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Investigation of Patients' Mood on Their Distance from the Pharmacist during Medication Instruction

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Abstract

Background: Pharmacists must adjust their distance from patients to facilitate communication during interviews and gain their trust. The distance between the patients and the pharmacists varies depending on many factors, such as gender, posture and the patients' mood. Only a few of these papers have actually measured and validated distance with patients. In this study, we validated our method of assessing mood and measuring distance before beginning a survey with patients. ***Methods***: We measured comfortable interpersonal distance among men and women using an ecological scenario, in which a pharmacist approaches the subject, and the subject is asked to stop the pharmacist at the distance he/she feel comfortable with. Five pharmacists and 33 subjects participated in the study. The Japanese version of the Brief Mood Questionnaire Checklists (BMC-J) was used to quantify the subject's mood for the day, and then the distance from the pharmacist that the subjects considered comfortable was measured at the bedside. The relationship between the mood and distance obtained was examined. ***Results***: The comfortable distance of subjects was influenced by gender, posture, and mood. The shortest distance was 94.7 ± 11.1 cm (mean ± SD), for the male subjects versus the female pharmacists in the sitting position. The distance of male subjects shorted when they had positive emotions and lengthened when they were worried. Female subjects maintained a long distance from both male and female pharmacists when they had positive emotions and a short distance when they were worried. ***Conclusion***: Findings show that the distance changes depending on the subjects' mood at the time of measurement. It was found that the present measurement method can be used to determine the psychological state of the patient and measure the comfort distance at that

time, and can be used as a simple method to examine these relationships. Therefore, it is also considered a practical method for the next step, which is a clinical study on patients.

Keywords

Non-Verbal Communication, Personal Space, Interpersonal Distance, Mood, Pharmacist

1. Introduction

Patients need to understand drug therapy and receive practical information from pharmacists to ensure the proper use of pharmaceuticals. This information is based on pharmacological evidence, and pharmacists constantly monitor patients' status, including confirmation of their level of understanding, adherence, therapeutic effects, and side effects. Therefore, pharmacists must improve their information-gathering skills, management skills, communication skills, and basic clinical knowledge [1]. This study focused on communication skills. There are two types of communication: verbal and nonverbal. Verbal communication entails transmitting information using spoken language, whereas nonverbal communication uses expressions, eyes, posture, and physical movements [2]. During face-to-face conversations, detailed information can be conveyed through verbal and nonverbal communication [3] [4]. Regarding nonverbal communication, we focused on personal space (PS), which includes interpersonal distance. PS is the immediate area surrounding individuals where most of their interactions with others occur [5]. PS varies among people and is used to facilitate interpersonal relationships [6]. Recently, there has been an increased interest in PS in the medical field. Dr. Kashiwagi highlighted the importance of considering the patient's comfort distance, that is, a daily-changing distance [7].

However, although there have been several reports on patients' comfort PS measurement studies, only a few studies have considered the patients' daily physical and psychological situation. Futami *et al.* reported no relationship between anxiety characteristics and distance [8].

We have been investigating methods of measuring mood and comfort distance to find a relationship between mood and this daily-changing distance. Our final goal is to conduct experiments on patients in a clinical setting; thus, we have devised a measurement method that emphasizes not being a burden on the patients. No other study has quantified the patient's mood at the time and actually measured the distance the patient feels comfortable, which is thought to provide new insights.

2. Methods

2.1. Pharmacists and Subjects

A study was set up with two male pharmacists (41 - 42 years), three female

pharmacists (22 - 40 years), 16 male subjects (48.7 ± 13.9 years), and 17 female subjects (60.9 ± 12.7 years). The subjects were volunteers involved in university education who understood the purpose of and consented to take part in this study.

2.2. Subjects' Mood Surveys

A questionnaire was developed for this study, which comprised the three following items: 1) The subject's attributes (gender and age). 2) The Japanese version of the Brief Mood Questionnaire Checklists (BMC-J) (**Figure 1**) [9] [10] was used to evaluate the subjects' mood (psychological state). 3) Free description items to describe the subjects' physical condition at the time of measurement.

