This is a post-peer-review, pre-copyedit version of an article published in *Behavior and Social Issues*. The final authenticated version is available online at: https://doi.org/10.1007/s42822-021-00057-z

Perceptions of Behavior Analysis in France:

Accuracy and Tone of Posts in an Internet Forum on Autism

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Author Note

This paper was written in partial fulfillment of the requirements of the Ph.D. degree in Psychoeducation at the Université de Montréal by the first author. This study was supported in part by a scholarship from the Social Sciences and Humanities Research Council to the first author and by a salary award from the Fonds de recherche du Québec – Santé (#269462) to the second author. The authors would like to acknowledge Noémie Hogan for her assistance with the interrater agreement.

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Abstract

Applied behavior analysis (ABA), which is often used as the basis for designing interventions for people with autism, is highly misrepresented and under-utilized in many countries. One country where ABA remains particularly difficult to access is France. One potential problem is that parents often rely on online resources such as social media to identify interventions for their child. Many of these sources of information do not accurately portray ABA or even openly disapprove of the science. To examine this issue, we used data mining methodology to extract, categorize, and analyze 897 messages on ABA published in a popular French internet forum based on their type, tone, and accuracy. Although messages were generally accurate and approving of ABA, our results showed that one in three messages fully or partially disapproved of the science and one in four messages contained some inaccurate information. Our analyses also indicated that parents were more likely to approve of ABA than individuals with an autism spectrum disorder. Finally, we found that the number of approving messages published in the internet forum decreased with time, especially over the last five years. Together, these results support the relevance of developing system-level approaches to dispel misconceptions about ABA in languages other than English.

Keywords: autism, behavior analysis, data mining, France, internet forum, perception.

Perceptions of Behavior Analysis in a France:

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Over 70 years ago, Ayllon and Micheal (1959) as well as Williams (1959) published the first studies using the principles of behavior analysis to solve problems of applied significance. Since then, research and clinical practice within the field of applied behavior analysis (ABA) have flourished and led to the creation of the Journal of Applied Behavior Analysis in 1968. More recently, concerns involving the practice of ABA has led to the development of the Behavior Analyst Certification Board "to meet professional certification needs identified by behavior analysts, governments, and consumers of behavior analysis services" (Behavior Analyst Certification Board, n.d.). Initially practiced predominantly in the United States of America, ABA has migrated to countries across all five continents (Ardila, 2006; Johnston et al., 2017). Researchers have studied the effectiveness of interventions based on ABA for a variety of populations (Fisher et al., 2013). Notably, the body of research on behavior analytic interventions for persons diagnosed with an autism spectrum disorder (ASD) has proliferated over the past decades (e.g., Leaf et al., 2016; Roth et al., 2014; Wong et al., 2015). With the consistent increase in prevalence of ASD (Fombonne, 2018), a majority of certified clinicians now work with individuals on the spectrum (Association of Professional Behavior Analysts, 2009; Deochand & Fuqua, 2016).

Behavior analytic interventions are functional procedures based on learning theory that aim to modify the antecedents and consequences associated with a behavior as well as to teach alternatives (Leaf et al., 2008). Researchers consider interventions based on behavior analytic principles as well established for individuals diagnosed with autism (National Autism Center, 2015). Many evidence-based interventions for ASD grounded in ABA have led to positive

effects on a variety of communication, social, behavior, academic, adaptive, and cognitive outcomes (Hyman et al., 2020; Roth et al., 2014; Wong et al., 2015). In fact, behavior analytic interventions have the most empirical evidence for decreasing challenging behaviors and teaching adaptive skills to children with ASD (Roth, et al., 2014; Wong et al., 2015).

