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Classifying Laughter: An Exploration Of The Identification and Acoustic Features of Laughter Types

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Abstract

This thesis seeks to improve the classification of laughter by uncovering its purpose in communication, identifiability, and acoustic features. Reviewing the existing literature, this paper identifies three main types of laughter: affiliative, de-escalative, and power. Consulting with research assistants, this paper then classifies 113 instances of laughter from 62 Congressional Committee meetings published on C-SPAN. The interrater classification agreement suggests individuals can identify and categorize the different types of laughter with context. Additionally, 14 participants were recruited to complete exercises designed to elicit archetypes of the three laughter categories. These study recordings, which included 124 laughter bouts, were analyzed for acoustic features (pitch (Hz), energy (dB), duration, and proportion of voiced laughter vs. silence). The audio analysis indicates acoustic features of laughter are not overall significantly different amongst the three categories and therefore suggests social context, including proximal language and visual cues, predominantly explains the identifiability of the laughter types.

Keywords

laughter, communication, acoustic features

Disciplines

Applied Linguistics | Communication | Organizational Behavior and Theory | Social Psychology

CLASSIFYING LAUGHTER: AN EXPLORATION OF THE IDENTIFICATION AND
ACOUSTIC FEATURES OF LAUGHTER TYPES

By

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An Undergraduate Thesis submitted in partial fulfillment of the requirements for the
JOSEPH WHARTON SCHOLARS

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ABSTRACT

This thesis seeks to improve the classification of laughter by uncovering its purpose in communication, identifiability, and acoustic features. Reviewing the existing literature, this paper identifies three main types of laughter: affiliative, de-escalative, and power. Consulting with research assistants, this paper then classifies 113 instances of laughter from 62 Congressional Committee meetings published on C-SPAN. The interrater classification agreement suggests individuals can identify and categorize the different types of laughter with context. Additionally, 14 participants were recruited to complete exercises designed to elicit archetypes of the three laughter categories. These study recordings, which included 124 laughter bouts, were analyzed for acoustic features (pitch (Hz), energy (dB), duration, and proportion of voiced laughter vs. silence). The audio analysis indicates acoustic features of laughter are not overall significantly different amongst the three categories and therefore suggests social context, including proximal language and visual cues, predominantly explains the identifiability of the laughter types.

Keywords: laughter, communication, acoustic features

INTRODUCTION

Laughter is one of the most fundamental and earliest forms of human communication (Provine 2004; Provine and Emmorey 2006; Sauter, Eisner, Ekman, and Scott 2015). First exemplified at around 14-16 weeks, laughter is an important aspect of social interactions throughout life (Provine 1996). Children laugh approximately 400 times per day and adults laugh less, but still frequently, at 15 times per day (Heggie 2019). Despite laughter's prominence in communication and the fact that it predates language, little research exists on humans' ability to identify its various purposes in conversation (Provine 2004). Experts understand laughter's potential for maintaining social order (Nesi 2012), but the specifics of how it is classified, understood, and perceived have yet to be fully explored. In distilling existing research in the field, this paper identifies three main types of laughter: affiliative, de-escalative, and power. Then, consulting research assistants, this paper classifies naturalistic data accordingly. Taking these questions a step further, this research analyzes collected laughter bouts in an effort to understand whether there exist acoustic differences in the varying types of laughter that may explain how and why individuals are able to identify and differentiate these types of laughter. In adding detail to the classification of laughter in the field, which is currently limited to authentic vs. inauthentic categories, the results from this research are helpful in expanding the exploration of the interpersonal implications of laughter.

BACKGROUND THEORY

The Importance of Laughter Research

The study of laughter, while deemed “evolutionarily significant” by Darwin in 1872, is still in its infancy compared to other subjects in communication and behavior research (Gervais and Wilson 2005, 396). Laughter has long been overlooked as an area of study, but its prominence in communication and its ability to shape perceptions makes it an important topic to unpack. Prior work has often oversimplified laughter as noise or waste. For example, transcriptions of conversations rarely note laughter and when they do, they focus on its occurrence, rather than the intricacies of the delivery or meaning (Hepburn and Bolden 2017). The English language has several words that describe different types of laughter, including but not limited to: giggle, chuckle, snicker, and guffaw (Hepburn and Varney 2013). The variety in these vernacular options speaks to the presence, importance, and recognition of different forms of laughter.

Laughter is heterogeneous and takes on various forms in social life, but the existing research does not document the different kinds and functions of laughter (Keltner and Bonanno 1997). The question of individuals’ ability to identify the meaning of laughter is important as it can give insight into the dynamics of how humans process laughter. While it is understood that laughter has different acoustic properties, these properties (including pitch and energy) have largely gone unstudied (Bachorowski and Owren 2001). By first determining the classifications of laughter and then analyzing the acoustic features of these different laughter types, we can ascertain whether acoustic features explain the identifiability of laughter. This research expands the opportunity to uncover the interpersonal effects of laughter, which can be used to navigate and soothe social dynamics.

With the currently limited study of laughter, we are overlooking our understanding of communication and conversation. Laughter has the power to transform relationships, interpersonal perceptions, and the meaning of proximal language. The more we can understand it, the better equipped we can be to successfully navigate social interactions in both personal and professional settings.

The Social Element of Laughter

Laughter is a social form of communication. While individuals do laugh by themselves, humans are 30 times more likely to laugh in the presence of others (Provine 2004). Because laughter is used as a social signal, it serves as an indication of mood and bonds people together. Traditionally defined as an expression of mirth, laughter can also be used to satisfy interpersonal goals and is not necessarily always authentic. While most laughter is instinctive and unconsciously controlled, existing research differentiates authentic laughter from inauthentic laughter (Provine 2004). Authentic laughter is the involuntary reaction to a stimulus (e.g., a joke) whereas inauthentic laughter is a deliberate faking of laughter (Gervais and Wilson 2005, Scott et al. 2014). In either case, laughter is a signal to others about our affect.

A study analyzing the use of laughter in the Supreme Court serves as an example of the social and interpersonal nature of laughter. In this study, Malphurs viewed transcripts of oral arguments, tagged those that included laughter, and listened to the audio files to “better understand the role laughter played in each instance” (2010, 59). He explained that hearing the files made it easier to understand the role the laughter was playing in the conversation because he could pinpoint, for example, “sarcasm in [the] voice” for context (59). As he categorized, the direction of the laughter was also helpful to consider as it, “coupled with tone, provides a means

of understanding the types of laughter-generating statements that justices and advocates use, as well as the level of control and resistance exerted by the statement” (60). This study speaks to the idea that humans may rely on context to fully understand the purpose of laughter.

Defined as an exhalation that produces a commonly identifiable sound, laughter is deemed to be recognizable (Provine and Yong 2010). Once laughter is recognized, it sets the emotional tone of a conversation and can alter the mood. The presence of laughter itself is enough to make someone else laugh, thus bringing about a jovial affect (Provine 1992). This type of contagious laughter is often affiliative. That said, laughing alongside someone else is very different from laughing at them. Depending on the context, laughter can be interpreted as a form of mockery. It is fun to laugh with people, but unpleasant to receive a scornful chuckle (Provine 1992). Context and delivery are important in understanding the role of laughter in interpersonal communication.

Theories of Laughter

While laughter is closely intertwined with humor, it has its own distinct functions. Laughter may occur, and often does, in the presence of humor, but it occurs without humor as well (Malphurs 2010). This delineation between humor and laughter is crucial to make to unpack the specific role laughter plays in social interactions. There are several historically significant theories behind laughter besides its role as an expression of joy that help clarify this distinction.

The superiority theory relies on the idea that humans find comedy in ridicule and regard an “object of amusement as inferior and/or ourselves as superior” (Bardon 2005, 463). In other words, people tend to let out laughter as a sign of amusement at the expense of someone else because of their perceived superiority. This theory of superiority was discussed by philosophers

Plato, Aristotle, and Hobbes (Lintott 2016). It can explain the type of laughter that is directed at someone else as an expression of power.

The incongruity theory focuses on the notion that laughter results from situations that differ from expectations or social norms (Lintott 2016). This type of divergence is surprising and is a “mismatch between conceptual understanding and perception” that results in laughter (Morreall 1983, 18). With the theory of incongruity, the exact meaning behind the laughter will depend on the emotion that comes to be from the unexpected situation (Billig 2005). For example, there is a difference between laughter that results from a surprisingly joyous event and laughter resulting from a surprisingly unfortunate one. This incongruity theory offers an explanation for one way laughter can come to be in communication.

The relief theory relies on the idea that the physical action of laughing reduces bodily tension (Malphurs 2010). This type of physical release that comes with laughing aligns with Freud’s discussion of mental release that comes with laughter as well (1960). Because laughing releases nervous energy and tension, this theory surmises that laughter often manifests as a de-escalation tool to relieve stress or discomfort.

Types of Laughter

Based on these theories, the purpose of laughter fits into three main categories: affiliation, de-escalation, and power.

Affiliative laughter is often the most commonly available as it encompasses laughter as an expression of mirth, a social bonding tool, and a signal of collaboration. Within the category of affiliative laughter, researchers express that laughter is a sign of social acceptance and it

develops cooperation amongst individuals (Curran 2018; Wildgruber, Ritter, and Kreifelts 2018). In other words, when someone laughs with another person, it is a sign of social affiliation.