The BMC-J assessed the subjects' mood at that time. The mood ratings comprised lists of four positive emotions (happy, joyful, pleased, and enjoyment or fun) and five negative emotions (depressed/blue, unhappy, frustrated, angry/hostile, and worried/anxious). The nine emotions were scored on a 7-point Likert scale ranging from 0 (not at all) to 6 (strongly). The following abbreviations were used to denote the nine sentiments of the BMC-J: happy (HAP), joyful (JOY), pleased (PLZ), enjoyment/fun (ENJ), depressed/blue (DEP), unhappy (UHA), frustrated (FRU), angry/hostile (ANG), and worried/anxious (WOR).

2.3. Measurement of Comfort Distance

Comfort distance was measured by having the pharmacist's approach or move away from the subjects and asking the subjects to indicate the distance they felt appropriate for conversation at the bedside.

The following unifications were made in this study: The comfort angle of the subjects and pharmacists was 45˚, we measured the distance on an extension line of 45˚ diagonally from front to back (**Figure 2**). The angle was set at 45˚ because our preliminary study showed the comfort angle was 45˚ and Futami *et al.* reported similar methods [8]. Other biases, such as intimidation due to eyes height, were avoided by matching the pharmacists' eyes height to the subjects. Furthermore, the room size and bed placement were standardized.

		(not at all)						(strongly)
Positive emotions	1. happy (HAP)	0	1	2	3	4	5	6
	2. joyful (JOY)	0	1	2	3	4	5	6
	3. pleased (PLZ)	0	1	2	3	4	5	6
	4. enjoyment/fun (ENJ)	0	1	2	3	4	5	6
Negative emotions	5. depressed/blue (DEP)	0	1	2	3	4	5	6
	6. unhappy (UHA)	0	1	2	3	4	5	6
	7. frustrated (FRU)	0	1	2	3	4	5	6
	8. angry/hostile (ANG)	0	1	2	3	4	5	6
	9. worried/anxious (WOR)	0	1	2	3	4	5	6

Figure 1. Brief mood questionnaire checklists.

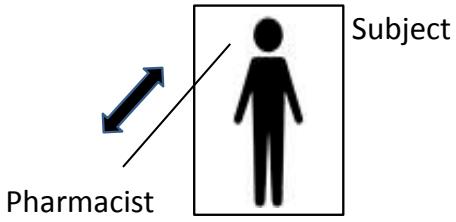

Figure 2. Position of subjects and pharmacists during measurement.

Pharmacists approached the subjects by closing half the steps from a distance extended from the subjects, and the distance was measured at the point where the subjects signaled that it was just right. The distance from the pharmacist's chin to the subject's chin was measured using a laser rangefinder (Zamo II, Bosch). Similarly, the distance was measured from the point where the pharmacist was too close by taking half the steps away to the subjects to the point where the subjects signaled "just right". The comfort distance is defined as the average of both the approaching distances.

Subjects were measured for distance in both sitting and supine posture patterns. The order of distance measurements was recorded, starting with the pharmacists of the same gender as the subjects they were sitting. Second, measurements were performed in the supine position. Third, pharmacists of the opposite gender as the subjects in the sitting position were measured. Finally, measurements were taken in the supine position. Mood was assessed only once before the measurements.

2.4. Analysis Method

IBM SPSS Statistics for Windows ver.27 (IBM Corp.) was used for the analysis. The comfort distance was divided by position and gender, and the mean and standard deviation were calculated for each. The results of the Shapiro-Wilk-Test, $p < 0.05$, prompted a nonparametric test. The Mann-Whitney U test was used to compare the two groups. The correlation between each mood and comfort distance was calculated using Spearman's rank correlation. In addition, the median for each mood was calculated. To more clearly assess differences by mood, after excluding the median from each subject's data, two groups for each mood were formed, in which the group with a score greater than the median was labeled as the "high group," while the group with a score lower than the median was labeled as the "low group." Subsequently, we compared the comfort distance between the two groups. This study is an exploratory study.

