

Perceived Empathy Relates to the Evaluation of Counseling by both a Human and an Artificial Intelligence Agent

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Abstract: An artificial intelligence (AI) counselor has potential to provide convenient services but is limited by its lower empathy ability than a human counselor. This study aims to investigate the effects of empathy perceived by clients on counseling by human and AI counselors. We designed a counseling experiment that a human or AI counselor motivated a client to increase physical exercise frequency using skills with different levels of empathy. In a high empathy condition, the counselors asked the clients' emotions and repeated the emotional statements, while they asked the reasons from the clients and showed agreements in the low empathy condition. We found that the evaluations of the counseling were positively correlated with the degrees of empathy perceived by the clients, which suggests that the perceived empathy might improve the evaluation. Further implementing sophisticated empathetic skills of expert counselors is required to build a better relationship between an AI counselor and a client.

INTRODUCTION

Characteristics of modern lifestyle such as lack of physical activities cause a variety of health issues in the current society. Counseling assists people to change their behaviors and solves their health problems, and the need for counseling is growing these years. An artificial intelligence (AI) counselor has potential to provide convenient services and is helpful to people who do not want to uncover their private lifestyle to another person. Previous studies have revealed the feasibility of AI counselors. For example, Da Silva et al [1] showed that a robot following a scripted motivational interview got positive evaluations from the clients. Fitzpatrick et al developed a chatbot to provide self-help counseling based on cognitive-behavioral therapy and found that the symptoms of depression of the users were reduced [2]. On the other hand,

empathy is identified as an essential factor in affecting the efficacy of a counseling process [3], [4]. Avatars equipped with empathetic communication systems also exhibited better performance than comparable ones without the empathetic systems [5], [6].

However, the above studies did not compare the performance of the AI counselors with that of human counselors. We hypothesized that the efficacy and evaluation of an AI counselor would be worse than a human counselor because of the lower empathy ability of AI. The objective of this study is to investigate the differences between a human counselor and an AI counselor in the case of counseling about physical exercises. We suggested that adopting an appropriate empathetic skill could enhance the performance of the AI counselor to a level closer to the efficacy of a human counselor.



Figure 1: The avatar as the AI counselor

EXPERIMENT DESIGN

Setting of counseling

The experiment was designed to investigate the effects of empathy on counseling by a human counselor and an AI counselor. The human counselor was an amateur at counseling, who was a 42 years woman. The AI counselor was a 3D avatar which was presented on a computer screen (Figure 1). The actions of the avatar were controlled by the person who also played as the human counselor. We used a webcam to capture the controller's expression and gesture and reflected them to the avatar in real-time. The voice of the AI counselor was the voice of the controller with pitch smoothing to make it unlike a real human's voice.

The counselor and the client talked through a video chat during counseling (Figure 2). The theme of the counseling was to increase the frequency of physical exercise. The counseling followed a script based on the approach of motivational interviewing [1], [3]. After a brief introduction at the beginning, the counseling was started with questions about the client's recent state of exercise frequency. Then, the client was asked to consider the consequences if he/she increases exercise frequency and also if he/she keeps the current frequency. For example, "If you increase

your exercise frequency, what will happen to your life?" At the end of the counseling, there were questions about the client's plan of physical exercises in the next week and his/her confidence to execute it, such as "What could you do to insure you follow your plan over the next week?"

Skills with two levels of empathy

We used two skills with different levels of empathy during the counseling. We supposed that showing concern about the opponent's emotion promotes an impression of greater empathy and then improves the influence of counseling. In the high empathy condition, the counselor asked the client's emotion and repeated his/her emotional statement. The counselor had to judge whether the client mentioned his/her emotion within the answers. If yes, the counselor repeated the emotional statement. For example, when the client said: "I feel encouraged", the counselor said: "Yes, it is encouraging, isn't it?" If the client did not say any word about emotion, the counselor took one of the following responses randomly: (1) to briefly show agreement to the statement or (2) to ask the client to describe his/her feeling relating to the previous statement. The counselor would repeated the emotional statement in the client's description as well. In the low empathy condition, the counselor did not repeat emotional statements. By contrast, the counselor asked the reason instead of feeling relating to the client's statement or briefly showed agreement.

This experiment applied a between-group design. There were two variables (i.e., counselor and skill) with two conditions respectively. Each client participated only in one of the groups.

Questionnaires

After the counseling, the clients were asked to fill in four questionnaires to evaluate the results of the counseling. The questionnaires were as follows: (1) The Session Evaluation Questionnaire (SEQ) includes four dimensions. Two of them are about the



Figure 2: The environment setting of the experiment. The counselor and the client talk by using a video chat.

judgment of psychotherapy and counseling sessions, which are depth (powerful and valuable versus weak and worthless) and smoothness (relaxed and comfortable versus tense and distressing). Another two dimensions are the positivity and arousal of clients' post-session emotional state [7], [8]. This experiment used a Japanese version of SEQ: The Japanese Session Evaluation Questionnaire (J-SEQ) developed by Katsuragawa's group [9].