The de-escalative role of laughter can be associated with the relief theory that when an individual laughs, they are releasing discomfort. This type of laughter also serves as an attempt to signal to others that whatever situation is causing the discomfort is trivial to the person who is laughing (Polimeni 2015). For example, an individual may laugh at an inappropriate joke to soothe social tensions and signal that the joke did not offend them. In this sense, the laughter reduces the idea of a situation being threatening for anyone involved and it signals to others that they are free to laugh as well (Warner-Garcia 2014). This laughter can de-escalate the stress of a situation or disagreement and make everyone involved more comfortable (Knight and Lewis 2014).

Finally, the role of laughter as a signal of power is most closely associated with the superiority theory. This type of laughter helps reinforce power dynamics because it communicates mockery (Davies 2009). Not only can laughter be directed at another individual or thing as an expression of power, but evidence also suggests that people in more formal positions of power tend to laugh more than their less powerful counterparts (Glenn 2010).

Acoustic Features of Laughter

The study of the acoustic properties of laughter is limited. What has become increasingly clear, however, is that the sound of laughter is highly variable. There exists diversity in fundamental frequency (more commonly known as pitch) characteristics, production modes, and articulation effects (Bachorowski, Smoski, and Owren 2001). According to Darwin, laughter is brought about with a deep breath followed by interrupted chest contractions (1872). Laughter

research calls each instance of laughter a bout, represented by an individual exhalation (Bachorowski, Smoski, and Owren 2001). These bouts can be broken up into vowel and fricative categories. Vowel-oriented laughter tends to be longer and refers to the song-like noise often beginning with “ha,” “he,” or “ho,” whereas fricative laughter has more friction in the throat and is characterized by a strong consonant sound due to a grunt or snort (2001).

According to Bachorowski, Smoski, and Owren, the acoustics of laughter function “to elicit emotional responses in listeners and thereby shape their subsequent behavior” (2001, 1595). For example, vowel-based laughs make a more positive impression on the listener than fricative grunts or pants (Bachorowski and Owren 2001). Listeners also can use these vowel cues to make a distinction between emotionally positive (pleased, relieved) and emotionally negative (anxious, embarrassed) laughs (Devillers and Vidrascu 2007). The acoustic features seem to point to individuals’ ability to differentiate the driving emotion behind laughter, as the energy and duration of bouts are higher for positive than negative laughter (2007). Additionally, a recent study found that affiliative laughter was louder and had less voicing than other forms of laughter (Wood, Martin, and Niedenthal 2017). That said, significant conclusions about whether the acoustics of laughter have specific, well-defined signaling purposes do not yet exist.

RESEARCH QUESTIONS

Objective

To classify the various types of laughter in communication and uncover the acoustic features that may contribute to the identification of these different types of laughter.

Questions

1. Can individuals interpret the meaning of and classify laughter when observing natural interactions?
2. Are there acoustic variances in the different types of laughter?

Hypotheses

1. Individuals can classify instances of laughter by type.
2. Affiliative, de-escalative, and power laughter differ in the following acoustic properties: average pitch, average energy, and proportion of voiced laughter within bouts.

METHODOLOGY

Naturalistic Data

To most accurately determine whether individuals can classify the various purposes of laughter, it was important to use real-world examples.

Naturalistic Data Collection

The naturalistic data collection process first entailed a brainstorm of instances of recorded and realistic laughter that could be publicly accessed. This initial brainstorm found potential ideas for naturalistic data collection including public proceedings, reality competition shows, and televised interviews. Out of these options, the public proceedings were the most viable as the centralized platform of the Cable-Satellite Public Affairs Network (C-SPAN) would allow for a systematic collection of natural examples of laughter. This network televises proceedings of the federal government of the United States and has an archive of recordings with transcripts. These transcripts note instances of laughter as “(Laughter.)” House Committee Videos were chosen for the naturalistic data collection because they cover a variety of topics given each committee has a different specific jurisdiction. These videos were sorted by “Most Viewed” in descending order to find clips of laughter. 113 instances of laughter were identified from 62 videos, with the timestamps of the bouts as well as the corresponding video links noted on a spreadsheet.

Naturalistic Data Analysis

The classification of the naturalistic data was inductive and independent of the collection process. This methodology aligns with the management research practice of using inductive analysis to shed light onto behavioral processes (Bluhm et al. 2011). Three independent research assistants (RAs) were trained to identify the types of laughter. According to Pratt (2009),

interrater reliability is a well-grounded concept for qualitative research. This practice is particularly relevant given the archival nature of the data and the established definitions of the three types of laughter in the literature. The RAs were given written and verbal instructions (included in the appendix) for classification. They were tasked with classifying the laughter clips (affiliative, de-escalative, power, other), specifying whether the laughter was individual or group-based, and rating how difficult each bout was to classify (on a scale from 1-7 with 1 being extremely easy and 7 being extremely difficult). Group laughter was defined as any instance of laughter where a singular voice could not be picked up above any background noise/laughter. Individual laughter bouts were considered to be all other cases in which one individual mic'd voice was audible. Bouts were defined to encompass both multi-bursts (“ha ha ha”) and single burst (“ha”) instances of laughter, aligning with existing research in the field (Wood 2020). In this classification process, the RAs were able to watch the context immediately preceding and following the laughter. The RAs each coded the same set of 113 instances of laughter independently.

I served as a fourth expert, classifying the laughter and acting as a tiebreaker if there was no majority conclusion from the RAs. The decision rule to finalize the classification was $\frac{2}{3}$ RA agreement, with disagreements settled based on my fourth classification. This methodology of disagreement resolution increased the confidence in the accuracy of the classifications.

$\frac{2}{3}$ of the coders agreed on the classifications 85% of the time. 80% is widely considered the acceptable threshold for percent agreement (McHugh 2012), meaning the directions and coding process were reliable. Cohen’s Kappa statistic is considered a more robust measurement for reliability and can be interpreted as follows: values ≤ 0 indicate no agreement, 0.01–0.20 indicate none to slight, 0.21–0.40 indicate fair, 0.41– 0.60 indicate moderate, 0.61–0.80 indicate

substantial, and 0.81–1.00 indicate almost perfect agreement (McHugh 2012). The reliability of the RAs (Kappas \approx 0.39, 0.69, 0.65) can therefore be considered fair to substantial. While this reliability may be concerning for medical diagnoses and clinical studies, lower Kappa values are accepted in social science literature. These Kappas and the percent agreement serve to help ensure confirmability of the classifications and support this paper’s hypothesis that, with social context of the bouts, individuals are able to classify laughter by type.

Beyond the classification of the different types of laughter, the individual instances of laughter were categorized based on the demographic information of the laugher. Because these bouts of laughter came from recorded committee hearings, the representatives and guests speaking and laughing were made visible at the center of the video. They also had name tags, which eased the process of consulting their biographies to take note of their gender, race, and age at the time of the video. These demographic breakdowns, highlighted in Figures 1-3, were important to consider as they could have a role in shaping the laughter’s social implications.

Type	Male	Female	Group	Total
Affiliative	43	12	6	61
De-escalative	28	4	0	32
Power	16	3	1	20
Total	87	19	7	113

Figure 1: This table displays the counts of each type of laughter by gender of the person laughing. Group laughter is separated into its own column as no individual laugher’s gender could be identified in those instances.

Type	White	Black	Asian	Latinx	Total
Affiliative	47	10	1	1	59
De-escalative	25	2	1	0	28
Power	14	5	0	0	19
Total	86	17	2	1	106

Figure 2: This table displays the counts of each type of laughter by race of the person laughing. Group laughter is removed from this table as no individual laugher’s race could be identified in those instances.

Type	30-39	40-49	50-59	60-69	70-79	80+	Total
Affiliative	2	3	16	17	11	6	55
De-escalative	0	3	3	16	8	2	32
Power	1	3	1	7	6	1	19
Total	3	9	20	40	25	9	106

Figure 3: This table displays the counts of each type of laughter by age (years) of the person laughing. Group laughter is removed from this table as no individual laugher’s age could be identified in those instances.

Induced Data

In addition to the natural samples of laughter from C-SPAN, Zoom studies designed to elicit the three main types of laughter were conducted. These studies were important for within-subject acoustic analysis because they produced recordings of all three types of laughter from the same participant.

Induced Data Collection

14 college students consented to participate in and share the audio recordings of a Zoom study. Every participant was between the ages of 18-22. The participants went through a series of carefully curated exercises designed to elicit archetypal examples of the three categories of laughter: affiliative, de-escalative, and power. I served as a facilitator for each study to maintain consistent delivery of instructions. To ensure each exercise properly encouraged the intended type of laughter, small tweaks were made along the way based on the previous responses from participants.

Affiliative laughter. The activity related to affiliative laughter involved participants rating a series of puns on a scale from 1 to 10, with 1 being the least funny and 10 being the most funny. This exercise aligns with the goal of eliciting affiliative laughter because the puns are funny, harmless jokes and can function as a tool to bond the participant and the facilitator.

De-escalative laughter. The exercise to induce de-escalative laughter entailed reading passages of the popular erotic novel *Fifty Shades of Grey* by E.L. James. This exercise goes along with the idea that de-escalative laughter results from an individual releasing discomfort as reading a sexual passage aloud can be embarrassing. The initial passage was longer and then after the first few sessions, the exercise switched to shorter quotes from *Fifty Shades of Grey* to elicit more de-escalative laughter and align with previous work in the field (Skowronek and Schweitzer 2018).

