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Some Structural and Expressive Variations in Performances of Six Grateful Dead Songs

Mark E. Mattson

A truism among musicians and critics is that every musical performance is unique and thus varies from every other performance. For musicians who specialize in improvisation, those variations are the *sine qua non* of their work, regardless of genre. For the Grateful Dead, improvisation lay at the core of their achievement, and the variations in their performances offer fertile ground for analysis by scholars in a wide array of fields. For experimental psychology, the Dead's repertoire and performing career provide a particularly rich body of data to explore questions raised by errors and intentionality. This article focuses on two kinds of intentional variation in performances by the Grateful Dead: structural changes in the arrangement and length of songs, and expressive variations in lyric performances. (A companion paper will cover unintentional variations as performance errors [Mattson, in preparation]).

The songs analyzed in this study are listed in table 1, along with the number and date range of performances. The songs were chosen to rep-

resent different time periods and different types of variation, and for their feasibility, due to a manageable number of performances.

Table 1. Songs and Performances

Song	Composers	Performed	Performances*	Analyzed
"Mason's Children"	Hunter, Garcia, Lesh, Weir	1969–70	19	19
"Doin' That Rag"	Hunter, Garcia, Lesh	1969	41	39
"Comes a Time"	Hunter, Garcia	1971–94	67	67
"Here Comes Sunshine"	Hunter, Garcia	1973–74	32	31
"Here Comes Sunshine"	Hunter, Garcia	1992–95	33	33
"Foolish Heart"	Hunter, Garcia	1988–95	87	87
"Days Between"	Hunter, Garcia	1993–95	41	41

* Source: Scott, Dolgushkin, and Nixon (1999).

There is a long history of research on speech and action errors, from Freud's 1901 "Psychopathology of Everyday Life" to more recent cognitive approaches and error collections (e.g., Fromkin 1973; Norman 1981; Deese 1984; Schütze and Ferreira 2007). My initial motivation in making these observations was to find an ecologically valid way to study speech and action errors to supplement the lab work I had been doing (Baars and Mattson 1981; Mattson 1987; Mattson and Baars 1992), in addition to extending this work to musical performances. Ecological validity is the concern that lab tasks may not reflect the same processes as performances in everyday life. A longstanding problem in analyzing expert musicians or bands has been the lack of comprehensive archives (Palmer 1997). However, with the Internet Archive, we now have access to 9,898 recordings of Grateful Dead performances (as of November 3, 2017), representing the vast majority of the 2,314 concerts listed in the standard reference work *DeadBase* (Scott, Dolgushkin, and Nixon 1999).

Most work on musical performance focuses on Western classical music, where the performance can be judged in relation to a written score (Palmer 1997). Even in classical music, however, performers may deliberately depart from the written score. These expressive variations are even

more common in the musical traditions that the Grateful Dead absorbed and in the approach they created.

I chose to focus on the most audible and obligatory aspects of the performances as a starting point: the lyrics and the overall arrangement. We can assess the lyric performances in three ways: in comparison to the published lyrics (Trist and Dodd 2005); in comparison to all the other performances; and by their internal coherence—does the variation make sense? An expressive variation is a performance that does not match some established standard for performance, but is internally consistent and/or consistent across performances. For example, the published lyric from "Comes a Time"—"I can't see much difference between the dark and the light"—was performed repeatedly as, "I can't see much difference 'tween the dark and light"; it is internally consistent, so it is offered as an expressive variation. We can define an error as a performance that does not match any of these established standards for performance, including expressive variations. An example would be omitting a lyric line or substantial parts of it, which would be categorized as an error. In this way it should be possible to classify most lyric variations as either errors or expressive variations. Those few variations that resist this schema deserve special attention, as they illuminate the boundary issues.

Structural variations are the changes in the arrangement of the lyrics and instrumental sections of the songs. Aside from their value as a context for assessing errors, what is the value of describing some of the structural and expressive variations in Grateful Dead performances? This work should be of most interest to the interdisciplinary community of scholars who study the Grateful Dead, especially musicians, musicologists, philosophers, and those engaged in the study of the lyrics themselves, because it explicates a dimension of Jerry Garcia as a performer: his approach to singing. Structural variations also illustrate the band's approaches to developing songs. Graeme Boone's detailed analysis of structural variations and modal and harmonic shifts in every version of "Dark Star" is a great example of the value of this approach for a song whose essence is variation (2010, 2014). Finally, these variations also highlight some of the band's most unusual and noteworthy performances.