Despite the accumulation of empirical evidence for the efficacy of interventions derived from behavior analysis with individuals diagnosed with ASD, the science is persistently misrepresented in many countries, especially where access to training is limited (Freedman, 2016; Krapfl, 2016). One country where ABA remains particularly misrepresented and difficult to access is France (Amouroux, 2017). Although efforts have been put forward during the last two decades to develop recognized academic programs, French-speaking students only have access to three active verified course sequences that meet the requirements for certification by the Behavior Analyst Certification Board (Association for Behavior Analysis International, 2021a; 2021b). In contrast, English Canada has 35 training programs despite having less than half the population of France. Moreover, interventions grounded in ABA for persons diagnosed with ASD were not recommended by France's higher health authorities until 2012 (Haute Autorité de Santé and Agence Nationale de l'Évaluation et de la Qualité des Établissements et Services Sociaux et Médico-Sociaux [HAS], 2012). In 2012, the HAS finally recommended interventions derived from the science of ABA, but their report categorized them as "Grade B" (i.e., presumed scientific). Thus, the HAS still considers that ABA derived interventions have insufficient scientific proof to merit a "Grade A" recommendation (i.e., established as scientific). Such misinformation has hindered, and continues to hinder, the application of the science in practice.

Parents play a major role in selecting interventions for their child (Green, 2007; McPhilemy & Dillenburger, 2013). When identifying potential interventions, parents are faced with an overwhelming amount of information (Miller et al., 2012; National Autism Center, 2015). For example, hundreds of different interventions exist for children with ASD with varying proof of effectiveness (Goin-Kotchel et al., 2007; Miller et al., 2012; National Autism Center, 2015). These can range from drug treatments and diet therapies to behavioral, educational, and alternative interventions. Parents can seek information on potential interventions from a diversity of sources such as health professionals, books, newspapers, other parents, and the internet (Miller et al., 2012).

Advances in technology and increased accessibility to the internet make the latter an important source of knowledge acquisition for parents of children with ASD (e.g., Grant et al., 2016; Hall et al., 2016; Pham et al., 2019). While Gibson et al. (2017) found that parents prefer obtaining information relating to ASD from local resources (e.g., pediatricians, teachers, and local organizations), results from other studies have suggested that the internet is increasingly used as parents' primary source of information (Grant et al., 2016; Hall et al., 2016). A recent study by Shepherd et al. (2020) found that nearly 45% of the parents in their sample reported using social media for caregiving-related support. In another example, Clifford and Minnes (2013) noted that 31% of the parents of children with ASD in their study were actively using online support groups. Social media platforms, such as Facebook, Twitter, blogs, and internet forums, are online resources that are particularly interesting as they not only give the parent access to large amounts of information, but also allow parents to get emotional support, interact with others (e.g., parents, professionals, researchers, persons with a diagnosis of ASD) and get answers to specific questions such as intervention recommendations (Saha & Agarwal, 2016;

Sherpherd et al., 2020). Although social media can be a helpful resource for parents of children with ASD, researchers have found that they contain an overabundance of information that is often unreliable and contradictory (Moorhead et al., 2013). Given that parents have reported that empirical evidence does not seem to influence their decision-making (Green et al., 2006) and that opinions or shared experiences of others are considered evidence of the effectiveness of interventions (Grant et al., 2016), relying on information found on social media can potentially result in parents selecting ineffective, or even dangerous, interventions for their child (Moorhead et al., 2013).

Considering that ABA is misrepresented in France (e.g., Richelle et al., 2006; Robert, 2017), it would be important to provide details of the extent of this problem. To address this issue, we examined messages about ABA in a French internet forum on ASD. The specific objectives of our study were to: 1) measure the perception of ABA by quantifying the information on accuracy and tone, 2) assess whether messages with varying tones differed in accuracy, 3) evaluate whether messages with varying tones differed across the type of user (parent or person with autism), and 4) examine whether the tone of more recent messages differed from older ones.

Method

Data Source

The first author identified a popular French internet forum for people with autism and their families using the Google search engine. This internet forum had at least 500 messages pertaining to ABA and is one of the most popular autism boards published in French, which is why we selected it for our analysis. The website divided the forum into multiple subforums with

specific themes. We focused our analyses on subforums that had themes involving autism in general, parents of children with autism, and intervention.

As per the *Canadian Tri-Council Statement: Ethical Conduct for Research Involving Humans* (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada, 2018), research involving publicly available data with no expectation of privacy does not require informed consent, nor ethical review. As anyone could access the website using a standard search engine and viewing the posts did not require the creation of a private account, the data were considered in the public domain. Nevertheless, we removed all usernames, timestamps, and message contents from our shared database so that it would be impossible to identify a participant if they were to delete their posts from the forum.