Power. There was originally one power exercise, in which participants were asked to take on the role of a college admissions officer and read through an application essay out loud and then determine whether they would choose to accept or reject the applicant to a prestigious university. This essay was pulled from a list of examples of “The Very Worst College Application Essays” published by Fort Thomas Independent Schools (n.d.). The idea behind this exercise was to put participants in a position of power to be able to ridicule the applicant, thus encouraging the power type of laughter. After a couple of pilots, it became unclear whether participants were laughing *at* the applicant or *with* the applicant, so the wording was altered to make the writing itself less humorous while still maintaining a poor quality.

To ensure we fully tested for power laughter, an additional exercise was added where participants watched a series of America’s Funniest Home Video fails in which someone injures themselves. This viewing exercise fit squarely within the power laughter dynamic as it prompted direct laughter at the expense of the people in the video.

Exercise Order. While the first couple of pilots went through the exercises in the order of 1) affiliative, 2) de-escalative, and 3) power, this was altered to avoid participants assuming the study was related to laughter or humor with the puns being first. The conclusive order moving forward with the studies was: 1) power exercises as a neutral starting point, 2) the de-escalative exercise to encourage embarrassment, and 3) the light-hearted affiliative exercise.

Induced Data Analysis

After the participants completed the exercises, their Zoom recordings were downloaded. I noted the start and end-time stamps of the bouts of laughter as well as the corresponding classification. Again, bouts were defined to encompass both multi-bursts (“ha ha ha”) and single burst (“ha”) instances of laughter, aligning with previous acoustic analysis work (Wood 2020). Overall, the interviews averaged about 10.5 minutes long. Figure 4 shows that 13 participants laughed and 7 demonstrated all three types of laughter. There were 124 total bouts of laughter in the recordings.

Laughter	Affiliative	De-escalative	Power	Total
A	9	4	8	21
B	3	1	4	8
C	1	4	2	7
D	2	4	9	15
E	1	10	10	21
F	6	2	4	12
G	4	3	5	12
H	4	2	0	6
I	3	0	1	4
J	5	0	3	8
K	5	0	0	5
L	0	0	4	4
M	0	1	0	1
N	0	0	0	0
Total	43	31	50	124

Figure 4: *This table shows the counts of the different types of laughter from each participant.*

The audio recordings of the studies were analyzed in R to report out acoustic summaries of the bouts of laughter. The R script identified the laughter bouts within the audio files and extracted features of energy/loudness (dB) and pitch (Hz), showcasing the results as time series plots and outputting csv files. Figures 5 and 6 serve as examples of the time-series plot outputs that display the acoustic features (blue = energy, red = pitch) for an individual bout of laughter.

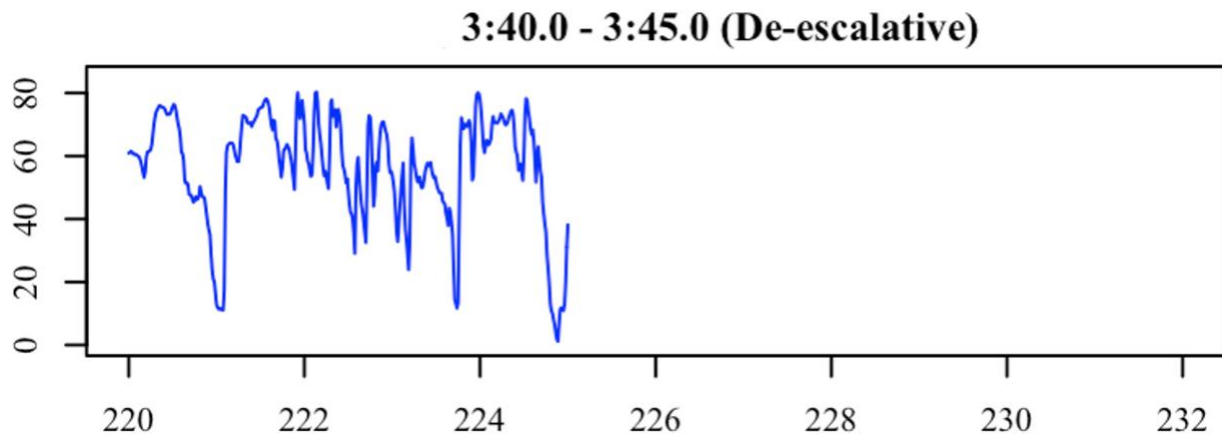


Figure 5: This image showcases the energy (dB) over time (seconds) in a specific de-escalative bout from participant A.

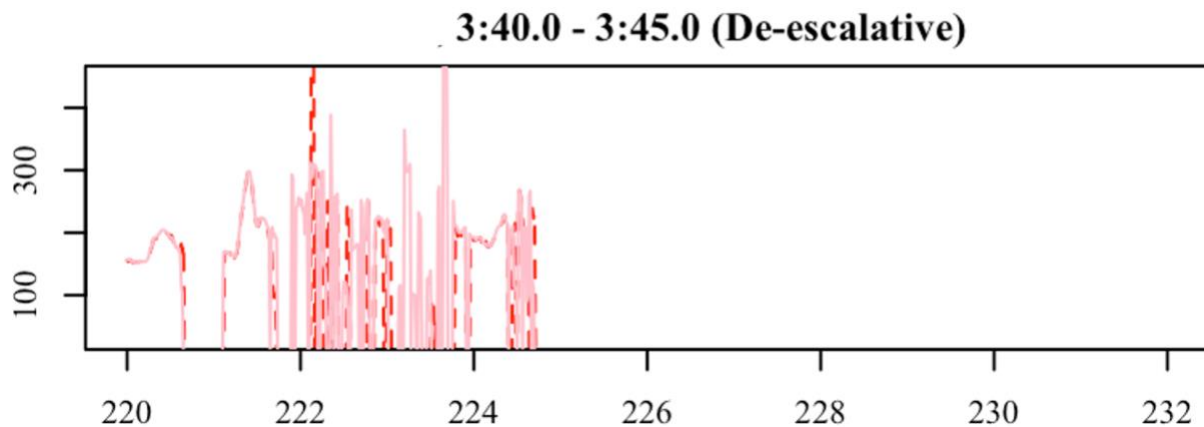


Figure 6: This image showcases the pitch (Hz) over time (seconds) in a specific de-escalative bout from participant A.

Both summary and within-subject analyses were conducted, specifically looking at average pitch, average energy, duration (bout stop-time minus bout start-time) and proportion of silence in a bout (percentage of time during a bout where loudness was above background-noise level).

FINDINGS

C-SPAN Laughter Classification

Analysis of the demographic information of the C-SPAN laughter clips is telling. Most broadly, and as indicated above in Figures 1-3, the sample of laughers was predominantly male, white, and middle-aged, reflective of the demographic breakdown of Congress. As shown in Figure 7 below, a comparison of the relative frequency of each type of laughter suggests women more commonly use affiliative laughter than men and that group laughter is nearly always affiliative. The 86% of group laughter being affiliative suggests that people predominantly laugh together to express mirth and signal collaboration. This aligns with existing research in the field that explains affiliative laughter is contagious (Provine 1992). Figure 8 considers the breakdown of type of laughter by race. Asian and Latinx representation is so low (N=2, N=1) that findings about these groups' use of laughter cannot be considered conclusive. That said, the findings for white and Black people showcase that affiliative laughter is used at a similar frequency, but de-escalative laughter takes up a larger proportion of laughter instances for white people and power laughter takes up a larger proportion of laughter instances for Black people. Age is another interesting demographic to look at. The majority of laughers in this sample are between 50 and 80 years old. As shown in Figure 9, N is low for the younger and older age brackets. No clear trends seem to exist in terms of age and use of the different types of laughter.

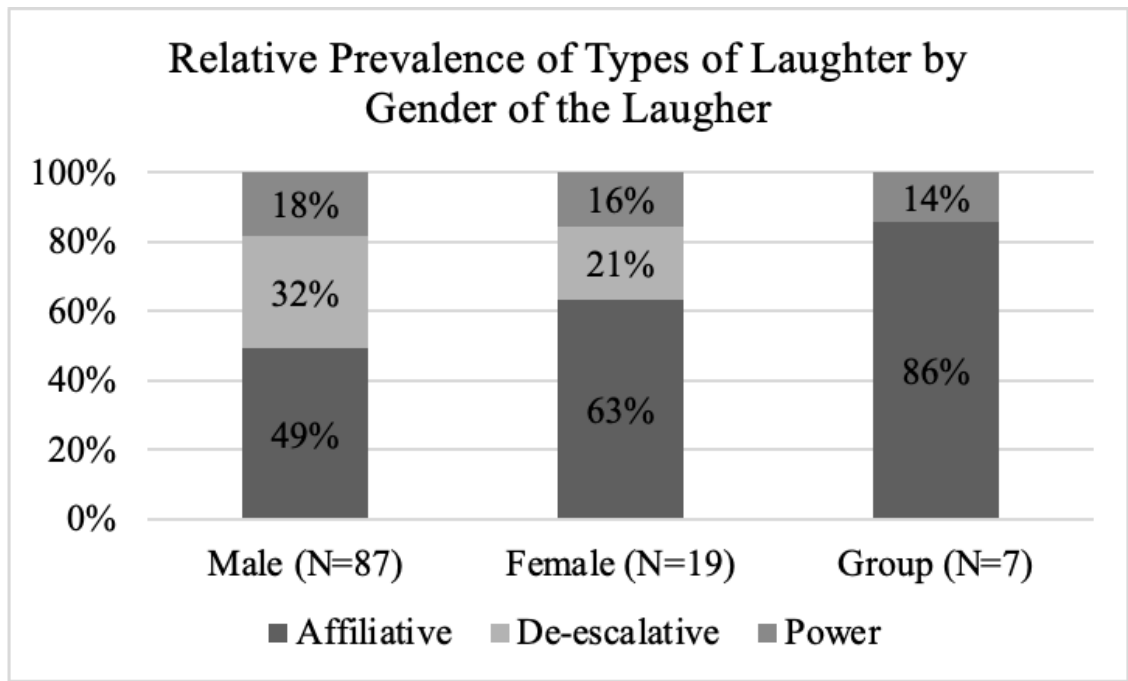


Figure 7: This chart displays the relative representation of each type of laughter by gender of the laugher.

