Conversations between individuals with autism and typical development: similarities, differences, and exchange characteristics and patterns from the perspective of verbal response modes

自閉症者と定型発達者はどのように会話をしているのか
―VRMから見た共通点、相違点、やりとりの特徴とパターン―

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Conversations between individuals with autism and typical development: similarities, differences, and exchange characteristics and patterns from the perspective of verbal response modes

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Abstract

The present study aimed to clarify the conversation characteristics of individuals with autism spectrum disorder (ASD) and typical development (TD). Unguided dyadic conversations between ASD (n=18) and TD (n=18) individuals in an experimental setting were analyzed using verbal response modes (VRM). No differences were observed with regard to total number or duration of utterances during these conversations. Utterances were classified based on the eight VRM categories (disclosure, edification, question, acknowledgement, confirmation, advisement, interpretation, and reflection). Although the numbers and durations of utterances for each category were similar, ASD individuals used fewer question utterances. Furthermore, examination of single utterances revealed that ASD individuals tended

not to use multiple categories within the same utterance, while utterances by TD individuals following a question or disclosure utterance by an ASD individuals tended to be longer, demonstrating that TD individuals were pivotal in keeping the conversation going.

Keywords: autism spectrum disorder; conversation; Verbal Response Modes

Background

Autism spectrum disorder (ASD) is a highly prevalent (1-2%), incurable, lifelong mental disorder involving varying degrees of intellectual impairment, and can cause great suffering for affected individuals and their families (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition : DSM-5) [1]. The DSM-5 defines the core symptoms of ASD as persistent deficits in social communication and social interaction (social symptoms) and restricted repetitive patterns of behavior, interests, or activities (repetitive behaviors). Social symptoms greatly affect interpersonal relationships and have been of interest since the condition was first described [2,3].

According to Baltaxe, the three areas of deficit in ASD individuals (social, cognitive, and linguistic) are reflected in language usage [4]. Social symptoms are particularly apparent during communication, primarily in the form of pragmatic deficits [5].

Pragmatic competence requires: 1) knowledge of how to appropriately express oneself verbally based on the context; 2) awareness of the social, physical, and psychological factors that control the relationship between the words spoken and the situation, including the listener; and 3) formation of a hypothesis regarding what the other individual will say. These requirements are particularly challenging for ASD individuals [4].

The majority of studies regarding communication and social ability in ASD have

investigated infants and children, clarifying the characteristics of communication with parents and other significant adults and within peer relationships [6,7].

These studies found that the support for communication and social ability provided to ASD children during infancy and childhood resulted in behavioral changes in the children and improved relationships with significant adults and peers. Such education and support regarding social skills were particularly effective during infancy and school age, before children know how to behave appropriately toward other people and are immature in such interactions.

Conversely, some cases show no changes in conversational ability even after a considerable time has passed. This may be because it is difficult for ASD children to naturally learn how to make conversation, little practical support is provided regarding conversation, and some aspects of support requirements have yet to be fully clarified. Many studies on communication in autism to date have been conducted during infancy, childhood, and school age, but few have been conducted on adults. They include studies that have clarified the unique characteristics of communication by ASD children and those that have investigated conversations between ASD children and parents, testers, and assistants.

However, it is also important to investigate ASD in adults after the acquisition of a higher level of communication ability compared to children, for whom communication is difficult regardless of ASD status. Focusing on dyadic conversation between ASD individuals and other non-assistant adults enables clarification of the communication characteristics during conversation established on an equal footing between ASD and typical development (TD) individuals. These findings should then be used to consider what support could be provided from infancy from both ASD and TD perspectives in order to achieve effective communication.