Data Extraction

Our data extraction process involved four steps. First, we hired a web data extraction service team to extract all messages as well as identification (message URL, message ID, and thread ID) and descriptive (subforum label, thread title, authors username, authors message ID, timestamp, and number of views) information for the targeted subforums. Second, a list of French keywords associated with ABA was created by the first author and approved by the second author (see Table 1 for the list of keywords). For the third step, we used Python as a keyword processing tool to identify messages relating to ABA that contained the keywords presented in Table 1. Finally, the first author manually searched each message to remove those with a confounded use of one of the keywords (e.g., GABA, *tabac* [tobacco], *abandonner* [abandon], or *thérapie comportementale cognitive* [cognitive behavior therapy]). Our final sample contained 897 messages.

Data Classification

Following the data extraction process, the first author manually coded each message in relation to three categories of characteristics: type of message, tone, and accuracy. While the type of message referred to the message as a whole, the remaining categories were coded based on the sections of the message pertaining to ABA (see Table 2 for definitions and examples for the characteristics of each category). To assess interrater reliability, an independent rater coded 25% (n = 224) of the messages, which were selected at random. Interrater reliability was quantified using the kappa coefficient to control for high accuracy scores resulting from chance when coding a binary variable (i.e., 50%; McHugh, 2012). Prior to calculating the kappa values, we transformed each characteristic to a binary variable. Kappa coefficients varied from .48 to .80 (mean = .67). With the exception of one value, all kappa values remained above .60, indicating that our interrater agreement for coding was moderate to strong.

The third objective involved identifying user status (i.e., parent or person with a diagnosis of ASD) so that we could conduct a more fine-grained analysis of tone. To address this issue, the first author also manually searched all user signatures at the end of each message in the internet forum. Within this signature, users often stated their relationship to ASD (e.g., father of two children with an ASD or diagnosed with Asperger's syndrome in 2011). When the signature did not clearly allow the identification of a user’s status, messages written by the user were hand searched to find this information. The dataset contained 193 different users in total: 85 users reported being a parent, 57 users reported having a diagnosis of ASD, 38 users reported neither being a parent or a person with ASD (e.g., pre-diagnosis, social communication disorder, students, practitioners), 9 users reported having both ASD and a child with ASD, and 4 users had

unidentifiable statuses. We excluded the latter three categories from our analyses involving user status to focus exclusively on parents and persons with ASD.

Data Analysis

First, we used descriptive statistics to quantify the prevalence for each category of the three main characteristics. Second, contingency tables were drawn to obtain the frequency distributions and conditional probabilities for all pairs of characteristics of tone (i.e., approving, disapproving, mixed, or neutral) and accuracy (accurate, inaccurate, mixed, or accuracy does not apply). Third, a chi-square analysis was used to test whether messages differed significantly on accuracy (i.e., accurate and inaccurate) given tone (i.e., approving and disapproving). Fourth, messages of parents were compared to messages of individuals with ASD using a chi-square test to measure whether they differed by opposing tones (i.e., approving vs disapproving). Given that some users wrote more than one message and to meet the assumption of independence of observations, we ran our chi-square using the rounded integer mean of tone (i.e., 0 = disapproving or 1 = approving) for each user. Users (n = 8) with a mean of 0.5 were excluded from the analysis since the number of approving and disapproving messages published was equal; thus, the user could not be classified in one of the mutually exclusive categories. Furthermore, we also excluded parents and individuals with ASD who did not publish any messages with an approving or disapproving tone from this analysis. The final sample for our comparison of tone given user status contained the average rounded tone for 62 parents and 43 individuals with ASD. Finally, we ran a binary logistic regression to examine if and how time predicted the prevalence of messages with opposing tones. All statistical analyses were conducted using the R software version 4.0.3. The anonymized data (i.e., without username, timestamp and message content) and code are freely available at: https://osf.io/wceh3/.