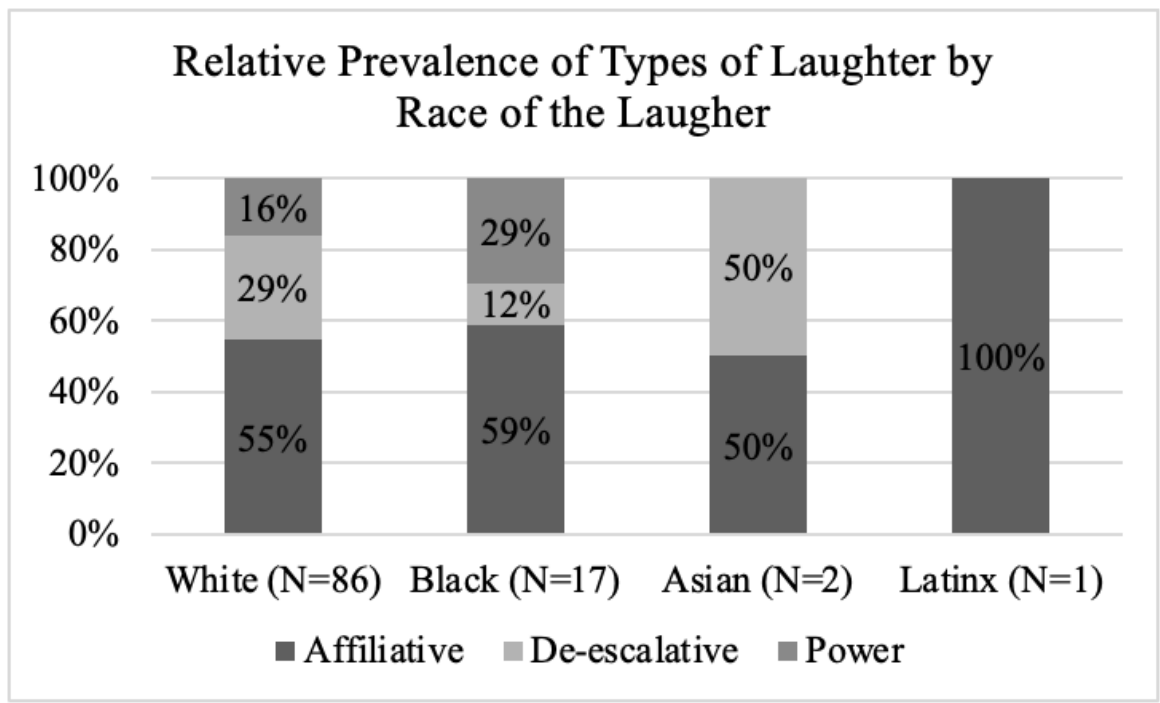


Figure 8: This chart displays the relative difference in the representation of each type of laughter by race of the laugher.

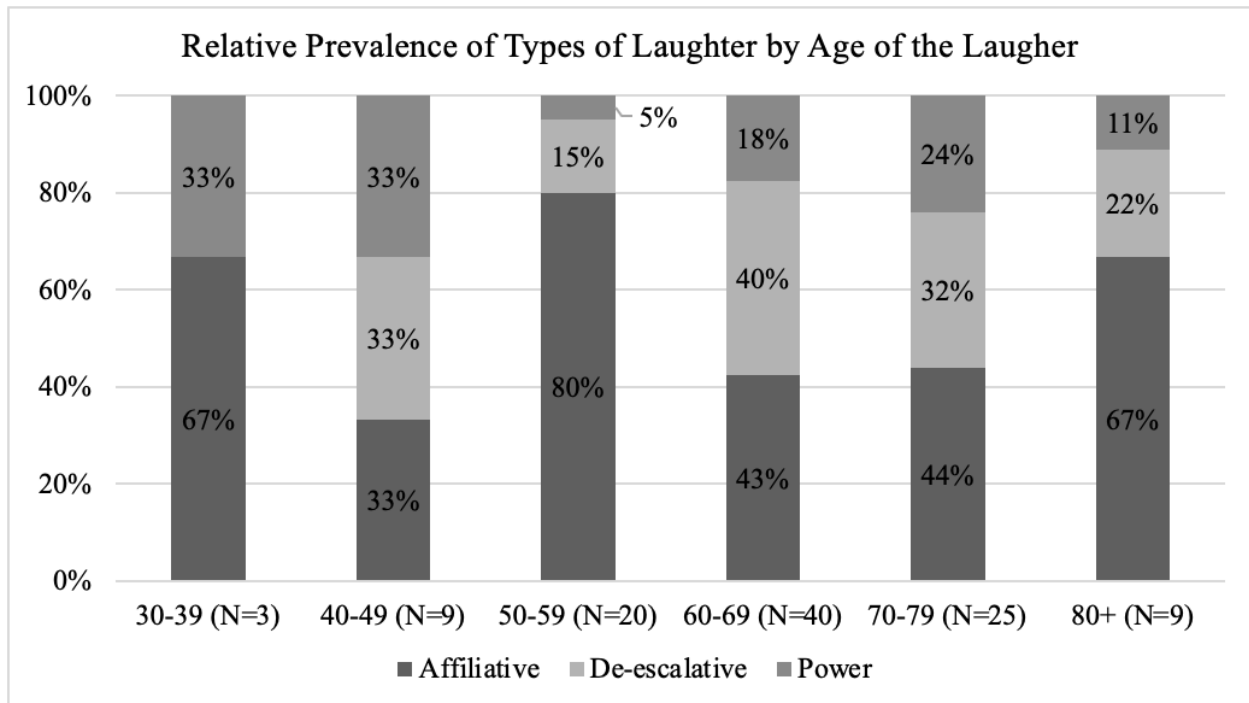


Figure 9: This chart displays the relative difference in the representation of each type of laughter by age of the laugher.

Figure 10 shows that affiliative laughter makes up a larger portion of the bouts agreed upon (56%) than disagreed on (41%), suggesting it is the most easily identifiable. On the other hand, power laughter takes up 35% of the disagreed instances compared to only 15% of the agreed bouts, suggesting there are certain dynamics with power laughter that make it more difficult to classify and identify. Figure 11 shows that the RAs agreed ever so slightly more on laughter that came from men than female and group laughter. While this difference is small and the sample is highly skewed towards male laughter, it is interesting to consider the possibility of a gendered phenomenon making it easier for the RAs (all male) to code male laughter than female or group laughter.

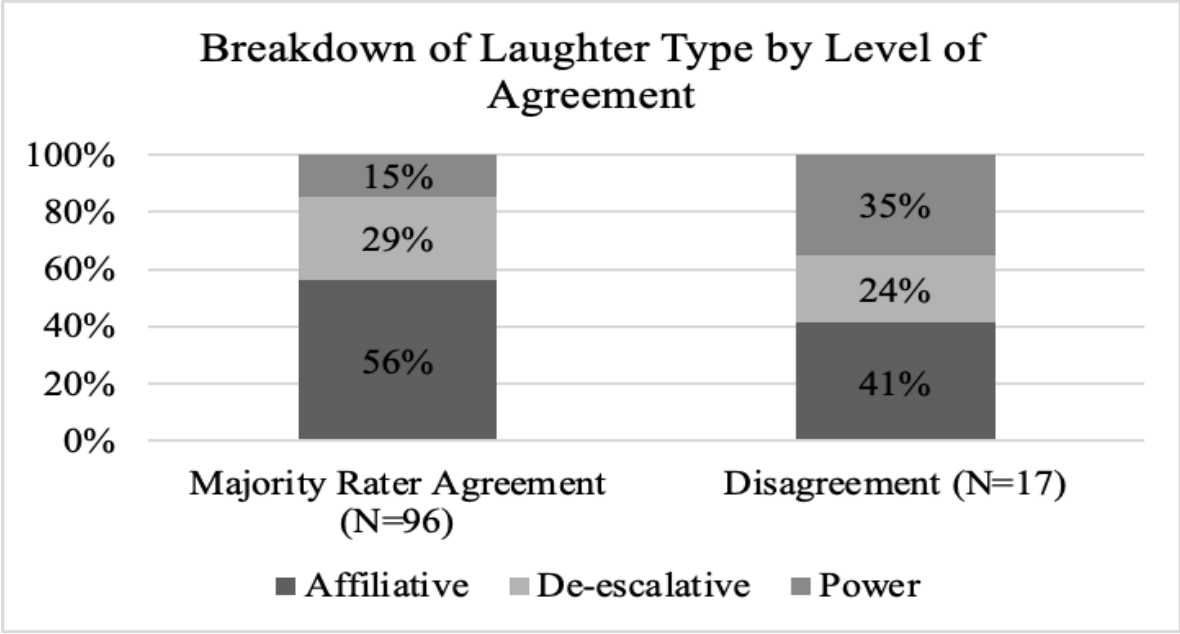


Figure 10: This chart displays the relative difference in the representation of each type of laughter in the sample of laughter with 2/3 agreement vs. the sample of laughter that used an expert tiebreaker.