3. Results

3.1. Relationship between the Comfort Distance and the Posture of the Subjects

The results of the comfort distances for each gender of pharmacists and for the

two postures of the subjects (sitting and supine) were showed in Table 1. The shortest distance was 94.7 ± 11.1 cm for the male subjects versus the female pharmacists in the sitting position. The longest distance was 124.2 ± 20.7 cm for the supine female subjects versus the male pharmacists. No difference was observed for male subjects when the distance was compared based on their posture. Moreover, no difference was observed when the distance was compared based on the pharmacist's gender. Conversely, the distance from male pharmacists to the sitting position of female subjects was significantly longer than that from female pharmacists ($p < 0.05$). The same result was observed in the supine position ($p < 0.01$). The distance from male pharmacists to female subjects was significantly longer in the supine position than in the sitting position ($p < 0.05$).

3.2. Correlation between Each Emotion and Comfort Distance

The correlations between the results of BMC-J and comfort distance are listed in Table 2 and Table 3. For the sitting position of male subjects, there was a significant negative correlation between male pharmacists and UHA ($r = -0.586$, $p < 0.05$), FRU ($r = -0.561$, $p < 0.05$), and ANG ($r = -0.625$, $p < 0.01$) and a significant positive correlation between female pharmacists and DEP ($r = 0.571$, $p < 0.05$). For the supine position of male subjects, a significantly negative correlation was observed between female pharmacists and PLZ ($r = -0.558$, $p < 0.05$), and a significantly positive correlation was observed between female pharmacists and DEP ($r = 0.635$, $p < 0.01$), FRU ($r = 0.561$, $p < 0.05$), and WOR ($r = 0.514$, $p < 0.05$). Furthermore, for the sitting position of female subjects, significant positive correlations between male pharmacists and ENJ ($r = 0.537$, $p < 0.05$) and between female pharmacists and all positive emotions, HAP ($r = 0.486$, $p < 0.05$), JOY ($r = 0.637$, $p < 0.01$), PLZ ($r = 0.615$, $p < 0.01$), and ENJ ($r = 0.713$, $p < 0.01$), were observed. For the supine position of female subjects, a significant positive correlation between male pharmacists and ENJ ($r = 0.499$, $p < 0.05$), and between female pharmacists and ENJ ($r = 0.570$, $p < 0.05$) was observed.

Table 1. Comparison with the comfort distance between subjects and pharmacists.

Subject	Position	Pharmacist	Comfort distance (Mean ± SD (cm))
male (n = 16)	SIT	male	98.7 ± 9.4
		female	94.7 ± 11.1
	SUP	male	101.7 ± 12.5
		female	95.2 ± 12.5
female (n = 17)	SIT	male	115.4 ± 18.5 *
		female	108.0 ± 12.2 *
	SUP	male	124.2 ± 20.7 **
		female	105.6 ± 16.2 **

Sitting position (SIT), Supine position (SUP) *$p < 0.05$ **$p < 0.01$.

Table 2. Correlation between BMC-J and comfort distance "male subjects".

Male subject					
Position		[SIT]		[SUP]	
Pharmacist		male	female	male	female
positive emotions	1. HAP	0.297	−0.305	0.070	−0.488
	2. JOY	0.109	−0.209	−0.191	−0.419
	3. PLZ	0.206	−0.338	−0.281	−0.558*
	4. ENJ	0.006	−0.384	−0.218	−0.495
negative emotions	5. DEP	−0.056	0.571*	0.249	0.635**
	6. UHA	−0.586*	−0.073	0.207	0.403
	7. FRU	−0.561*	0.131	0.223	0.561*
	8. ANG	−0.625**	−0.012	0.146	0.473
	9. WOR	−0.159	0.349	0.182	0.514*

Sitting position (SIT), Supine position (SUP), *$p < 0.05$, **$p < 0.01$.