The verbal response modes (VRM) defined by Stiles enable classification of utterances

made during conversation [8]. The VRM were developed based on conversation analysis in a counseling setting, but can be applied to various conversational situations such as conversations between couples and within hierarchical relationships. However, VRM have not been used in ASD research. VRM classification is based on three main principles, regarding whether utterances: 1) are based on the experiences or thoughts of the speaker; 2) presume experiences or thoughts of the other person in the conversation; or 3) use the point of view of the speaker. Based on these principles, utterances can be classified into one of eight categories (disclosure, edification, question, acknowledgement, confirmation, advisement, interpretation, and reflection).

Using VRM to code and compare conversations between ASD and TD individuals enables us to move beyond simply extracting and clarifying ASD characteristics to obtain new perspectives on the conversation characteristics of both AS and TD individuals. The present study aimed to investigate the following hypotheses: 1) that as ASD individuals tend to speak for too long or not enough, differences will be observed in utterance duration compared to TD individuals; 2) that as ASD individuals have pragmatic deficits, differences will be observed in the VRM categories used compared to TD individuals; and 3) that as ASD individuals have difficulty maintaining conversation, utterances from TD individuals will play some kind of role in maintaining the conversation.

Methods

Participants

A total of 18 ASD participants (12 men, 6 women; mean age ±standard deviation [SD], 25.2±6.8 years) were recruited from the local community. ASD had been diagnosed by a clinically experienced psychiatrist in 2 participants and based on symptom evaluation

according to the Diagnostic Interview for Social and Communication Disorders [9] and the DSM, Fourth Edition, Text Revision [10] in 16 participants. Mean autism-spectrum quotient (AQ) and intelligence quotient (IQ) were 32.2±8.3 and 97.6±18.0, respectively. A total of 13 ASD participants were taking psychotropic drugs. A total of 18 TD participants matched for sex and as much as possible for age (12 men, 6 women; mean age, 23.6±6.6 years) were also recruited from the local community. TD participants were physically healthy with no history of psychiatric examination. They had never received special needs education and were assumed to have no cognitive impairment. Mean AQ was 17.5±9.0. Participants were divided into 18 pairs consisting of one ASD and one TD participant matched for sex and age (Table 1).

Table 1. Participant characteristics

	ASD	TD	
n	18	18	
Sex (men : women)	12 : 6	12 : 6	
Mean age [SD] (years)	25.2 [6.8]	23.6 [6.6]	ns
Mean AQ [SD]	32.2 [8.3]	17.5 [9.0]	$p<0.001$

ASD, autism spectrum disorder; TD, typical development; AQ, autism-spectrum quotient; SD, standard deviation

The present study was approved by the Kanazawa University Medical Ethics Review Board. After providing a thorough explanation of the present study, written informed consent was obtained from each participant before the start of the study.

Procedures

ASD and TD participants met one-on-one for the first time at the laboratory at Kanazawa University. Participants were each aware of their partner's ASD/TD status. The dyadic

conversations were unguided.

The procedure from arrival at the University until the end of the conversation was as follows.

1. On arrival at the designated meeting place at Kanazawa University, participants were each guided to the laboratory by the authors.
2. Participants listened to an explanation of the ethical considerations of the study, and then completed a participation consent form and other paperwork.
3. The authors informed participants of each other's names, explained that they were to have a 10-min conversation and that the conversation would be recorded, turned on the digital voice recorder, and left the room.
4. Participants had a 10-min conversation.
5. After 10 min, the authors returned to the room and turned off the digital voice recorder.
6. Participants completed a questionnaire regarding their impressions of the conversation and their conversation partner.
7. Participants left the room when they had completed the paperwork relating to the study.

Data analysis

Transcripts of the conversations were created and the duration of each utterance (single utterance duration) was measured with a stopwatch and recorded.

Conversation content was coded according to the VRM, in which utterances are classified into eight categories based on semantic and syntactic/pragmatic perspectives . The authors explained the coding method to two graduate students unaware of

participant characteristics, who then coded each conversation. Each student coded the same sample transcripts. Once a constant consistency (0.61) was achieved, all conversation data were coded. Periods in which no conversation could be heard were classified as “silence”. After coding was complete, numbers and durations of utterances were calculated for each category.