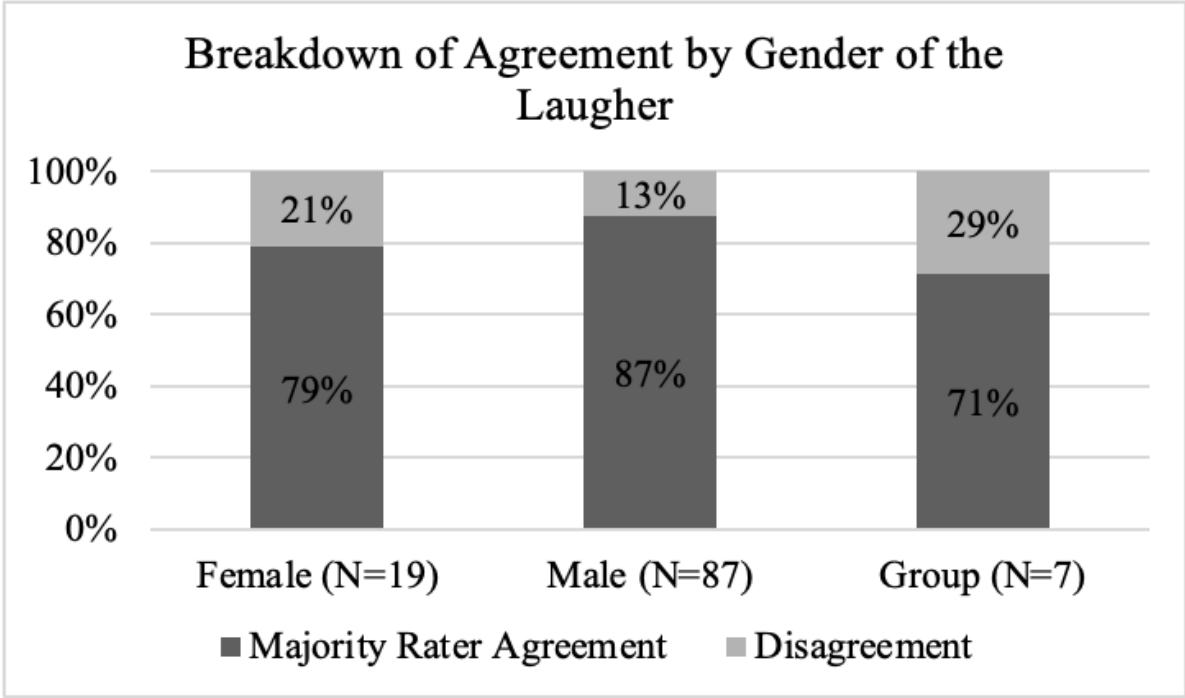


Figure 11: This chart displays the relative difference in agreement (2/3 RAs agree) vs. Disagreement (4th tie-breaker necessary) by gender of the laughter.

These findings related to the ease of classifying each type of laughter align with the RAs' self-reports of difficulty (Figure 12). The average classification difficulty for any of the types of laughter was at most between “somewhat easy” and “neither easy nor difficult” (i.e., 3 and 4 on the Likert scale). Within that, all three RAs found affiliative laughter to be the easiest to classify and power to be the most difficult (although RA #1 deemed power and de-escalative laughter to be equally as difficult).

RA	Affiliative	De-escalative	Power
1	3.22	3.47	3.47
2	2.31	2.50	3.37
3	1.78	2.63	2.95

Figure 12: This table shows the average classification difficulty each rater assigned to the three types of laughter (1 being extremely easy and 7 being extremely difficult).

Zoom Study Acoustic Analysis

Acoustic analyses were conducted on the Zoom study recordings. Figure 13 shows that in this sample of induced laughter, on average, males exhibited more power and de-escalative laughter than females, whereas females exhibited more affiliative laughter. That said, these differences in average count of each type of laughter are not statistically significant (ANOVA tests showed p-values > 0.05), so we cannot conclude that gender influences the frequency of each type of laughter. Taking this finding that there were no significant gender differences in the frequency of laughter forward, we can move to the analysis of the acoustic features of laughter.

	Affiliative	De-escalative	Power
Female (N=10)	3.60	1.40	3.10
Male (N=4)	1.75	4.25	4.75

Figure 13: This table shows the average number of an individual's instances of each laughter type by gender.

Overall summary statistics of the acoustic analyses are shown in Figure 14. It is important to note that an energy reading below 40dB is considered to be silence (background noise), so the timestamps in which the energy was below 40dB were removed from the average pitch and average energy metrics (“Noise Level Chart: DB Levels of Common Sounds”). The duration metrics were calculated based on the bout’s end-time minus its start-time. The proportion of voiced laughter vs. silence was calculated based on the percentage of time during the bout during which the energy level was above 40dB. This initial analysis of the Zoom recordings makes it clear that individual bouts are short, with the average duration of the 124 instances of the three types of laughter sitting at 1.95 seconds. Affiliative laughter appears to be slightly shorter on average (1.63 seconds) than de-escalative (2.23 seconds) and power (2.06 seconds) laughter. As Figure 14 displays, the overall summary suggests the average pitch is highest for power and lowest for affiliative laughter. The average loudness of the three types of laughter looks to be relatively consistent. Affiliative bouts seem to have the most silence compared to de-escalative and power laughter, suggesting that when individuals express affiliative laughter, there may be more pauses in the delivery (i.e., punctuations).

	Affiliative (N=43)	De-escalative (N=31)	Power (N=50)
Average Pitch (Hz)	45.28	54.26	58.16
Average Energy (dB)	58.21	62.18	61.43
Average Duration (s)	1.63	2.23	2.06
Average % of Voiced Laughter	58%	72%	73%

Figure 14: This table displays the summary analysis of all of the bouts of laughter from the induced data.

While these summary statistics are helpful, within-subject analyses of the seven participants who showcased all three types of laughter are most relevant considering the varied

nature of laughter amongst individuals. Figure 15 showcases the p-values from ANOVA tests to determine whether there are significant differences in the acoustic features of the three types of laughter. Given a significance level of 0.05, the highlighted p-values in the table indicate that the difference in averages across the three types of laughter are statistically significant. Laughers A and B were the only participants to exhibit significant differences across the types of laughter. Laughter A's results indicate laughter type affects pitch and proportion of voiced laughter. Laughter B's results indicate that laughter type affects pitch, energy, and proportion of voiced laughter.

Laughter	Average Pitch (Hz)	Average Energy (dB)	Average Duration (s)	Average % of Voiced Laughter
A (N=21)	0.038	0.129	0.610	0.028
B (N=8)	0.001	0.008	0.680	0.001
C (N=7)	0.917	0.991	0.926	0.343
D (N=15)	0.550	0.870	0.721	0.644
E (N=21)	0.564	0.278	0.977	0.686
F (N=12)	0.483	0.711	0.417	0.316
G (N=12)	0.851	0.377	0.465	0.197

Figure 15: This table displays the ANOVA p-values for the seven laughers who showcased all three types of laughter. It compares the average acoustic feature values for the three types of laughter for each laugher and determines whether the differences in means are statistically significant.

Further t-tests indicate that for Laughter A, the difference in pitch means stems from affiliative laughter being significantly lower than de-escalative (two-tail $p = 0.049$, one-tail $p = 0.024$) and power (two-tail $p = 0.029$, one-tail $p = 0.015$) laughter, and the difference in proportion of voiced laughter stems from affiliative laughter being significantly more silent than power laughter (two-tail $p = 0.010$, one-tail $p = 0.005$). For Laughter B, the difference in pitch and energy means can be attributed to affiliative laughter being significantly lower than power

laughter (pitch: two-tail $p = 0.0002$, one-tail $p = 0.001$; energy: two-tail $p = 0.030$, one-tail $p = 0.015$), and the difference in proportion of voiced laughter can be attributed to affiliative laughter being significantly more silent than power laughter (two-tail $p = 0.001$, one-tail $p = 0.001$). Comparing these two laughers' samples, the findings indicate 1) affiliative laughter tends to be lower in pitch than the other types of laughter, and 2) affiliative laughter may have more silence (i.e., be more punctuated) than power laughter. This second indication aligns with existing research that explains dominant laughs (i.e., power laughter bouts) tend to be more uninhibited (i.e., more voiced) than submissive (i.e., de-escalative or affiliative) laughs (Oveis et. al 2016).