Table 3. Correlation between BMC-J and comfort distance "female subjects".

Female subject					
Position		[SIT]		[SUP]	
Pharmacist		male	female	male	female
positive emotions	1. HAP	0.265	0.486*	0.211	0.354
	2. JOY	0.462	0.637**	0.319	0.441
	3. PLZ	0.454	0.615**	0.217	0.266
	4. ENJ	0.537*	0.713**	0.499*	0.570*
negative emotions	5. DEP	−0.287	−0.405	−0.356	−0.118
	6. UHA	−0.369	−0.205	−0.368	−0.291
	7. FRU	−0.207	−0.211	−0.300	−0.217
	8. ANG	−0.247	−0.102	−0.379	−0.236
	9. WOR	−0.247	−0.102	−0.379	−0.236

Sitting position (SIT), Supine position (SUP), *$p < 0.05$, **$p < 0.01$.

3.3. Comparison of Subjects' Mood Degree and Comfort Distance

The group with a BMC-J score greater than the median was labeled as the "high group," while the group with a score lower than the median was labeled as the "low group." Subsequently, we compared the comfort distance between the two groups (**Figure 3** and **Figure 4**). For male subjects, the high group for PLZ in the supine position had a significantly short distance ($p < 0.05$). In contrast, the high groups for UHA and WOR in the supine position had significantly long distances ($p < 0.05$).

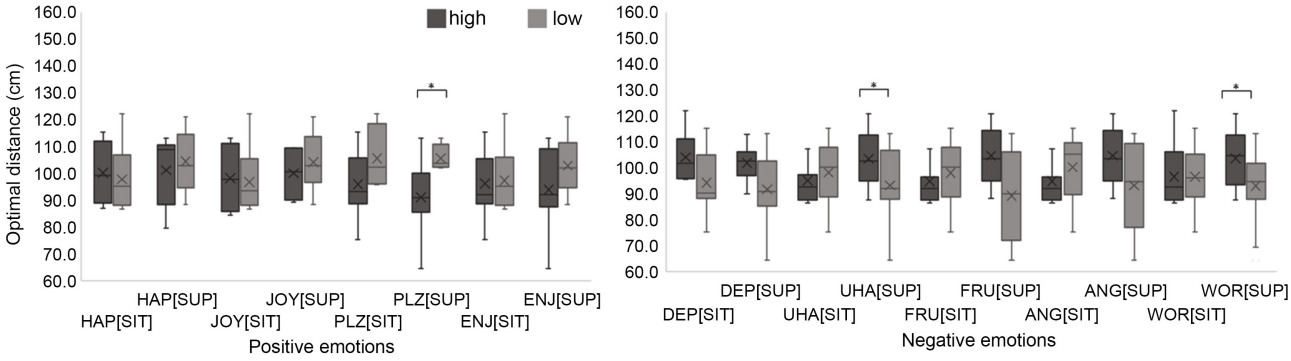

Figure 3. Comparison of subjects' mood degree and comfort distance in male subjects (n = 16; *p < 0.05).