The Scale of Impressions of Conversation (Ogawa, 2000) and Scale of Unique Adjectives (Hayashi, 1978) were used to evaluate participant impressions of the conversation and their conversation partner, respectively.

Results

Numbers and durations of utterances

No significant differences were observed between ASD and TD participants with regard to the total numbers or durations of utterances (Table 2). Utterances were classified as single- or multiple-category based on whether they could be classified into one category or two or more categories, respectively. No difference was observed between ASD and TD participants with regard to the number of single-category utterances. However, the number of multiple-category utterances was significantly lower among ASD participants (Cochran-Mantel-Haenszel test, $p<0.001$). No significant differences were observed between ASD and TD participants with regard to impressions of the conversation or their partner.

Table 2. Total number and duration of utterances and impressions

	ASD	TD	
Total number of utterances	64.6 (18.5)	64.3 (18.7)	ns
Total duration of utterances (s)	243.9 (96.2)	308.1 (97.6)	ns
Number of single-category utterances	56.1 (15.9)	45.2 (18.2)	ns
Number of multiple-category utterances	8.4 (19.2)	19.2 (7.1)	p<0.001
Impressions of conversation	12.5 (4.6)	11.1 (3.6)	ns
Impressions of partner	79.9 (5.1)	82.8 (4.5)	

*Values are number of times or seconds. Values for impressions correspond to scale scores. Values are given as mean (SD).

Comparison of the total number of utterances for each category revealed that ASD participants used significantly fewer “question” utterances ($F(8,17)=57.605$, $p<0.001$; Table 3).

Table 3. Number of utterances for each category during 10-min conversation

Category	ASD	TD	
Reflection	4.9 (6.1)	5.3 (3.8)	ns
Acknowledgement	22.8 (12.6)	25.9 (9.4)	ns
Confirmation	1.4 (1.9)	3.0 (5.0)	ns

Edification	11.1 (12.7)	11.8 (6.5)	ns
Interpretation	1.2 (1.6)	2.3 (2.1)	ns
Question	6.8 (6.9)	17.8 (10.8)	p<0.001
Advisement	0.2 (0.5)	0.8 (1.1)	ns
Disclosure	22.3 (7.6)	20.7 (11.7)	ns
Silence	2.2 (2.7)	1.3 (1.6)	ns

*Values are shown in number of times as mean (SD).

Comparison of the total duration of utterances for each category revealed that ASD participants used significantly shorter acknowledgement utterances ($F(8,17)=35.243$, $p=0.021$) and question utterances ($p=0.003$) (Table 4).

Table 4. Total duration of utterances for each category during 10-min conversation

Category	ASD	TD	
Reflection	9.6 (13.1)	14.5 (15.5)	ns
Acknowledgement	34.1 (19.9)	59.6 (24.6)	p=0021
Confirmation	3.2 (4.7)	10.0 (16.1)	ns
Edification	56.0 (69.9)	57.9 (36.6)	ns
Interpretation	2.9 (3.9)	7.0 (7.2)	ns
Question	16.7 (24.6)	49.5 (34.4)	p=0.003
Advisement	0.5 (1.4)	3.0 (5.1)	ns
Disclosure	101.6 (63.9)	94.9 (62.7)	ns
Silence	20.4 (41.0)	8.0 (19.3)	ns

*Values are given in seconds as mean (SD).

Comparison of the duration of conversation for each category during one utterance revealed significantly shorter acknowledgement utterances ($F(7,14)=7.921$, $p<0.05$) and question utterances ($p<0.05$) in the ASD participants (Table 5).