After a short description of the overall method, each song will be

considered separately. First the structural variations are described, then the expressive variations. The expressive variations are further subdivided into variations on open-class vs. closed-class words. Closed-class words are the little words that we stopped adding to our vocabularies in early language learning, such as articles (e.g., "the"), pronouns ("you"), and conjunctions ("and"). We learn and create new nouns, verbs, adjectives, and other open-class words all the time. There is reason to believe that closed- and open-class words are processed differently in speech production. Open-class word variations are more interesting with respect to the meaning of the lyrics, so more context is provided for those variations. Conclusions are summarized in the final section.

Method

My research team and I listened to at least one version of each song from each live performance for which a recording was available, mostly in chronological order, taking notes on variations on a page with the chords and lyrics (one page per performance). I had help on "Foolish Heart" from research assistants Jonathan DePierro and Alexander Rabinovich, but otherwise I did all the listening, coding, and analysis. Whenever possible we used official releases and soundboard recordings accessible at the Internet Archive. The lyrics and structure of the arrangement were the primary focus, as opposed to, for example, variations in harmony singing or solo quality. We backtracked as needed within each performance, and also went back to earlier recordings as needed. When song lengths are reported, these are based on tracks with non-song parts edited out.

"Mason's Children"

Structural Variations

"Mason's Children" is particularly interesting for its structural variations. The song was written after the notorious Altamont music festival (Jackson 1999, 5), which took place December 6, 1969, and the Dead performed it from December 19, 1969, to February 28, 1970, so most of its development can be traced. One kind of variation is the repeated riff, of which there were three. The first known performance of "Mason's Children" was December 19, 1969. The dominant riff was E–E–E–G–A

(reminiscent of Steppenwolf's 1968 hit, "Born to Be Wild"). This riff introduced every version and every jam up to January 3, 1970. Then the Dead were off for a week, and on January 10 they presented a new arrangement, with no vestige of the two-measure "Born to Be Wild" riff. In its place was a three-measure riff: E–E–G–G–A–A–G–G–A–G, called the Mason riff here, since it is found in all of the officially released versions of "Mason's Children." Third, there is the studio riff, found on all the studio versions and the final live performance on February 28, 1970: E–G–A. These versions also have the Mason riff, but less often. They are also notably slower than all the earlier versions, which were otherwise fairly consistent in tempo.

Tightening is when parts of a song's structure become fixed. The "Born to Be Wild" introduction to "Mason's Children" was quite variable, with 12 to 19 repetitions before any vocals. On the December 31, 1969, performance, it included a solo. The Mason riff introduction was repeated twice in all cases except segues from other songs, so the structure was tighter. The break between verse 1 and 2 was tightened more quickly. Though initially variable, it settled down to two repetitions by the December 29, 1969 show. This four-measure break length was preserved when the "Born to Be Wild" riff was replaced with an E^7 chord beginning with the January 10, 1970, performance.

The chords of the guitar solos were another major structural variation. Both solos in the first two performances and the first solo in the fourth performance were based entirely on the "Born to Be Wild" riff. Beginning with the second solo on December 28, 1969, the solos shifted from the riff to a freer Em^7 chord-based jam, then back to the riff again. This opened up the song, allowing for more improvisation, and the performances lengthened as a result. The performances from December 28 to 31 are the four longest overall. Then, beginning January 2, 1970, the first solo was based on the chords to one verse. All remaining performances have this, except the outtake included in the *So Many Roads* box set, from which it was edited (Jackson 1999, 5–6). The second solo continued to be based on Em^7, and in three cases led directly to the next segue, dropping the end of "Mason's Children." The studio versions end before the second solo.

All of the preceding structural variations had an impact on the length of the performances. For the twelve "Mason's Children" performances that are complete, the mean length was 6:34 min. If the edited "Mason's Children" recordings are included, the mean is 6:08 min.—clearly an underestimate. So the average is approximately 6:30 min. Variability is the factor most affected by the structural changes: the shortest complete performance—on February 14, 1970, at 3:52 min.—is less than half as long as the longest, on December 28, 1969, at 9:59 min. Over time, the general trend was toward shorter performances: the Spearman rank order correlation between performance number and length was -.58 ($p < .05$).