Results

Sample Description

Our sample consisted of 897 messages from 193 different users published between 2005 and 2020. The user sought support or information in 68 (8%) messages while information or support was offered in 110 (12%) messages. Furthermore, the user provided general information in 321 (36%) messages or commented on another message in 398 (44%) instances. Figure 1 presents the frequency distributions for the number of words per message, the number of messages published per user, and the number of views per discussion thread following the removal of outliers (i.e., top 5%). Table 3 also presents descriptive statistics for frequency of publication by users and message length (i.e., number of words). Based on these results, the average user posted one or two messages that contained fewer than 500 words and garnered more than 1,000 views.

Perceptions of ABA

To examine perceptions of ABA, we first assessed the frequency distribution of messages with information on ABA for all four characteristics of tone (i.e., approving, disapproving, mixed, or neutral). More than one third of messages (n = 349; 39%) discussed ABA in an approving manner. On the other hand, nearly one in five (n = 178; 20%) messages disapprovingly referred to ABA. Additionally, 113 (13%) messages contained both approving and disapproving comments on ABA. Finally, 257 (29%) messages used a non-polarized tone (i.e., neutral).

We also qualified the accuracy of the information on ABA (i.e., accurate, inaccurate, mixed, accuracy not applicable). In all, 268 (30%) messages had information on ABA that was considered accurate and 158 (18%) messages contained inaccurate information on ABA.

Moreover, 43 (5%) messages presented a mixed accuracy (i.e., containing accurate and inaccurate information). Finally, we classified 428 (48%) messages as not applicable (i.e., reporting anecdotal information [*n* =88] or without judgment [*n* =340]).

Accuracy Given Tone

Table 4 presents the frequency distribution and the conditional probability of accuracy given message tone. The results show that messages with an approving tone were most likely of being accurate (*n* = 172; 49%) whereas messages with a disapproving tone had the highest probability of being inaccurate (*n* = 110; 62%). To measure whether messages significantly differed based on accuracy and tone, we ran a chi-square analysis using polarized characteristics (i.e., accurate, inaccurate, approving, and disapproving). The results suggest that there was a significant association between message accuracy and tone, $\chi^2(1) = 201.31$, $p < 0.01$. Specifically, our result confirms our prior observation that approving messages were more likely to be accurate. Conversely, disapproving messages were dominantly inaccurate.

Tone Given User Status

Table 5 presents the frequency distribution of polarized tone given user status. Conditional probabilities suggest that parents were more likely to write messages approving of ABA than individuals on the spectrum. Specifically, we observed that 84% (*n* = 52) of parents wrote messages with an approving tone whereas only 16% (*n* = 10) of parents wrote messages with a disapproving tone. Results for users with ASD also suggest that they published more approving than disapproving messages. However, the contrast for users with ASD was not as important as the one observed for parents with 24 (56%) individuals publishing more approving messages versus 19 (44%) individuals publishing more disapproving messages. Our chi-square

analysis revealed that messages significantly differ across tones and type of user $\chi^2(1) = 8.64$, $p < 0.01$.

Evaluating Tone as a Result of Time

Figure 2 shows that the number of approving messages was mostly homogenous from 2006 to 2014, then decreased from 2015 to 2020. On the other hand, the number of disapproving messages remains generally stable. Interestingly, the number of approving messages per year was consistently superior to the number of disapproving messages, except for 2018. The result of the logistic regression suggests that time was a significant predictor of whether a message was approving or disapproving, Wald(1) = 3.40, $p < 0.01$, with the probability of a message being approving decreasing across years.

Discussion

The objectives of our study were to measure the accuracy and tone of messages about ABA in an internet forum, investigate the relationship between the tone and accuracy of messages, compare the tones across types of users (parents vs. persons with ASD), and examine the evolution of tone over time. Although messages were generally approving of ABA, our results suggest that the applied branch of our science remains contested and misunderstood in France. In fact, nearly one in four messages contained some inaccurate information on ABA while one in three messages fully or partially disapproved of ABA. Moreover, we found that the number of approving messages on ABA decreased with time, indicating that the perception of ABA published in the French internet forum has deteriorated since 2005. One potential explanation for this results involves the mass exposure of the population to misinformation and negative publicity from public events (e.g., trials, protests), media coverage, and advances in technology (e.g., social media that facilitates and accelerates the spread of misinformation;

Freedman, 2016; Keenan & Dillenburger, 2018, n.d.). That is, parents and persons with autism may consume inaccurate information, which may lead to misinformed posts. Our analyses also showed that messages that approved of ABA were most likely to be accurate whereas messages classified as disapproving of ABA had a higher probability of being inaccurate. Finally, we observed that parents and individuals with ASD perceived ABA differently. Specifically, parents were more likely to post messages approving of ABA than individuals on the spectrum.