Table 5. Mean duration of conversation for each category during one utterance

Sum of categories	Mean duration of conversation: ASD (s)	Mean duration of conversation: TD (s)	
Reflection	1.9 (2.1) (n=124)	2.7 (2.7) (N=105)	ns
Acknowledgement	1.5 (1.6) (n=547)	2.3 (2.2) (N=510)	p<0.05
Confirmation	2.2 (0.8) (n=33)	3.4 (2.4) (N=60)	ns
Edification	5.0 (4.3) (n=246)	5.0 (4.7) (N=238)	ns
Interpretation	2.2 (1.0) (n=29)	2.8 (1.6) (N=52)	ns
Question	2.5 (1.8) (n=151)	2.8 (2.2) (N=362)	p<0.05
Disclosure	4.1 (5.3) (n=596)	4.9 (4.5) (N=420)	ns

*Values are given as mean (SD). n, number of utterances

Analysis of duration of exchange segments between ASD and TD participants

In order to analyze the pattern of exchanges in conversations between ASD and TD participants, the first and second utterances within an exchange segment were labeled Utterance 1 and Utterance 2, respectively. Multiple comparison was performed

regarding category and duration of exchange segments when Utterance 1 was uttered by the ASD participant and Utterance 2 by the TD participant (ASD First), and vice versa (TD First). Significant differences in the duration of exchange segments were observed for six utterance category combinations, depending on who spoke first. ($p<0.05$, $p<0.01$; Table 6).

Table 6. Comparison of duration of exchange segments depending on the order in which ASD and TD participants spoke

Category (Utterance 1)	Category (Utterance 2)	Segment duration (ASD First; s)	Segment duration (TD First; s)	Difference in segment duration (ASD First-TD First; s)	
Acknowledgement	Acknowledgement	3.1 (2.5)	2.1 (2.5)	1.0	$p<0.05$
Acknowledgement	Interpretation	4.3 (3.8)	0.9 (0.6)	3.4	$p<0.05$
Acknowledgement	Disclosure	2.2 (2.3)	1.3 (1.3)	0.9	$p<0.05$
Disclosure	Disclosure	5.6 (4.8)	3.3 (2.6)	2.3	$p<0.01$
Disclosure	Confirmation	7.3 (10.6)	3.7 (3.3)	3.6	$p<0.01$
Disclosure	Reflection	4.4 (4.7)	2.4 (2.0)	2.0	$p<0.01$

* Values are given as mean (SD).

Discussion

The present findings provide a new perspective regarding the characteristics of conversational exchanges between ASD and TD individuals, as well as clarifying the

respective conversation characteristics of these individuals, thereby making a valuable contribution to the field of ASD research.

1. Similarities in the conversation characteristics of ASD and TD individuals

One of the characteristic communication difficulties reportedly experienced by ASD individuals is a tendency to either talk too much or too little. However, during the present 10-min conversations, the numbers and durations of utterances made by ASD participants resembled those of TD participants. These results are consistent with findings that, superficially, the conversation of ASD individuals without cognitive impairment does not greatly differ from that of TD individuals. The present findings also clarified that conversational reciprocity, in which both speakers try to maintain a similar volume of conversation, can be seen in dyadic conversations between ASD and TD individuals, as well as between TD individuals.

Differences in post-conversation impressions of the conversation and conversation partner were investigated, but no differences in impressions of either were observed between ASD and TD participants. Questions regarding impressions of the conversation covered aspects such as tempo, but both ASD and TD participants rated conversations the same. Furthermore, the lack of difference in impressions of the conversation partner indicated that neither person felt uncomfortable and that conversation flowed smoothly. Specific components of the impressions of conversations and conversation partners were not investigated, preventing discussion of the specific impressions themselves. Further investigation is required regarding differences and characteristics of impression components.

2. Differences in the conversation characteristics of ASD and TD individuals

Investigation of the differences between ASD and TD participants based on VRM found that TD participants used about twice as many multiple-category utterances compared

to ASD participants. This shows that TD individuals conversed using utterances covering more functions than those of ASD individuals. This finding that ASD individuals often use utterances that comprise only a single function indicates that the difficulty with multitasking that is characteristic of ASD can also be observed in conversation.