While the findings for Laughers A and B are interesting, the ANOVA tests show that the difference of means for average pitch, average energy, average duration, and average proportion of voiced laughter are not significant across all participants (5/7 showed no significant difference for any of the acoustic properties). The results from these ANOVA tests are not consistent with the initial hypothesis that affiliative, de-escalative, and power laughter differ in their acoustic properties.

DISCUSSION

Research Discussion

This research sought to shed light onto whether individuals can identify the three main types of laughter: affiliative, de-escalative, and power. The findings indicate people are able to classify laughter when given its proximal context and in turn, this research solidified a data set of classifications of laughter based on the real-world clips from C-SPAN. This data set contributes to the larger discussion of laughter as current classifications are limited to center around authentic vs. inauthentic uses (Gervais and Wilson 2005, Scott et al. 2014). The nuanced demographic analyses of the classification brought forth the idea that, in addition to individual personality differences, there may be elements of socialization that impact the type of laughter individuals tend to display. For example, research suggests younger women tend to laugh more frequently than older women (Martin and Kuiper 2009) and observational studies show women laugh comparatively more than men no matter their audience (Provine 1993). Discussion of how and why laughter use may differ amongst groups can be supported and expanded with this more specific classification of the three types of laughter.

The classification process suggests affiliative laughter is the most easily identifiable, which aligns with its role as the most commonly cited definition of laughter. Power laughter, on the other hand, seems to be the most difficult to identify, perhaps because of its inherent social nature (e.g., someone in power laughing at the expense of someone else).

This question of identifiability brings about the idea of whether acoustic features can be used to differentiate the types of laughter. While the analyses of the participants who demonstrated all three types of laughter showed a few statistically significant differences in

average acoustic properties across laughter types, these differences were not significant across the board and therefore are inconclusive. The findings indicate that acoustic features (pitch, energy, duration, proportion voiced vs. silence) are not significantly different for the different types of laughter. The lack of significant differentiation of acoustic features amongst laughter types suggests that acoustic features alone are not enough to classify laughter and instead, individuals rely predominantly on social context (e.g., visual cues, audience reaction, proximal language) to identify and categorize laughter.

Limitations

Classification of Laughter

All of the clips of laughter used in the classification process came from Congressional Committee recordings on C-SPAN. While this consistency was helpful, this setting may not be representative of all environments in which laughter is displayed. The professional nature of these meetings and the formal power dynamics in place could impact the use of laughter in communication. For example, power laughter may be more well-represented in this sample.

Acoustic Analysis of Laughter

All of the induced data recordings were from Zoom given Covid-19 restrictions. This Zoom dynamic could have implications on the prevalence of laughter since laughter is a social form of communication. Had the studies been conducted live, perhaps the frequency of laughter would have been higher, providing more data points and increasing the power of the study. Additionally, the participants were recruited through word-of-mouth, meaning I was familiar with them and vice versa. This level of familiarity may have influenced the frequency of each type of laughter. For example, a participant mentioned they did not feel as embarrassed reading

aloud the *Fifty Shades of Grey* passages because they were comfortable around me. Furthermore, the exercises designed to elicit the archetypes of the three categories of laughter may not have encompassed all the different potential sounds of each type of laughter. For example, the affiliative laughter exercise was based on individuals' responses to puns and it is possible that people's responses to puns are less intense (e.g., lower pitch and energy, more punctuated) than laughing at other types of jokes given puns have a connotation of being cheesy.

Future Research

This paper introduces several areas of further study. While this research suggests there are three main types of laughter, exploration of how these types of laughter can be used genuinely and disingenuously in conversation is a next step. This further exploration could spark additional discussion of the pro-social behaviors related to laughter. Also, this research hints at the idea that one's identity influences the type of laughter they invoke so continued study of the social dynamics of different groups (i.e., gender, age, race, sexuality) is suggested. These two areas of further research relate to the perception of laughter. Researchers may choose to explore what the use of each type of laughter does to shape others' perceptions of both a conversation and of the person laughing. Some preliminary questions could relate to the perceived veracity, warmth, and power of the laughter.

Additionally, expanding the analysis of the acoustic functions of laughter could help in the exploration of the interpersonal effects of laughter as any differences in the sound of the different types of laughter could inform, beyond the social context, why and how laughter is classified and perceived. This research analyzed induced laughter so increasing the sample size of recordings of induced laughter would increase the power of the study. Furthermore, within-

subject acoustic analysis of naturalistic laughter bouts would be a logical next step. Beyond expanding the dataset of recordings (both induced and natural), further analyses of different acoustic features could shed additional insight. Some suggestions include studying variance, # of loudness peaks, and slopes of the pitch and energy of the bouts of the different types of laughter. Additionally, multinomial logistic regression analyses could provide understanding of how the acoustic functions of laughter can perhaps predict its classification.

Furthermore, while laughter itself functions importantly in social interactions, the absence of laughter is another area of interest. For example, an infamous example of a failed attempt at humor occurred when attorney Jay Floyd said “Mr. Chief Justice and may it please the Court. It’s an old joke, but when a man argues against two beautiful ladies like this, they are going to have the last word.” This poor attempt at a joke was met with silence while Floyd intended to pause for laughter (Malphurs 2010). Researchers could explore situations like these to determine what this silence indicates.

REFERENCES

- Addyman, Caspar, Charlotte Fogelquist, Lenka Levakova, and Sarah Rees. "Social Facilitation of Laughter and Smiles in Preschool Children." *Frontiers in Psychology* 9 (2018). doi:10.3389/fpsyg.2018.01048.
- Adelswärd, Viveka, and Britt-Marie Öberg. "The Function of Laughter and Joking in Negotiation Activities." *Humor - International Journal of Humor Research* 11, no. 4 (1998). doi:10.1515/humr.1998.11.4.411.
- Bachorowski, Jo-Anne, and Michael J. Owren. "Not All Laughs Are Alike: Voiced but Not Unvoiced Laughter Readily Elicits Positive Affect." *Psychological Science* 12, no. 3 (2001): 252-57. doi:10.1111/1467-9280.00346.
- Bachorowski, Jo-Anne, Moria J. Smoski, and Michael J. Owren. "The Acoustic Features of Human Laughter." *The Journal of the Acoustical Society of America* 110, no. 3 (September 2001): 1581-597. doi:10.1121/1.1391244.
- Bardon, Adrian. "The Philosophy of Humor." In *Comedy: A Geographic and Historical Guide*, 462-76. Vol. 2. Westport, CT: Praeger, 2005.
- Baumeister, Roy, and Mark Leary. "The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation." *Psychological Bulletin* 117, no. 3 (1995): 497-529. doi:10.1037/0033-2909.117.3.497.
- Billig, Michael. *Laughter and Ridicule: Towards a Social Critique of Laughter*. London: Sage Publications, 2005.
- Bitterly, T. Bradford, Alison Wood Brooks, and Maurice E. Schweitzer. "Risky Business: When Humor Increases and Decreases Status." *Journal of Personality and Social Psychology* 112, no. 3 (2017): 431-55. doi:10.1037/pspi0000079.
- Bitterly, T. Bradford, and Maurice E. Schweitzer. "The Impression Management Benefits of Humorous Self-disclosures: How Humor Influences Perceptions of Veracity." *Organizational Behavior and Human Decision Processes* 151 (2019): 73-89. doi:10.1016/j.obhdp.2019.01.005.
- Bluhm, Dustin J., Wendy Harman, Thomas W. Lee, and Terence R. Mitchell. "Qualitative Research in Management: A Decade of Progress." *Journal of Management Studies* 48, no. 8 (2010): 1866-891. doi:10.1111/j.1467-6486.2010.00972.x.
- Bonin, Francesca, Nick Campbell, and Carl Vogel. "Time for Laughter." *Knowledge-Based*

- Systems* 71 (2014): 15-24. doi:10.1016/j.knosys.2014.04.031.
- Brooks, Alison Wood. "Emotion and the Art of Negotiation." *Harvard Business Review*. September 10, 2020. Accessed October 10, 2020. <https://hbr.org/2015/12/emotion-and-the-art-of-negotiation>.
- Butler, John K., and R. Stephen Cantrell. "A Behavioral Decision Theory Approach to Modeling Dyadic Trust in Superiors and Subordinates." *Psychological Reports* 55, no. 1 (1984): 19-28. doi:10.2466/pr0.1984.55.1.19.
- Curran, William, Gary McKeown, Magdalena Rychlowska, Elisabeth André, Johannes Wagner, and Florian Lingenfelser. "Social Context Disambiguates the Interpretation of Laughter." *Frontiers in Psychology* 8, no. 2342 (2018). doi:10.3389/fpsyg.2017.02342.
- Darwin, Charles. "Joy, High Spirits, Love, Tender Feelings, Devotion." In *The Expression of the Emotions in Man and Animals*, 196-219. New York, NY: D. Appleton & Company, 1872.
- Davies, Christie. "Humor Theory and the Fear of Being Laughed at." *Humor - International Journal of Humor Research* 22, no. 1-2 (2009). doi:10.1515/humr.2009.003.
- Devillers, Laurence, and Laurence Vidrascu. *Positive and Negative Emotional States Behind the Laughs in Spontaneous Spoken Dialogs*. Interdisciplinary Workshop on The Phonetics of Laughter. August 2007. Accessed 2021. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.433.8826&rep=rep1&type=pdf>.
- Dunbar, R. I. M., Rebecca Baron, Anna Frangou, Eiluned Pearce, Edwin J. C. Van Leeuwen, Julie Stow, Giselle Partridge, Ian Macdonald, Vincent Barra, and Mark Van Vugt. "Social Laughter Is Correlated with an Elevated Pain Threshold." *Proceedings of the Royal Society B: Biological Sciences* 279, no. 1731 (2011): 1161-167. doi:10.1098/rspb.2011.1373.
- Freud, Sigmund. *Jokes and Their Relation to the Unconscious*. Translated by James Strachey. New York, NY: W. W. Norton, 1960.
- Gervais, Matthew, and David Sloan Wilson. "The Evolution And Functions Of Laughter And Humor: A Synthetic Approach." *The Quarterly Review of Biology* 80, no. 4 (2005): 395-430. doi:10.1086/498281.
- Glenn, Phillip J. "Initiating Shared Laughter in Multi-party Conversations." *Western Journal of*