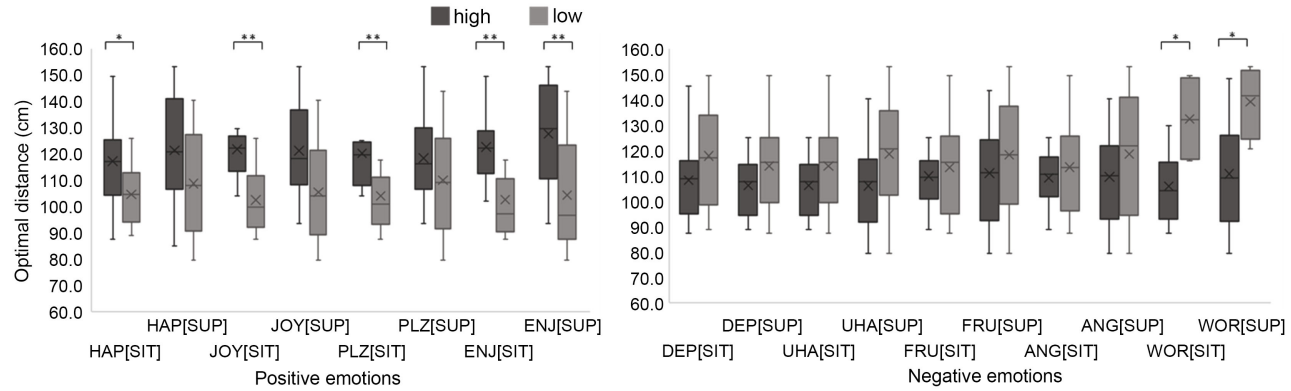

Figure 4. Comparison of subjects' mood degree and comfort distance in female subjects (n = 17; *p < 0.05, **p < 0.01).

For female subjects, the high groups of HAP ($p < 0.05$), JOY ($p < 0.01$), PLZ ($p < 0.01$), and ENJ ($p < 0.01$) had significantly long distances in the sitting position. The high group of ENJ had a significantly long distance in the supine position ($p < 0.01$), and the high group of WOR had significantly short distances in both positions ($p < 0.05$).

4. Discussion

To study the relationship between subjects' mood and their daily changing comfort distance, the measurement methods of mood and distance were examined. The results suggest that the distance changes depending on the subjects' mood at the time of measurement. Therefore, this method can be used as a simple way to examine these relationships and can be applied in actual clinical practice.

The comfort distance between the subjects and the pharmacists at the bedside ranged between 46.5 to 153.1 cm. Hall classified interpersonal distance into 4 types (close distance of 45 cm or less, individual distance of 45 - 120 cm, social distance of 120 - 350 cm, and public distance of 350 cm or more) and revealed that there were proximity and distant phases for each of these distances [11]. Our result was near the individual distance, suggesting that this distance is necessary during medication instruction. In this study, we set the distance ap-

proaching from the pharmacists as the comfortable distance. In general, it was reported that the subjects preferred a shorter distance when approached by female measurers than by male one [12]. It was also reported that male subjects tended to maintain the same distance regardless of gender, while female subjects maintained a long distance from male measures [5]. In this study, male subjects were not influenced by the pharmacist's gender, and only female subjects maintained a long distance from male pharmacists. Therefore, the influence of the pharmacists' gender was considered a significant factor for female subjects. There was no difference in the comparison of distance by body position of male subjects. Conversely, for female subjects, when male pharmacists approached, the distance was significantly longer in the supine position than in the sitting position ($p < 0.05$). It was suggested that female subjects were inclined to be more influenced by posture than male subjects. This may be because subjects in the supine position were perceived to be more vulnerable than those in the sitting position and, thus, were more alert. Therefore, pharmacists should consider subject's gender and position at the bedside.

The relationship between the subjects' mood and distance was strongly associated with both male and female subjects. For male subjects, the results differed between male and female pharmacists. Additionally, when each subjects' mood was divided into high and low groups and the comfort distances for each mood were compared, male subjects, who felt strong unhappy or worry in a supine position, tended to take a long distance. This may be because male subjects expressed their feelings as follows: "I don't want to show weakness" and "I want to be left alone." It was possibly influenced by the fact that Japanese society has long held the concept of male domination, which persists even now. Heshka and Nelson reported that interpersonal distance increases with age and peaks at 40 because people in their 40s have the greatest need for independence [13]. The middle age of the male subjects in this study (48.7 ± 13.9 years) may have also contributed to this result. Female subjects tended to maintain longer distances, particularly when positive emotions were high, and shorter distances when worry was high. It could be to gain support from medical staff, such as "I want them to come close to me." when female subjects were worried.