Parents play a major role in selecting interventions for their children. When parents are faced with challenges such as those associated with ASD (e.g., speech impairment or challenging behaviors), they often turn to social media to identify potential interventions (Grant et al., 2016; Hall et al., 2016). Grant et al. (2016) have found that parental choice of intervention is highly influenced by opinions or shared experiences of others. Our results are concerning given that the information found on one internet forum contained many inaccuracies. The presentation of inaccuracies pertaining to ABA was especially disconcerting because of the ramifications for public policy. Notably, nearly half (43%) of the messages with a non-neutral tone contained some inaccurate information. Beyond disapproving messages portraying ABA inaccurately (e.g., stating that there is no evidence that ABA is effective or that ABA always leads to post-traumatic stress disorder), some messages approving of ABA also presented inaccurate information (e.g., ABA heals one in five people of ASD or ABA therapy is the best resource to treat anxiety and negative thoughts). Relying on such inaccurate and confusing information may result in parents considering ABA as ineffective, which may ultimately lead them to select alternative, invalidated, and potentially dangerous interventions for their child (e.g., Arnold et al., 2003; Brown et al., 2006; Heiger et al., 2008). In contrast, overgeneralizations and inexact positive

effects presented in the internet forum may produce false hope or lead to the inappropriate use of behavioral interventions.

Our results stress the importance of being exposed to accurate information when selecting an intervention. To achieve this purpose, different steps should be taken. First, efforts must be put forward to ensure that practitioners, researchers and policymakers are cognizant of current evidence-based interventions. This action is especially important given France's long history with psychoanalysis as the preferred intervention for ASD (e.g., Bates, 2020; Bishop & Swendsen, 2020; Houzel, 2018) and recent research suggesting that ABA remains misrepresented and difficult to access in France (Amouroux, 2017). Despite more than 40 years of empirical evidence (Keenan & Dillenburger, 2018), the HAS (2012) has categorized ABA-based interventions as "Grade B", stating that there was insufficient evidence for the science to be classified as established. "Fake news", "propaganda" and "myths" about ABA as well as a lack of knowledge regarding the concepts, methods, principles, and vocabulary used in behavior analysis can result in misconceptions regarding its ethical and effective use (Freedman, 2017; Keenan, 2015; Krapfl, 2016) and can even negatively impact policy development (Keenan & Dillenburger, 2018, n.d.). As a result, families can be deprived of effective interventions for their child. This result stresses the importance that researchers and practitioners work together to disseminate factual evidence and help educational agencies, health authorities and policymakers better understand the science of ABA.

Building an accurate understanding of ABA for addressing core features or associated conditions of ASD also requires that information is disseminated and accessible to parents and key stakeholders in multiple languages. Special attention must be given to the French translation of vocabulary relating to ABA to limit misinterpretation of the science. For example, the use of

the word *punition* to refer to “punishment” may lead parents to believe that we are using immoral practices because this term is not understood as a functional technical procedure by the general public (Rivière, 2015).

As indicated in the introduction to this paper, the limited number training programs also remains an issue. Investing in the development of recognized certification programs could limit the widespread of misinformation pertaining to ABA by increasing the number of behavior analysts that can disseminate accurate information on the science in communities and allowing families to experience ABA-based interventions implemented by a competent professional. Finally, parents need to be guided on how and where to get accurate information on interventions for their child with a diagnosis of ASD, especially when they do not have access to professional intervention services (e.g., during the diagnosis process or when on a waiting list for intervention services).