- Speech Communication* 53, no. 2 (1989): 127-49. doi:10.1080/10570318909374296.
- Glenn, Phillip J. "Current Speaker Initiation of Two-party Shared Laughter." *Research on Language and Social Interaction* 25, no. 1-4 (1991): 139-62.
doi:<https://doi.org/10.1080/08351819109389360>.
- Glenn, Phillip J. "Interviewer Laughs: Shared Laughter and Asymmetries in Employment Interviews." *Journal of Pragmatics* 42, no. 6 (2010): 1485-498.
doi:<https://doi.org/10.1016/j.pragma.2010.01.009>.
- Hart, Einav, Eric M. Vanepps, and Maurice E. Schweitzer. "The (better than Expected) Consequences of Asking Sensitive Questions." *Organizational Behavior and Human Decision Processes* 162 (2021): 136-54. doi:10.1016/j.obhdp.2020.10.014.
- Heggie, Betty-Ann. "The Healing Power of Laughter." *Journal of Hospital Medicine* 14, no. 5 (May 2019). doi:10.12788/jhm.3205.
Children laugh 400/day and adults laugh 15/day on average
- Hepburn, Alexa, and Galina B. Bolden. "Transcribing Aspiration and Laughter." In *Transcribing for Social Research*, 65-80. Sage Publications, 2017.
- Hepburn, Alexa, and Scott Varney. "Beyond (Laughter)." *Studies of Laughter in Interaction*, January 2013. doi:10.5040/9781472542069.ch-002.
- Keltner, Dacher, and George A. Bonanno. "A Study of Laughter and Dissociation: Distinct Correlates of Laughter and Smiling During Bereavement." *Journal of Personality and Social Psychology* 73, no. 4 (1997): 687-702. doi:10.1037/0022-3514.73.4.687.
- Knight, Chris, and Jerome Lewis. "Vocal Deception, Laughter, and the Linguistic Significance of Reverse Dominance." *The Social Origins of Language*, 2014, 297-314.
doi:10.1093/acprof:oso/9780199665327.003.0021.
- Kurtz, Laura E., and Sara B. Algoe. "When Sharing a Laugh Means Sharing More: Testing the Role of Shared Laughter on Short-Term Interpersonal Consequences." *Journal of Nonverbal Behavior* 41, no. 1 (2016): 45-65. doi:10.1007/s10919-016-0245-9.
- Lackner, Helmut K., Katharina Reiter-Scheidl, Nilüfer Aydin, Corinna M. Perchtold, Elisabeth M. Weiss, and Ilona Papousek. "Laughter as a Social Rejection Cue: Influence of Prior Explicit Experience of Social Rejection on Cardiac Signs of "freezing"." *International Journal of Psychophysiology* 128 (2018): 1-6. doi:10.1016/j.ijpsycho.2018.03.022.
- Levine, Emma E., T. Bradford Bitterly, Taya R. Cohen, and Maurice E. Schweitzer. "Who Is

- Trustworthy? Predicting Trustworthy Intentions and Behavior." *Journal of Personality and Social Psychology* 115, no. 3 (2018): 468-94. doi:10.1037/pspi0000136.
- Lintott, Sheila. "Superiority in Humor Theory." *Journal of Aesthetics and Art Criticism*, 2016, 347-58.
- Maemura, Yu, and Masahide Horita. "Humour in Negotiations: A Pragmatic Analysis of Humour in Simulated Negotiations." *Group Decision and Negotiation* 21, no. 6 (2011): 821-38. doi:10.1007/s10726-011-9251-9.
- Malphurs, Ryan. "The Function of Laughter at the U.S. Supreme Court." *Communication Law Review* 10, no. 2 (2010).
- Martin, Rod A., and Nicholas A. Kuiper. "Daily Occurrence of Laughter: Relationships with Age, Gender, and Type A Personality." *Humor* 12, no. 4 (1999). doi:10.1515/humr.1999.12.4.355.
- Martin, Rod A., and Thomas E. Ford. *The Psychology of Humor: An Integrative Approach*. London, United Kingdom: Academic Press, an Imprint of Elsevier, 2018.
- Mayer, Roger C., James H. Davis, and F. David Schoorman. "An Integrative Model of Organizational Trust." *The Academy of Management Review* 20, no. 3 (1995): 709. doi:10.2307/258792.
- McHugh, Marry L. "Interrater Reliability: The Kappa Statistic." *Biochemia Medica* 22, no. 3 (2012): 276-82. doi:10.11613/bm.2012.031.
- Mckeown, Gary, Ian Sneddon, and William Curran. "Gender Differences in the Perceptions of Genuine and Simulated Laughter and Amused Facial Expressions." *Emotion Review* 7, no. 1 (2014): 30-38. doi:10.1177/1754073914544475.
- Morreall, John. *Taking Laughter Seriously*. NY: State University of New York Press, 1983.
- Nesi, Hilary. "Laughter in University Lectures." *Journal of English for Academic Purposes* 11, no. 2 (2012): 79-89. doi:10.1016/j.jeap.2011.12.003.
- "Noise Level Chart: DB Levels of Common Sounds." Noise Help. 2019. Accessed April 04, 2021. <https://www.noisehelp.com/noise-level-chart.html>.
- Oveis, Christopher, Aleksandr Spectre, Pamela K. Smith, Mary Y. Liu, and Dacher Keltner. "Laughter Conveys Status." *Journal of Experimental Social Psychology* 65 (2016): 109-15. doi:10.1016/j.jesp.2016.04.005.
- Polimeni, Joseph. "Jokes Optimise Social Norms, Laughter Synchronises Social Attitudes: An

- Evolutionary Hypothesis on the Origins of Humour." *The European Journal of Humour Research* 4, no. 2 (2016). doi:10.7592/ejhr2016.4.2.polimeni.
- Pratt, Michael G. "From the Editors: For the Lack of a Boilerplate: Tips on Writing Up (and Reviewing) Qualitative Research." *Academy of Management Journal* 52, no 5 (2017). doi: 10.5465/amj.2009.44632557.
- Prinstein, Mitchell J. *Popular: The Power of Likability in a Status-obsessed World*. NY, NY: Penguin Random House LLC, 2017.
- Provine, Robert R. "Contagious Laughter: Laughter Is a Sufficient Stimulus for Laughs and Smiles." *Bulletin of the Psychonomic Society* 30, no. 1 (1992): 1-4. doi:10.3758/bf03330380.
- Provine, Robert R. "Laughter." *American Scientist* 84, no. 1 (February 1996): 38-45. Accessed September 27, 2020. <https://www.jstor.org/stable/29775596?seq=1>.
- Provine, Robert R. "Laughter Punctuates Speech: Linguistic, Social and Gender Contexts of Laughter." *Ethology* 95, no. 4 (December 1993): 291-98.
- Provine, Robert R. "Laughing, Tickling, and the Evolution of Speech and Self." *Current Directions in Psychological Science* 13, no. 6 (December 2004): 215-18. doi:10.1111/j.0963-7214.2004.00311.x.
- Provine, Robert R., and Karen Emmorey. "Laughter Among Deaf Signers." *Journal of Deaf Studies and Deaf Education* 11, no. 4 (2006): 403-09. doi:10.1093/deafed/enl008.
- Provine, Robert R., and Yvonne L. Yong. "Laughter: A Stereotyped Human Vocalization." *Ethology* 89, no. 2 (2010): 115-24. doi:10.1111/j.1439-0310.1991.tb00298.x.
- Rempel, John K., Michael Ross, and John G Holmes. "Trust and Communicated Attributions in Close Relationships." *Journal of Personality and Social Psychology* 81, no. 1 (2001): 57-64. doi:10.1037/0022-3514.81.1.57.
- Ritter, Jan, Carolin Brück, Heike Jacob, Dirk Wildgruber, and Benjamin Kreifelts. "Laughter Perception in Social Anxiety." *Journal of Psychiatric Research* 60 (2015): 178-84. doi:10.1016/j.jpsychires.2014.09.021.
- Rousseau, Denise M., Sim B. Sitkin, Ronald S. Burt, and Colin Camerer. "Not So Different After All: A Cross-Discipline View Of Trust." *Academy of Management Review* 23, no. 3 (1998): 393-404. doi:10.5465/amr.1998.926617.