Expressive Variations

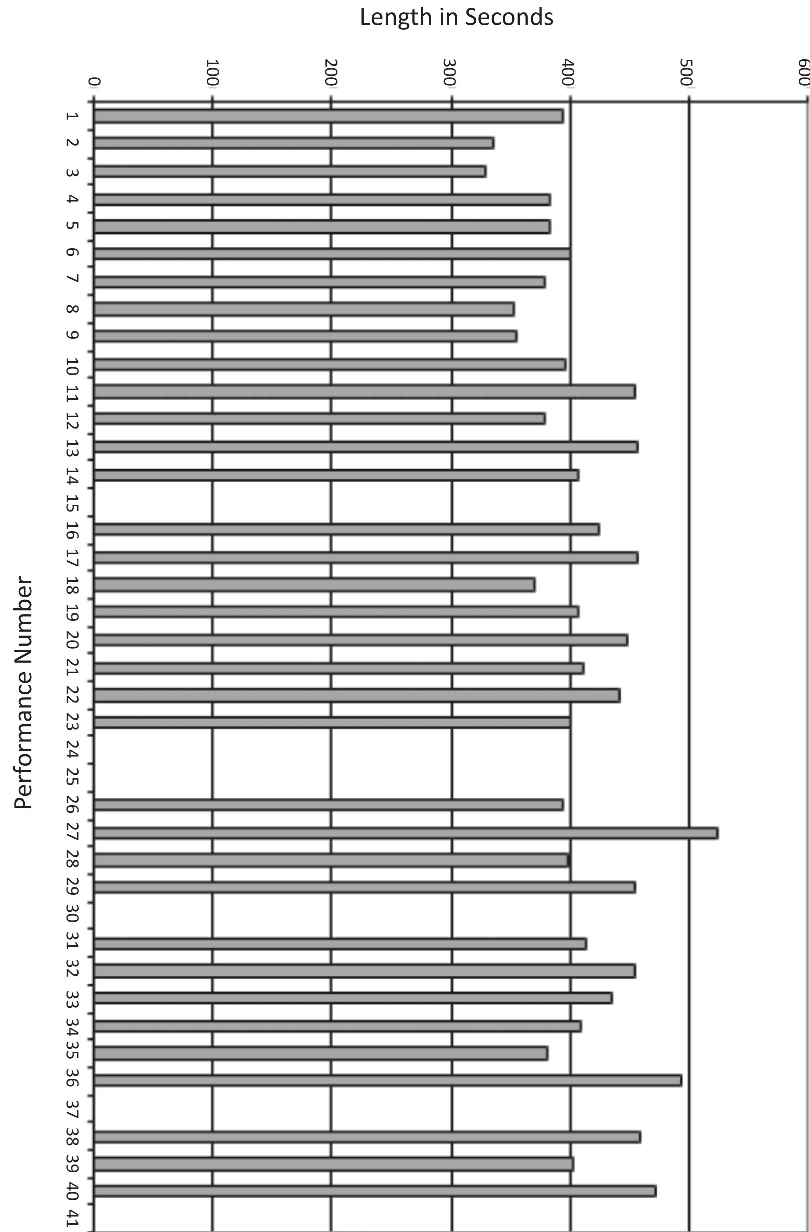
There were four expressive lyric variations. In verses 1 and 4, sometimes it was "the Mason," and in other cases, just "Mason," as in, for example, "the Mason died on Monday." This is one difference between the *So Many Roads* outtake (no "the") and the other two studio outtakes (with "the"). Sometimes verse 2 began with "they," but not always. Finally, in verse 4, the conjunction began as "cooked the stew, then" and shifted to "cooked the stew, and." All of these are closed-class words.

"Doin' That Rag"

Structural Variations

In contrast to "Mason's Children," "Doin' That Rag" was performed live after its release on *Aoxomoxoa* and increased in length over performances: $r = .57$, $p < .05$ (fig. 1). The shortest performance was February 11, 1969, at 5:28, and the longest was May 16, 1969, at 8:43. The longer versions had longer end jams. The number of repetitions of the final tag line varied from 2 to 8 with a mean of 4.2. On some performances Garcia scatted (sang non-word syllables) after the tag, and on April 23, 1969, he went back to the tag after scatting. The rest of the structure of the song was relatively fixed, with one change early on: the *Aoxomoxoa* and first two live versions begin in the key of G and then modulate to the key of B at the end of verse 2, while all the rest begin in A and then modulate to B. The modulation section was especially difficult to sing and play as shown by the many omission errors by Garcia.

Figure 1. Length of "Doin' That Rag"



* Note: Cut versions (15, 24, 25, 41) not included.

Expressive Variations

One kind of expressive variation is substituting a close synonym, as in verse 1, line 9 (n=15: 38%); verse 1, line 10 (n=4: 10%); and verse 2, line 9 (n=10: 26%), where "everyone" was sung as "everybody." Garcia sometimes sang "everyone's doin' that rag," and other times clearly articulated each word and sound, as in "everyone is doing that rag." There were nine consecutive performances (23%) of verse 2, line 7, in which the dungeon was "damp" instead of "dark." In verse 3, line 5, "don't neglect" was replaced by "don't forget" (n=3: 8%). In verse 3, line 7, "love" was replaced by "lover" (n=11: 28%), and in verse 4, line 2, "sleeves" was shortened to "sleeve" (n=19: 49%).