(2) We used the Degree of Clients' Perceived Empathy [10] to examine how much empathy the clients perceived from the counselors. It includes items such as "I felt the counselor understood me" and "the counselor understood only what I said but not what I thought". The last example is a reverse item.

(3) Working Alliance Inventory (WAI) [11]–[13] is a questionnaire to estimate the degree of cooperation in any helping relationship. It is composed of three parts: consistency on goal setting (goal), agreement on the required task to achieve the goal (task), and the emotional bond between the two parties (bond). We used a Japanese version

developed by Kasai et al [12].

(4) We designed three questions to investigate the clients' motivation to change behaviors after counseling. The questions were about (a) discussion on behavior changes during counseling: "Did you talk about behavior changes during the counseling?" (b) the plan of behavior changes: "After the counseling, do you have any idea about what to do in order to change your behavior?" and (c) confidence to change behavior: "Do you think you can change your behavior?"

All the questionnaires were 7-point scales. Besides the questionnaires, we also recorded videos of both the counselors and the clients.

RESULTS

Participants

The clients were eighty-seven participants (50 women and 47 men) whose ages ranged from 20 years to 40 years (mean age, 26.7 years; standard deviation [SD], 6.2 years). We only recruited persons who

Table 1: participants in groups

		Human counselor		AI counselor	
		Emotion[1]	Reason[2]	Emotion[1]	Reason[2]
Gender		11M12F	11M14F	12M13F	13M11F
Age	Mean	26.3	26.9	25.8	28
	SD	5.3	6.7	6.0	6.7

[1]The "emotion" represents the skill with high level of empathy

[2]The "reason" represents the skill with low level of empathy

thought more exercise is required. The participants were distributed into four groups equally. Table 1 shows the detailed information of the participants in each group. We obtained written informed consent, which was reviewed and approved by the institutional review boards of Osaka University, from all participants.

Results correlated to the perceived empathy

Figure 3a-d shows that the relations between the perceived empathy and the evaluations of the counseling. Correlation analysis revealed that the perceived empathy was strongly correlated with the depth of the counseling ($R = 0.56$, $p < 0.0001$), the smoothness of the counseling ($R = 0.47$, $p < 0.0001$), and the emotional positivity after the counseling ($R = 0.61$, $p < 0.0001$). These results implied that perceived empathy improved the clients' evaluation of the counseling. In contrast, the correlation result of the perceived empathy on the arousal was ($R = 0.24$, $p = 0.017$), which would be considered insignificant in the case of the Bonferroni post-hoc test.

The relation between the perceived empathy and the motivation of behavior changes is shown in Figure 3h-j. The perceived empathy was significantly correlated with discussion of behavior changes during counseling ($R = 0.35$, $p = 0.0004$), the plan of behavior changes ($R = 0.44$, $p < 0.0001$), and confidence to change behavior ($R = 0.37$,

$p = 0.0002$). These results suggested that the perceived empathy of the counselors is important to help the clients change behavior.

About the results of WAI, the perceived empathy was intensely related to the collaboration between the clients and the counselors (Figure 3e-g). There were significant correlations of the perceived empathy on the goal ($R = 0.59$, $p < 0.0001$), the task ($R = 0.57$, $p < 0.0001$), and the bond ($R = 0.43$, $p < 0.0001$).

The above results suggested that empathy is influential to improve the effect of counseling and may help to create closer cooperation between the client and the counselor.

Restuls of the groups

The experiment investigated the effects of human/AI counselors and the counseling skills with high or low empathy. Figure 4 shows the results of the four groups. Two-way ANOVA exhibited that there were no significant main effects between the groups on all the items in Figure 4. However, the type of counselor and the counseling skill had significant interaction effects on the goal ($F[1, 93] = 5.42$, $p = 0.022$) and the bond ($F[1, 93] = 4.45$, $p = 0.039$) in WAI, which implied that the human counselor benefit by the skill with higher empathy, but this positive impact was not observed in the case of the AI counselor.

The effects of the AI counselor were similar to what of the human counselor in this experiment. This result suggested that an AI counselor is as helpful as a human counselor, at least in simple counseling like which in this

study.

Although we designed the counseling skills trying to manipulate the levels of empathy, the results indicated that the perceived empathy did not vary significantly. It is necessary to develop a more sophisticated approach to enhance the empathy perceived by the client if we want to improve the effect of counseling no matter by a human or by an AI counselor.

