Q&A

‘Tone’ of phrase may differ in autism, but meaning is clear

BY **NICHOLETTE ZELIADT**

3 OCTOBER 2017

It’s not always what we say, but how we say it: Even a ‘hello’ can take on dramatically different meanings, depending on its delivery. Spoken quickly and with a pitch that rises and falls, it suggests happy excitement; said slowly and with a falling pitch, it can impart disappointment.

The patterns of emphasis and intonation people use when they speak give their sentences and phrases a musical quality called ‘prosody.’ Prosody conveys the emotions behind the words as much as the words themselves do.

Men who have autism often speak with unusual prosody when making emotional statements, but this does not seem to disrupt clarity: Their listeners have no trouble decoding the emotions they are trying to communicate, according to a study published in August in *Autism Research*[1].

We asked the study’s lead investigator, **Noah Sasson** of the University of Texas at Dallas, how the findings might be used to improve the social experiences of adults with autism.

***Spectrum*: What is prosody?**

Noah Sasson: Prosody refers to any of the non-linguistic content in speech, including cues that indicate whether somebody is making a statement or asking a question. It consists primarily of the things we detect in speech that make it different from written text.

In our study, we focused on emotional prosody, which refers to the nonlinguistic patterns in speech that confer emotional information to a listener.

S: Why did you study emotional prosody in people with autism?

NS: Since the first descriptions of autism, people have noticed that the speech patterns of

individuals with autism are sometimes different, or even odd or peculiar. Previous acoustic analysis of speech patterns in autism have largely focused on non-emotional prosody. However, because social expressivity often differs in autism, we wanted to see whether emotional prosody has distinct features in adults with autism, and if so, whether it affects how listeners perceive the emotions.

I became interested in this because my team previously found that neurotypical people report being **less inclined to interact** with people who have autism after seeing videos of them or hearing recordings of them talking. But that wasn't the case when they only read the transcripts of their speech. This suggested to us that the speech patterns of people with autism can convey information that leads to unfavorable impressions.

S: How did you study prosody in people with autism?

NS: We recorded audio from 15 men with autism and 15 neurotypical men, all of at least average intelligence. Each man spoke five phrases — such as "I can't believe this" — that could have different emotionality attached to them depending on how they were said. We asked the men to say each phrase in a neutral tone and then in four different emotional contexts — happy, interested, angry and sad — after evoking these emotional states in the participants. Daniel Hubbard, the graduate student who led the study, analyzed the basic acoustic properties of each person's speech, including pitch range, volume and how long it took to say each phrase.

We found robust differences in speech patterns between the adults with autism and neurotypicals for all four emotions: The adults with autism used a greater pitch range, were louder and took longer to finish each phrase.

However, the two groups didn't differ on the neutral phrasing, which indicated to us that, at least in this sample, these prosodic differences are specific to emotion and not just to phrasing in general.

We then asked a group of 22 people with autism and 30 neurotypical individuals to listen to the same recordings and identify the emotion being expressed. Consistent with previous studies, we found that listeners with autism were less accurate at identifying the emotion in the phrases than the controls were. But all of the listeners were better at identifying emotion in the speech from individuals with autism than from controls. So, although speech patterns of adults with autism were quantitatively different than those of typical individuals — they were exaggerated in pitch and volume — they retained the prosodic qualities that conveyed specific emotions.

Still, all of the listeners rated the speech of the men with autism as less natural than that of controls, and this kind of judgment could affect the quality of social interaction.

S: How might unusual prosody affect social interactions?

NS: This study aligns with our previous work showing that neurotypical people are sensitive to

differences in social and emotional expression among people with autism. Even when those differences don't affect emotional understanding, they might lead to evaluative judgments that decrease the chances of a neurotypical person wanting to interact with a person with autism. And if interaction does occur, it might affect the quality of the interaction. In this way, the perceptions, biases, and behaviors of neurotypical people affect the social experiences of adults with autism.

One thing we hadn't predicted was that listeners with autism are just as likely as others to judge the speech of people with autism as less natural. That indicates to us that they, like controls, are sensitive to qualities in speech that can provoke evaluative judgments.

That's interesting to me because there's this idea that prosody differences in adults with autism happen because these adults are insensitive to others judging them as different. But the adults with autism in our study were just as sensitive as controls at detecting unusual prosody.

From our study, we can't determine the origin of these differences in prosody. We can just note that they exist and drive certain perceptions.

S: Do your findings have implications for therapy?

NS: Yes, perhaps. For individuals with autism, it might depend on whether they are aware of their own speech differences, and are interested in knowing how they are perceived by others.

Now, obviously, when speech patterns are perceived as less natural, it also says a lot about the evaluator. I have been thinking about how informing neurotypical people about social expression differences in autism might improve social experiences for people with autism. The goal would be to minimize negative biases associated with those characteristics. Our research and others' suggests that the more familiarity people have with individuals on the spectrum, the more positive their perceptions of individuals with autism.

S: What are you working on now?

NS: We're interested in seeing how evaluations are formed in real time when people meet each other in person, rather than while watching videos or listening to speech recordings. After two people get to know each other, we ask each person to evaluate the other person on a number of traits. We can have a person who has autism meet a neurotypical person, or have two unfamiliar people with autism get to know each other, and then try to identify characteristics in each individual that drive positive social evaluations and interactions.

REFERENCES:

1. Hubbard D.J. *et al. Autism Res.* Epub ahead of print (2017) **PubMed**