Readers should bear in mind the limitations of our study when considering the results. First, data mining social media platforms allowed us to have access to a large dataset, but the amount of descriptive information extractable remained limited. Hence, variables such as gender, age, ethnicity, and education could not be analyzed to identify potential moderators across the tone and accuracy of messages. Furthermore, the nature of our design prevents us from reaching conclusions regarding the causes of our observations. Our results must be interpreted carefully given that our level of interrater agreement was moderate for some categories. Notably, two issues seemed to limit the agreement between the raters: the average length of each message and the use of overlapping categories for tone and accuracy (i.e., the presence of a mixed category resulted in overlap with two other categories). A large number of messages contained more than 500 words, which made their categorization challenging as these messages discussed multiple

topics. Misreading a single word in the message could lead to it being rated in one category rather than another, which could explain the moderate interrater agreement observed for some categories. Similarly, another methodological limitation is the absence of an interrater procedure for the selection of keywords used for our data extraction. For example, we chose not to include the keyword BCBA as it is an English abbreviation that we thought was uncommon in French. Therefore, our initial search may have failed to include some messages about ABA.

Despite being based in France, the forum had no restrictions regarding the location of its users. Even though all participants were French speakers, some messages may thus have been posted by users in other countries (e.g., Canada, Belgium, Switzerland). Finally, our design does not allow us to generalize our findings to other social media platforms. Future research should replicate this study with other social media used by parents to see how our results would compare to popular platforms such as Twitter. Researchers should also develop strategies to effectively disseminate information on ABA in non-English speaking communities and examine their effects on the perception of behavior analysis using experimental designs.

Compliance with Ethical Standards

Funding: This study was supported in part by a scholarship from the Social Sciences and Humanities Council of Canada to the first author and by a salary award from the Fonds de recherche du Québec – Santé to the second author.

Ethical Approval: This project did not require ethical approval as the data were publicly available over the internet and the researchers did not participate in the forum.

Conflict of Interest: On behalf of all authors, the corresponding author states that there is no conflict of interest.

Availability of Code and Data: The code and data are freely available at https://osf.io/wceh3/.

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Table 1

List of French and Translated Keywords used in Python Code for Message Extraction

French	English
aba	aba
*analyse appliqu**	applied analysis
*intervention comportemental**	behavioral intervention
*interventions comportemental**	behavioral interventions
comportementalisme	behaviorism
*thérapie comportement**	behavior* therapy
thérapies comportement*	behavior* therapies
aac	aac
*analyse comportementale appliqu**	applied behavior analys*
Comportementaliste	behaviorist
*méthode comportement**	behavior* method
*méthodes comportement**	behavior* methods
*behavioris**	behavioris
*approche comportemental**	behavior* approach

Note. The asterisk denotes keywords with incomplete endings to identify posts that contain variations of the same word or expression. For example, searching comportement* identifies the words comportement, comportemental, comportementaux.

Table 2

Definitions and Examples of Each Category for Type of Message, Tone and Accuracy

Category		Definition	Example (translated to English)
Type of message			
	1	Question/seeking information/seeking support.	My son was recently diagnosed. What is your experience with ABA?
	2	Answering a question/responding to someone seeking information or support.	No, many schools don't offer accommodations. We were told that we had to change schools to get access to support from behavior analyst.
	3	Giving general information or suggesting a resource. This category excludes responses to another person's message or question.	I found the following article on ABA, I think it is interesting. Here is the link https://....
	4	Commenting on another message or subject.	I think what you are describing is CBT and not ABA.
Tone			
	1	Approving: Message that promotes ABA, describes its benefits, or mentions positive experiences with ABA.	We saw great improvements after only a couple of months of interventions.
	2	Disapproving: Message that discourages the use of ABA, describes the harmful/negative effects or talks about negative experiences with ABA.	We should accept our children as they are and not try to change them using ABA.
	3	Mixed: Message with an approving and disapproving tone about ABA.	I have some friends that loved their experience and others that didn't. There are some competent professional and others not so competent.
	4	Neutral: Message that mentions ABA without using a polarized tone.	ABA means applied behavior analysis. You can get information here https://....

Accuracy

1	Accurate: Message that accurately describes the procedures, methods, interventions or effects of ABA. This category excludes anecdotal information.	You should get support from a behavior analyst. They can help with your child aggressive behaviors.
2	Inaccurate: Message that inaccurately describes the procedures, methods, interventions or effects of ABA. This category excludes anecdotal information.	ABA is a sub-branch of CBT.
3	Mixed: Message presenting accurate and inaccurate information on ABA. This category excludes anecdotal information.	ABA can be helpful for younger children, but it is ineffective for adults.
4	Non-applicable: Messages without judgment on ABA or reporting anecdotal information on ABA.	A behavior therapist worked with my daughter. After only one month, she was able to use the bathroom alone. However, we did not see an improvement in her food selectivity.