DISCUSSION

Our original expectation is that the effects and evaluation of the counseling by the AI counselor should be lower than those of the human counselor, and one critical reason is that the perceived empathy of the AI is weaker. However, the current experiment showed that the results of the counseling by an AI counselor and a human counselor were similar, which conflicted with our expectation. This is not really bad news to the engineers who want to develop AI counseling, because it demonstrated that AI could have similar performance as a human in the case of simple script-based counseling. Nevertheless, it does not mean that AI can already work as well as an expert counselor, who knows more skills to enhance the perceived empathy and further increase the effects of counseling corresponding to different situations.

The strong positive correlations between the perceived empathy and the results of the counseling support our assumption about the importance of empathy in counseling. We designed a skill to show the empathy from the counselors by asking the clients' emotion and verbally repeating the emotional statements. Although this skill seemed to enhance the emotional bond between the clients and the human counselors, the influence was limited and obscure in other evaluations.

There might be other factors which affect the perceived empathy and could help to develop an useful counseling skill. A potential candidate is the facial expression of the counselors. Some clients in the current experiment commented that the expressions of the counselors changed their impressions to the counselors. We are going to investigate how

expressions influence the results of counseling. We hypothesize that the synchronization between the expressions of the client and the counselor, which represents that they share the same feeling, may influence the perceived empathy.

CONCLUSION

This study shows that an AI counselor had similar level of performance as a human counselor in a case of simple script-based counseling. The results strongly supported the assumption that empathy is critical to the efficacy of counseling.

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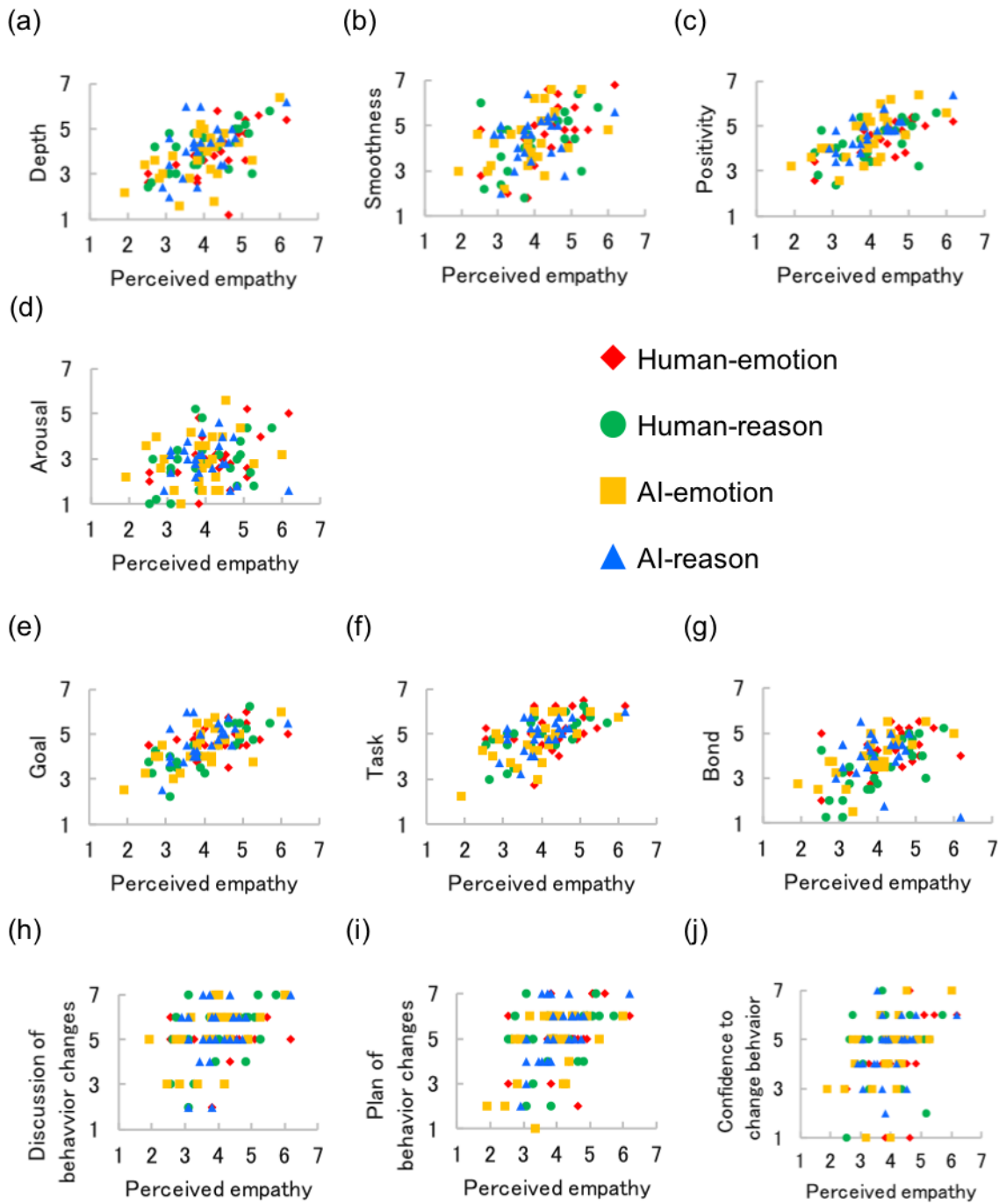