These results show that pharmacists need to be careful in staying close when the male subjects are lying down and appears sad. It is also suggested that pharmacists should maintain a shorter distance when female subjects are worry; the feeling of "I want you to stay close" can offer a sense of security.

Furthermore, this study was conducted during the COVID-19 epidemic, when this spatial behavior was modified by two further factors: social distance and wearing a face mask. Biggio, M. *et al.*, Cartaud, A. *et al.*, Kühne, K. *et al.* found that mask wearing versus non-wearing stated that the interpersonal space (IPS) was greater for non-wearing [14] [15] [16]. Iachini, T. *et al.* also reported that the IPS regulation was affected by how people subjectively perceived COVID-19 risk and the related level of anxiety, not by actual objective risk [17]. Social anxiety is an important factor that can predict preference for interpersonal distance

[18] [19]. Furthermore, social anxiety levels are associated with perceiving strangers as closer than they actually are [20] [21], which, in turn, is associated with the preference for greater distance. Originally, medical personnel wear masks in the hospital setting, and this study was conducted in a similar setting; however, we believe that COVID-19 may have had an effect on the change in interpersonal distance.

Although we examined the relationship between BMC-J and interpersonal distance in this study by using a direct measurement method, we must also take into account that there are various factors behind the results obtained. This study is set up as a "pharmacist's bedside medication instruction" study, it has not been compared with non-pharmacist subjects. Therefore, further verification is needed to determine whether the results of this study are relevant to pharmacology. In the future, age and other factors will also be taken into consideration.

In addition to mastering medical skills, medical professionals must develop sensitivity to patients' emotional needs. Communication skills (specifically nonverbal communication) are essential for healthcare workers [12]. It is necessary to observe the patient's delicate nonverbal signs and consider the distance suitable for their condition at that time [22]. This act allows patients to interact with healthcare workers without feeling anxious or afraid.

This study was conducted to investigate the influence of emotion and distance with pharmacists at the bedside. The comfort distance of the subjects was influenced by gender, posture, and mood. This new study may provide a clue to the next step.

5. Conclusion

This method enabled the examination of the relationship between mood and comfort distance. Therefore, the present measurement method can be used to understand the patients' mood and measure the comfort distance at that time. In the future, we intend to use a clinical practical approach along with this measurement method.

Acknowledgements

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Ethics Approval and Consent to Participate

Informed consent was obtained from all participants who participated in this study. The design of this study and procedures for obtaining informed consent were approved by the Medical Ethic Committee of Kinjyo Gakuin Univercity School (Approval number: H16002).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Kodama, T. (2013) Japan Pharmaceutical Association, Pharmacist Vision. https://www.nichiyaku.or.jp/assets/pdf/vision.pdf

[2] Arita, E. (2006) Basic Attitudes When Communicating—Integration of Verbal and Non-Verbal Communication. *Dispensing and Information*, **12**, 66-68.

[3] Merabian, A. (1968) Communication without Words. *Psychological Today*, **2**, 53-55.

[4] Takagi, S. (2005) The Role of Facial Expressions and Body Movements in Communication. *Bulletin of the Graduate School of Letters, Arts and Sciences*, **1**, 25-36.

[5] Sommer, R. (1959) Studies in Personal Space. *Sociometry*, **22**, 247-260.

[6] Little, K.B. (1965) Personal Space. *Journal of Experimental Social Psychology*, **1**, 237-247. https://doi.org/10.1016/0022-1031(65)90028-4

[7] Kashiwagi, T. (2008) Living with Death: From the Field of Life and End-of-Life Care. Japan Christian Church Publishing House, 33.

[8] Futami, A. (2014) A Study of Nurse Standing Position at the Bedside Considering the Patient's Personal Space. *Japanese Journal of Nursing Art and Science*, **13**, 211-218.