Note. Values associated for each category represent the values in the dataset available at https://osf.io/wceh3/. The examples presented are based on messages extracted from the Forum. ABA: applied behavior analysis; CBT: cognitive-behavior therapy.

Table 3

Descriptive Statistics for our Sample

Characteristic	Median	Mean	SD	Min	Max
Number of messages published by user	2	4.65	21.96	1	303
Number of words per message	263	450.74	547.85	9	5147
Number of views per discussion thread	2,631	7,358	19,702	294	308,218

Table 4

Frequency Distribution and Conditional Percentage of Accuracy Given Tone

	Tone			
Accuracy	Approving	Disapproving	Mixed	Neutral
Accurate	172(49%)	11(6%)	39(35%)	46(18%)
Inaccurate	17(5%)	110(62%)	14(12%)	17(7%)
Mixed	11(3%)	6(3%)	24(21%)	2(1%)
Accuracy not applicable	149(43%)	51(29%)	36(32%)	192(75%)
Total	349(100%)	178(100%)	113(100%)	257(100%)

Table 5

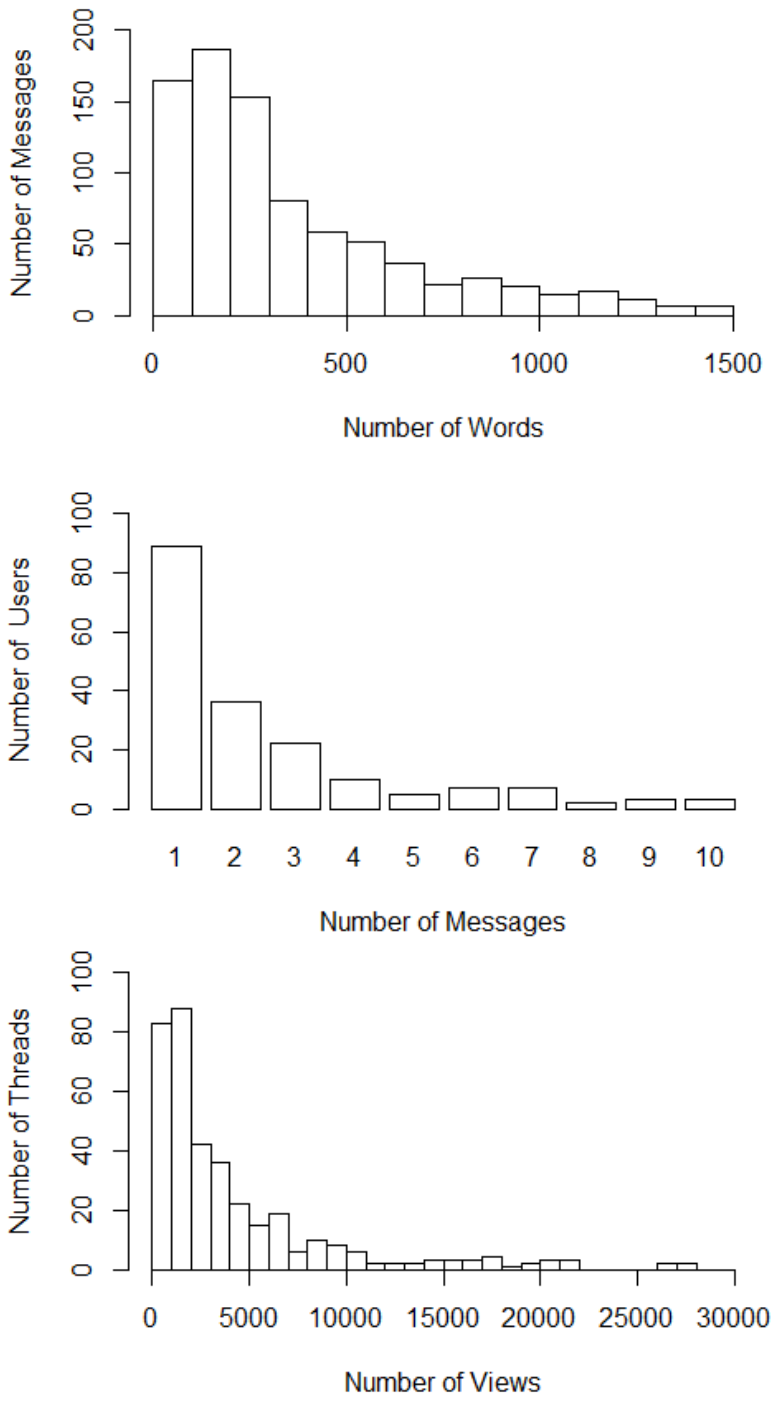
Frequency Distribution and Conditional Percentage of Polarized Tone Given User Status