Figure 3: The results of relations between the perceived empathy and the evaluations of the counseling. (a)-(d) show the results of SEQ. (a)-(d) are the results of WAI. The results about the motivation of behavior changes are shown from (h) to (j). The "emotion" in the legend represents the skill with high level of empathy, and the skill with low empathy is indicated as the "reason".

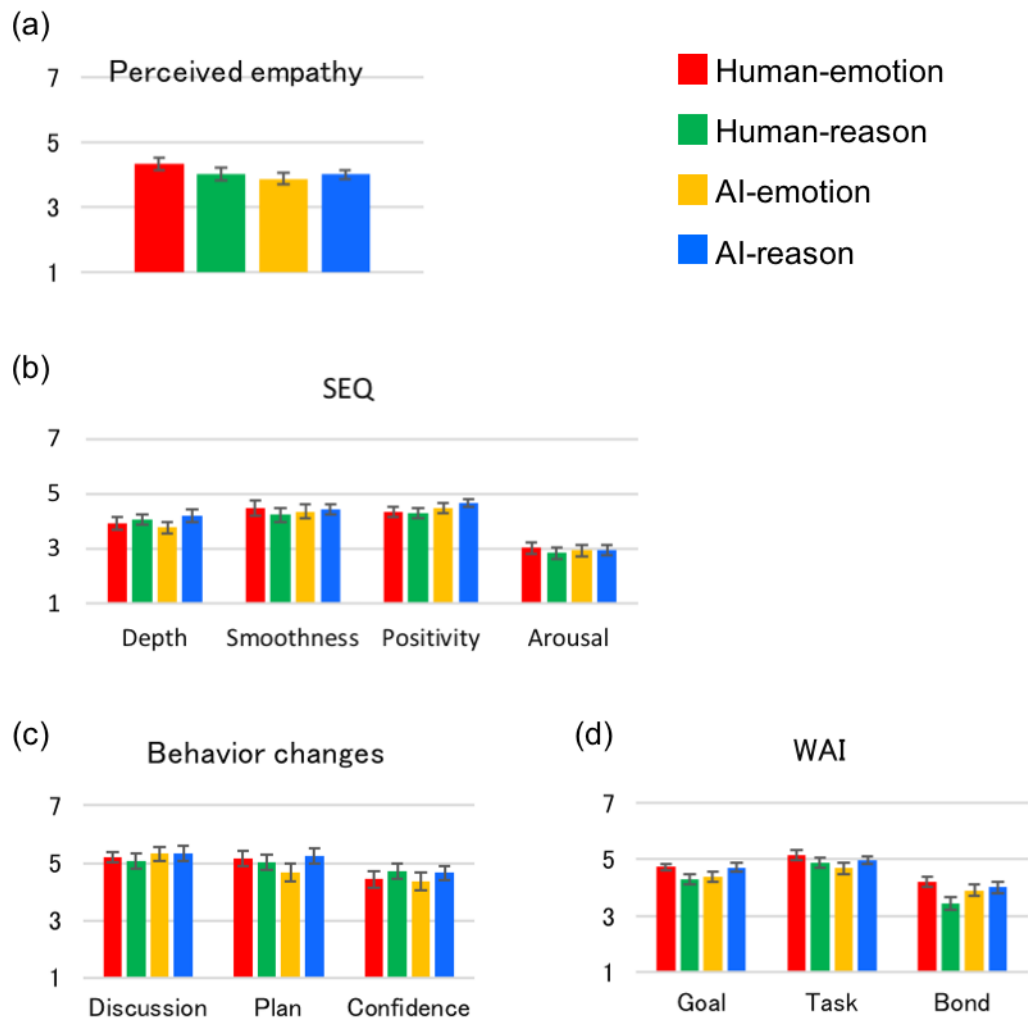


Figure 4: The effects of human/AI counselors and the counseling skills with high or low empathy. The "emotion" in the legend represents the skill with high level of empathy, and the skill with low empathy is indicated as the "reason".