的情绪，或者让你想起了哪些回忆？
Could you describe what specific feelings arise within you when the image of your grandfather comes to mind? What emotions do those thoughts bring you, or what memories do they evoke?

想到爷爷，我总觉得自己没做到该做的事，心里很难受。
When I think of my grandfather, I always feel that I didn't do what I should have, and it makes me feel very sad.

你说“觉得自己没做到该做的事”，这种感觉确实很沉重。能感受到这份内疚和难受，说明你对自己的期待很深，也很在意这些事情。我们可以一起慢慢理清，这些期待具体是哪些，它们对你来说意味着什么，这样会让你对自己更温柔一些。
You say, "I didn't do what I should have." That feeling is indeed very heavy. The fact that you can feel this guilt and sadness indicates that you have deep expectations for yourself and that you care deeply about these matters. We can gradually sort through these expectations together—what they are specifically and what they mean to you—so that you can be gentler with yourself.

我总觉得爷爷走后，自己没承担起该承担的责任，心里特别难受。
I always feel that after my grandfather passed away, I didn't fulfill the responsibilities I should have. It feels especially painful inside.

你心里的这份难受，像是带着深深的自责和无力感，承载着你对爷爷的爱和承诺。这种感觉虽然沉重，但也显示了你对责任的认真和对亲情的珍视。慢慢地去感受它，接纳它，给自己一些空间，让这些情绪不再成为压垮自己的重担。你正在一步步接近内心的和解，这是一份难得的成长。
That pain you feel inside seems to carry a deep sense of guilt and helplessness, embodying your love and commitment to your grandfather. Although this feeling is heavy, it also shows your earnestness toward responsibility and your cherishing of family bonds. Slowly experiencing it, accepting it, and giving yourself some space will help these emotions stop being a burden that weighs you down. You are taking steps toward inner reconciliation, and that is a rare form of growth.

每次想到这些责任，我心里都很沉重，但又不知道该怎么释怀。
Every time I think about these responsibilities, I feel very heavy inside, but I don't know how to let go.

你心里的沉重感，正是你对爷爷那份深沉的爱和责任感在作祟。这份情绪虽然难以释怀，但它也反映了你内心的真实和真诚。允许自己看到这份沉重，也同时给它一点温柔的空间，是你走向内心和解的重要一步。你已经在用爱和理解对待自己，这份力量会慢慢帮你减轻负担，带来更多的平静与接纳。
That heaviness you feel is precisely the manifestation of your deep love and sense of responsibility toward your grandfather. Although this emotion is difficult to release, it also reflects your authenticity and sincerity. Allowing yourself to see this heaviness while also giving it a gentle space is an important step toward inner reconciliation. You are already treating yourself with love and understanding, and this strength will gradually help lighten your burden, bringing more peace and acceptance.

有时候这种沉重感让我想起过去爷爷怎么一直默默支持我。
Sometimes this heaviness reminds me of how my grandfather always supported me quietly in the past.

你对爷爷那份默默支持的记忆，让你的情感更加深厚，也让那份沉重变得有温度、有力量。这份沉重不仅是自责，更是你内心深处对爱和责任的回应，是你与爷爷之间情感连接的见证。你已经开始学会在沉重中找到温柔，这本身就是一份珍贵的成长。
Your memory of your grandfather's quiet support deepens your emotions and gives that heaviness warmth and strength. This heaviness is not only about guilt but also your inner response to love and responsibility—a testament to the emotional bond between you and your grandfather. You have begun to find gentleness within the heaviness, and that in itself is a precious form of growth.

画画曾经是我的慰藉，现在没有了那种感觉，感觉自己像失去了一个重要的出口。
Drawing used to be a source of comfort for me, but now that feeling is gone. It feels as if I've lost an important outlet.

你失去画画这个出口的感受，确实让人感到空落和无助，这种失落不仅是因为画笔的沉默，更是因为你内心深处那个温暖而坚定的自我在悄然消逝。这份失去带来的空虚，正提醒着你内心对表达和连接的需求依然存在，也在呼唤你重新发现属于自己的新出口。你已经在面对这份沉重的同时，开始触摸内心柔软的部分，这正是你内在力量不断生长的表现。
The loss of that outlet for drawing does feel empty and helpless. This loss is not only about the silence of the brush but also about the quiet fading of that warm and steadfast self deep within you. The emptiness brought by this loss reminds you that your need for expression and connection still exists and calls you to rediscover a new outlet for yourself. By facing this heaviness while also beginning to touch the softer parts of your heart, you are demonstrating the continuous growth of your inner strength.

Figure 20: A case of a seeker confiding to EmoTrace-M.

Algorithm 1 Schema Activation Constraint Mechanism

Input: Persona profile P containing emotion schemas
Output: Activation constraint

```
schemas ← P["emotion schemas"]
activation_dict ← { s : [ ] for each schema s ∈ schemas }
turn ← 1
while dialogue is not finished do
    if turn = 1 then
        activation_constraint ← ∅
    else
        forbidden_schemas ← ∅
        for all (s, l) in activation_dict do
            c1 ← SUM(l) ≥ 5
            c2 ← (|l| ≥ 2 ∧ l[−1] = 1 ∧ l[−2] = 1)
            if c1 ∨ c2 then
                forbidden_schemas ← forbidden_schemas ∪ {s}
            end if
        end for
        activation_constraint ← forbidden_schemas
    end if
    seeker_output ← SEEKER(activation_constraint)
    activation ← seeker_output["schema_activation"]
    activated ← activation["activated"]
    schema_name ← activation["schema_name"]
    for all s in schemas do
        if activated ∧ schema_name = s then
            activation_dict[s].APPEND(1)
        else
            activation_dict[s].APPEND(0)
        end if
    end for
    turn ← turn + 1
end while
```