	User Status	
Tone	Parents	Individuals with ASD
Approving	52(84%)	24(56%)
Disapproving	10(16%)	19(44%)
Total	62(100%)	43(100%)

Note. ASD: Autism spectrum disorder.

Figure 1

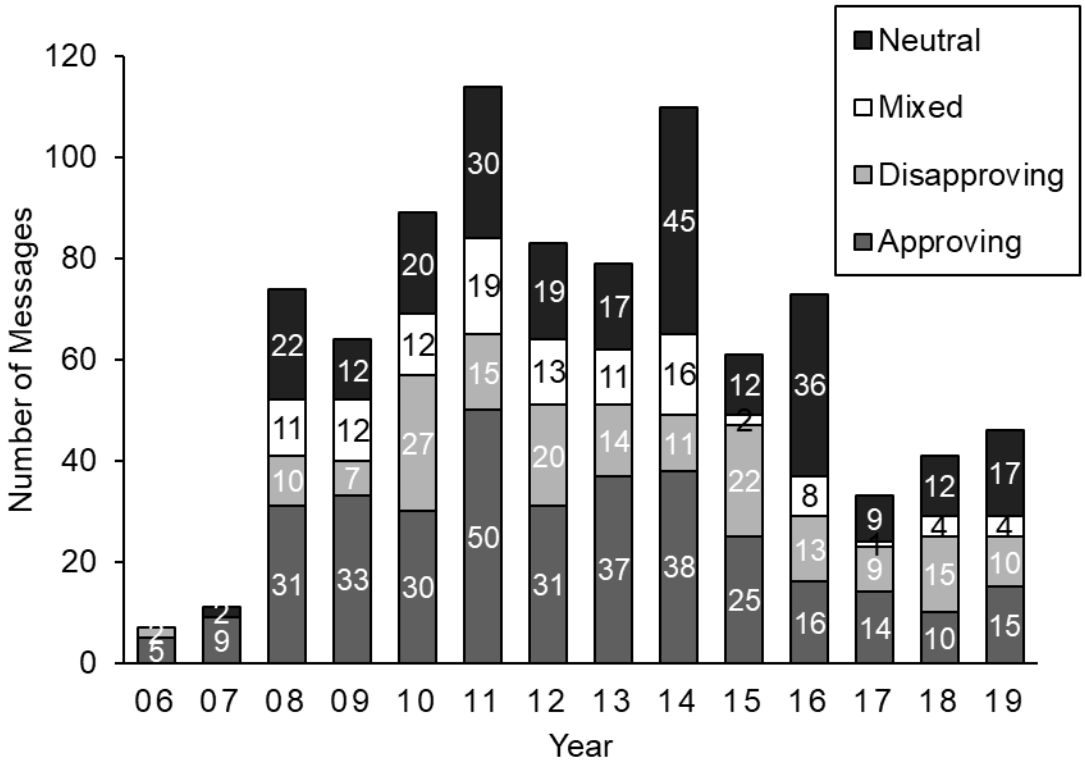
Frequency Distribution of the Number of Words in a Message, the Number of Messages Published per User, and the Number of Views per Thread.



Note. The outliers (i.e., top 5%) were removed from the graphs.

Figure 2

Number of Messages for Each Tone Published on the Internet Forum by Year.



Note. We excluded messages published in 2005 and 2020 from the histogram as data were unavailable for all months of those years.