3. Characteristics and patterns of exchange in dyadic conversations between ASD and TD individuals

The uses of each VRM category during the 10-min conversations were almost identical between ASD and TD participants, with frequent use of acknowledgment, disclosure, and edification utterances and infrequent use of reflection, confirmation, interpretation, and advisement utterances. The only difference was seen for question utterances, which were frequently used by TD participants, but not by ASD participants. The duration of utterances in each category was similar between groups, with disclosure utterances being the longest, edification utterances also being fairly long, and reflection, interpretation, confirmation, and advisement utterances tending to be short. However, question and acknowledgement utterances were long for TD and short for ASD participants. The low number and short duration of question utterances by ASD participants may be because, in addition to having little interest in others and finding it difficult to see things from their perspectives, ASD individuals find it difficult to predict the thoughts or situations of other people, which is not conducive to using question utterances to clarify. No difference was observed with regard to the number of acknowledgement utterances, but the duration of utterances in this category was shorter for ASD participants. Acknowledgement utterances act to fill the gaps in conversations, provide links to subsequent conversation segments, and convey that the speaker has been heard. ASD individuals are aware of the necessity of and use acknowledgement

utterances during conversation, so the number of acknowledgment utterances was similar to that of TD participants. However, the lack of consideration for the other person or a desire to try and achieve smooth conversational flow may prevent these utterances moving past formulaic responses, resulting in a shorter duration.

Multiple comparison of the duration of exchange segments for different patterns of conversation between ASD and TD participants demonstrated significant differences in the durations of segments for six patterns in which the first utterance was an acknowledgment or a disclosure, depending on whether the ASD or TD participant spoke first. Exchange segments were longer if the TD participant spoke after the ASD participant. These findings suggest that after an ASD individual uses an acknowledgement or disclosure utterance, the TD individual plays a connecting role, using acknowledgement, interpretation, disclosure, and confirmation utterances to maintain the conversation. This role may be important for TD individuals to converse with ASD individuals.

The present characteristics were clarified through comparative investigation of each VRM category used during conversation between TD participants and ASD participants without cognitive impairment. Conversations were unguided; however, different characteristics may be observed if the conversation topic were of interest to the ASD participant or set in advance. Furthermore, while no differences were observed regarding impressions of the present conversations, restricting analysis to conversations where there was a mutually positive impression may reveal new characteristics. Further investigation is required to clarify the support required for smooth conversation between ASD and TD individuals.

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References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders Fifth Edition. Washington DC: American Psychiatric Publishing, 2013.
2. Kanner L. Autistic disturbances of affective contact. Nerv Child. 1943; 2: 217-250.
3. Asperger H. Die "autistischen Psychopathen" im Kindersalter. Arch Psychiat Nervenkr. 1944; 117: 76-136.
4. Baltaxe CA. Pragmatic deficits in the language of autistic adolescents. J Pediatr Psychol. 1977; 2: 176-180.
5. Tager-Flusberg H. On the nature of linguistic functioning in early infantile autism. J Autism Dev Disord. 1981; 11: 45-56.
6. Shapiro T, Huebner HF, Campbell M. Language behavior and hierarchic integration in a psychotic child. J Autism Childh Schizophr. 1974; 4: 71-90.
7. Pierce S, Bartolucci G. A syntactic investigation of verbal autistic, mentally retarded, and normal children. J Autism Childh Schizophr. 1977; 7: 121-134.
8. Stiles WB. Describing talk: A taxonomy of verbal response modes. Newbury Park: SAGE Publications, Inc, 1992.

9. Wing L, Leekam SR, Libby SJ, et al. The Diagnostic Interview for Social and Communication Disorders: background, inter-rater reliability and clinical use. J Child Psychol Psychiatry. 2002; 43: 307-325.
10. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders Fourth Edition Text Revision. Washington DC: American Psychiatric Publishing, 1990.