- Sauter, Disa A., Frank Eisner, Paul Ekman, and Sophie K. Scott. "Emotional Vocalizations Are Recognized Across Cultures Regardless of the Valence of Distractors." *Psychological Science* 26, no. 3 (2015): 354-56. doi:10.1177/0956797614560771.
- Schweitzer, Maurice E., John C. Hershey, and Eric T. Bradlow. "Promises and Lies: Restoring Violated Trust." *Organizational Behavior and Human Decision Processes* 101, no. 1 (2006): 1-19. doi:10.1016/j.obhdp.2006.05.005.
- Scott, Sophie K., Nadine Lavan, Sinead Chen, and Carolyn Mcgettigan. "The Social Life of Laughter." *Trends in Cognitive Sciences* 18, no. 12 (2014): 618-20. doi:10.1016/j.tics.2014.09.002.
- Simpson, Jeffrey A. "Foundations of Interpersonal Trust." In *Social Psychology: Handbook of Basic principles*, 587-607. New York, NY: Guilford Press, 2007).
- Skowronek, Samuel, and Maurice Schweitzer. *S Embarrassment A Moral Emotion? The Prospect and Experience of Embarrassment Promote Antisocial Behavior*. Society for Judgement and Decision Making. 2018.
- The Very Worst College Application Essays*. PDF. Fort Thomas: Fort Thomas Independent Schools.
- Warner-Garcia, Shawn. "Laughing When Nothing's Funny: The Pragmatic Use of Coping Laughter in the Negotiation of Conversational Disagreement." *Pragmatics* 24, no. 1 (2014): 157-80. doi:https://doi.org/10.1075/prag.24.1.07war.
- Wildgruber, Dirk, Jan Ritter, Heike Jacob, and Benjamin Kreifelts. "Perspective Taking during Laughter Perception." *Clinical Neurophysiology* 129, no. 8 (August 2018): 56-57. doi:10.1016/j.clinph.2018.04.630.
- Wood, Adrienne. "Social Context Influences the Acoustic Properties of Laughter." *Affective Science* 1 (November 5, 2020): 247-56. doi:10.31234/osf.io/npk8u.
- Wood, Adrienne, Jared Martin, and Paula Niedenthal. "Towards a Social Functional Account of Laughter: Acoustic Features Convey Reward, Affiliation, and Dominance." *Plos One* 12, no. 8 (2017). doi:10.1371/journal.pone.0183811.
- Zaheer, Akbar, Bill McEvily, and Vincenzo Perrone. "Does Trust Still Matter? Research on the

Role of Trust in Inter-Organizational Exchange." *Handbook of Trust Research*, February 1998, 141-59. doi:10.4337/9781847202819.00024.

APPENDIX

Naturalistic Data Coding Instructions

This assignment entails listening/watching 113 short clips (<20 seconds) of laughter and categorizing the laughter based on your understanding of its meaning. Before you move forward, please consult this document outlining the key steps.

1. **Watch/Listen:** When you open the “LaughterClips” excel sheet, you will see three columns filled out: ID, Link, and Time. Click on the corresponding link and drag your cursor to the time indicated on the sheet to listen to the incidence of laughter.
 - a. You may have to rewind/fast-forward a few seconds to gather the context of the laughter.
 - b. There is no need to watch more than the comment that resulted in the laughter.
 - c. In the vast majority of these clips, the person laughing will be shown on screen but in a few, there is group laughter. If you hear a group laughing and cannot piece out an individual’s mic’d laughter above the crowd, please type “Group” in Column D.
2. **Categorize:** After viewing the incidence of laughter, please fill out Column E, “Type,” with your best conclusion of the type of laughter you just watched using the following definitions.
 - a. Affiliative: Affiliative laughter encompasses laughter as an expression of mirth, a social bonding tool, and a signal of collaboration. This type of laughter is a sign of social acceptance and it develops cooperation amongst individuals (Curran 2018; Wildgruber, Ritter, and Kreifelts 2018).
 - b. De-escalative: With de-escalative laughter, an individual releases discomfort and attempts to de-escalate the stress of a situation (Knight and Lewis 2014). This type of laughter can also be an attempt to signal to others that whatever situation is causing the discomfort is trivial to the person laughing (Polimeni 2015). For example, an individual may laugh at an inappropriate or uncomfortable joke to soothe social tensions and signal that the joke did not offend them.
 - c. Power: Power laughter is associated with the superiority theory. It helps enforce power dynamics by communicating mockery and is often laughter at the expense of someone else (Davies 2009). This type of laughter may come from someone in a position of formal or situational power.
 - d. Other: If you feel the laughter does not fall into the aforementioned categories, please write “Other” and in Column G, “Notes” add a description of the categorization of laughter you have in mind.
3. **Reflection:** In Column F, rate the difficulty of categorizing the laughter on a scale of 1-7, with 1 being extremely easy and 7 being extremely difficult. Feel free to elaborate in the “Notes” column if you wish.

Induced Data Collection Script

Affiliative Laughter

- I was wondering why the ball kept getting bigger and bigger...And then it hit me
- Sometimes I tuck my knees into my chest and lean forward. That’s just how I roll.

- My Grandpa said, "Your generation relies too much on technology!" I replied, "No, your generation relies too much on technology!" Then I unplugged his life support.
- What do you call an elephant that doesn't matter? An irrelephant
- What do you call a fake noodle? An Impasta.
 - *This pun was later replaced due to a lack of elicited laughter: I renamed my phone The Titanic, so when I plug it in, it says "The Titanic is syncing."*
- My ex-wife still misses me. But her aim is starting to improve!
- Who is the penguin's favorite Aunt? Aunt-Artica!
 - *This pun was later replaced due to a lack of elicited laughter: Last night, I dreamed I was swimming in an ocean of orange soda. But it was just a Fanta sea.*
- The past, the present, and the future walk into a bar. It was tense!
- My dad unfortunately passed away when we couldn't remember his blood type. His last words to us were, "Be positive!"
- Coffee has a rough time in our house. It gets mugged every single morning!

De-escalative Laughter

Long passage.

He lunges at me, pushing me against the wall of the elevator. Before I know it, he's got both of my hands in one of his in a vise-like grip above my head, and he's pinning me to the wall using his hips. Holy shit. His other hand grabs my hair and yanks down, bringing my face up, and his lips are on mine. It's only just not painful. I moan into his mouth, giving his tongue an opening. He takes full advantage, his tongue expertly exploring my mouth. I have never been kissed like this. My tongue tentatively strokes his and joins his in a slow, erotic dance that's all about touch and sensation, all bump and grind. He brings his hand up to grasp my chin and holds me in place. I'm helpless, my hands pinned, my face held, and his hips restraining me. His erection is against my belly. Oh my... He wants me.

Short passages.

I moan into his mouth, giving his tongue an opening.

Suddenly, he sits up and tugs my panties off and throws them on the floor. Pulling off his boxer briefs, his erection springs free. Holy cow...

My tongue tentatively strokes his and joins his in a slow, erotic dance that's all about touch and sensation, all bump and grind.

Seeing him on his knees in front of me, feeling his mouth on me, it's so unexpected, and hot. My hands stay in his hair, pulling gently as I try to quiet my too-loud breathing.

His erection is against my belly. Oh my... He wants me.

Oh no... Will it? How?

Power Laughter

Prompt: Why are you interested in your chosen field of study?

Original essay.

Hi! :-)

I want to be a pediatric (baby) marine biologist because I like the ocean, small things, and animals. :-)

Every summer my family and I go to our summer house for July and August and it is near the ocean. This is in Woods Hole, Massachusetts, where there is even a marine biologist museum, and the people inside the museum have cool clothes and they always have shoes that you can't get anywhere else. I call them Marine Biologist shoes. :-)

By the way, I was looking in your course catalog for the marine biologist courses and those courses seem to involve working with fish or things like fish. :-(I'm not really all that interested in fish, I mean I'll take the required fish courses, but what I am really interested in is animals that live in or near the water, except fish. :-(

I like seals, especially baby seals, :-) and whales :-) (Free Willy was so cool, except or part II), and even wet kittens and other small things, like baby dolphins :-)(are they fish? :-). That's why I want to specialize in being a pediatric marine biologist, because animals are cuter when they are little, and probably easier to study. :-)

Call me Rachel,
The Future Pediatric Marine Biologist :-) :-) :-) :-) :-)

Updated Essay.

Hi!

I want to be a pediatric (baby) marine biologist because I like the ocean, small things, and animals.

Every summer my family and I go to our summer house for July and August and it is near the ocean. This is in Woods Hole, Massachusetts, where there is even a marine biologist museum, and the people inside the museum have cool clothes and they always have shoes that you can't get anywhere else. *I call them Marine Biologist shoes.* Wow, I have always loved this museum! The exhibits showed off so many little animals. The lady working there told me I should try to be a pediatric marine biologist.

By the way, I was looking in your course catalog for the marine biologist courses and those courses seem to involve working with fish or things like fish.

I'm not really all that interested in fish, I mean I'll take the required fish courses, but what I am really interested in is animals that live in or near the water, except fish.

I like seals, especially baby seals, and whales (Free Willy was so cool, except for part II), and even wet kittens and other small things, like baby dolphins (are they fish?). That's why I want to specialize in being a pediatric marine biologist, because animals are cuter when they are little, and probably easier to study.

Call me Rachel,
The Future Pediatric Marine Biologist :-)