[9] David, L.T. and Ed, D. (1990) Memory Accuracy in the Recall of Emotions. *Journal of Personality and Social Psychology*, **59**, 291-297. https://doi.org/10.1037/0022-3514.59.2.291

[10] Tanaka, K. (2008) An Examination of the Reliability and Validity of the Japanese Version of the Brief, Momentary Mood Checklists (BMC-J). *Collection of Papers from Osaka University of Economics*, **58**, 271-275.

[11] Hall, E.T. (1966) The Hidden Dimension. Japanese Translation by Hidaka, T. and Sato, N. (1970) Misuzu Shobo, Tokyo.

[12] Aono, A. (2003) Gender Differences in Interpersonal Distance: From the View Point of Oppression Hypothesis. *The Japanese Journal of Experimental Social Psychology*, **42**, 201-218. https://doi.org/10.2130/jjesp.42.201

[13] Heshka, S. and Nelson, Y. (1972) Interpersonal Speaking Distance as a Function of Age, Sex, and Relationship. *Sociometry*, **35**, 491-498. https://doi.org/10.2307/2786529

[14] Biggio, M., Bisio, A., Bruno, V., Garbarini, F. and Bove, M. (2022) Wearing a Mask Shapes Interpersonal Space during COVID-19 Pandemic. *Brain Sciences*, **12**, Article 682. https://doi.org/10.3390/brainsci12050682

[15] Cartaud, A., Quesque, F. and Coello, Y. (2020) Wearing a Face Mask against Covid-19 Results in a Reduction of Social Distancing. *PLOS One*, **15**, e0243023. https://doi.org/10.1371/journal.pone.0243023

[16] Kühne, K., Fischer, M.H. and Jeglinski-Mende, M.A. (2022) During the COVID-19 Pandemic Participants Prefer Settings with a Face Mask, No Interaction and at a Closer Distance. *Scientific Reports*, **12**, Article No. 12777. https://doi.org/10.1038/s41598-022-16730-1

[17] Iachini, T., Frassinett, F., Ruotolo, F., Sbordone, F.L., Ferrara, A., Ariol, M. and Ruggiero, G. (2021) Social Distance during the COVID-19 Pandemic Reflects Perceived Rather than Actual Risk. *International Journal of Environmental Research and Public Health*, **18**, Article 5504. https://doi.org/10.3390/ijerph18115504

[18] Givon-Benjio, N. and Okon-Singer, H. (2020) Biased Estimations of Interpersonal Distance in Non-Clinical Social Anxiety. *Journal of Anx*iety Disorders, **69**, Article ID: 102171. https://doi.org/10.1016/j.janxdis.2019.102171

[19] Givon-Benjio, N., Oren-Yagoda, R., Aderka, I.M. and Okon-Singer, H. (2020) Biased Distance Estimation in Social Anxiety Disorder: A New Avenue for Understanding Avoidance Behavior. *Depression and Anxiety*, **37**, 1243-1252. https://doi.org/10.1002/da.23086

[20] Perry, A., Rubinsten, O., Peled, L. and Shamay-Tsoory, S.G. (2013) Don't Stand So Close to Me: A Behavioral and ERP Study of Preferred Interpersonal Distance. *Neuroimage*, **83**, 761-769. https://doi.org/10.1016/j.neuroimage.2013.07.042

[21] Wieser, M.J., Pauli, P., Grosseibl, M., Molzow, I. and Mühlberger, A. (2010) Virtual Social Interactions in Social Anxiety—The Impact of Sex, Gaze, and Interpersonal Distance. *Cyberpsychology, Behavior, and Social Networking*, **13**, 547-554. https://doi.org/10.1089/cyber.2009.0432

[22] Blondis, M.N. and Jackson, B.E. (1977) Nonverbal Communication with Patients: Back to the Human Touch. Japanese Translation by Niki, H. and Iwamoto, S. (1979) John Wiley & Sons Inc., New York.