Verse 2, line 8, was written as "maybe get a little bit darker 'fore the day" (Trist and Dodd 2005, 78), but it was never sung that way. In every live version "dark" was sung instead of "darker"; twenty-four performances (62%) have "of dark;" and nineteen (49%) have "before" rather than "fore." So a common expressive variation would be, "maybe get a little bit of dark before the day."

Another kind of expressive variation is omission of closed-class words like "from" from verse 1, line 2 (n=2: 5%), and "the" from verse 1, line 9 (n=5: 13%); insertion of closed-class words, as in verse 2, line 1, "Take my line *and* go fishing" (n=19: 49%), and verse 3, line 9 (n=6: 15%) and line 10 (n=3: 8%), "Wade in the water *and* "; and substitution, as in verse 2, line 5, where "and" was substituted for "but" (n=3: 8%).

There were some insertions that represented standard rock and roll catch words and phrases, like "hey" (n=2: 5%) appended to verse 2, line 2, a second "hey" inserted in verse 3, line 7 (n=9: 23%), and "you know" inserted in verse 2, line 9 (n=4: 10%).

"Comes a Time"

Structural Variations

"Comes a Time" was performed more often than "Mason's Children" and "Doin' That Rag" and remained in the repertoire throughout most of the Grateful Dead's career. Most structural variations took place in the first twenty-two performances, from October 19, 1971, to October 19,

1972. After “Comes a Time” appeared on *Reflections* (released February 3, 1976), subsequent performances followed that arrangement. Structural variations on “Comes a Time” performances are shown in table 2.

Table 2. Structural Variations in Performances of “Comes a Time”

First Performance	Sequence of Song Sections	Mean Length (in seconds)
10/19/71	c1 v1 c2 v2 c3 vgs v3 c4 gs	454
10/26/71	c1 v1 c2 v3 c3 vgs v2 c4 gs	454
12/01/71	c1 v1 c2 vgs c3 v2 c4 gs	425
04/11/72	c1 v1 c2 vgs v2 c3 gs	417
06/12/76	intro c1 v1 c2 vgs v2 c3 gs	597

Key: c = chorus c1 = first chorus v = verse v1 = verse 1 gs = guitar solo

The most interesting variation was a third verse in the first nine performances that does not appear in *The Complete Annotated Grateful Dead Lyrics*:

> (When) the words come out like an angry stream
> You hear yourself say things you could never mean
> (When) the heat cools down and you find your mind
> You got a lot of words you’ve got to stand behind

The parentheses around “when” indicated that it was sometimes omitted (n=5), which is an expressive variation on this verse. Line 3 was sung as “When you cool down and you find your mind” on October 21, 1971.

As we saw with “Mason’s Children,” “Comes a Time” tightened up over the course of its early performances, with sections moving around and getting dropped. After the studio arrangement gelled, some variations were the addition of harmony on the chorus by Donna Jean Godchaux in 1976–77; an extra verse guitar solo on May 16, 1978; skipping the introduction twice (May 29, 1980, and May 11, 1986); Bruce Hornsby repeating the intro on September 16, 1991; and varying the number of repetitions of the line “only love can fill” before beginning the guitar solo at the end.

Expressive Variations

In the first performance, Garcia consistently sang “the blind man takes your arm” on the choruses, then switched to “hand,” with errors in three performances to show for his efforts (discussed in Mattson, in preparation). Another expressive variation on some choruses was adding “that” to line 4, making it “that only love can fill.”

Closed-class words were omitted, as in omitting “you” from line 3 of the chorus: “got an empty cup,” which was omitted in almost half the performances (n=102 across four choruses: 47%), with the majority of omissions from 1985 to 1994. Verse 1 omissions include “been” from line 1 (n=31: 46%); “the” from line 2 from all but four (94%) performances right after the release of *Reflections*; and “and” from line 3 in both phrases (n_1=16: 24%, n_2=23: 34%). The first word of line 1 (“from”: n= 15: 22%), line 2 (“you”: n=2: 3%), and line 3 (“you”: n=14: 21%) of verse 2 were omitted.

In ten early performances (15%; ending May 25, 1972) “been” was substituted for “went” in the second phrase of verse 1, line 1: “been walkin’ all night.” In four early performances (6%) ending November 6, 1971, “don’t” was substituted for “can’t” in verse 1, line 2. Also on this line, “between” was shortened to “tween” (n=42: 63%) in almost two-thirds of performances. It was always “tween” until the first “between” on June 22, 1976 (the second performance after the release of *Reflections*), then mostly “between” with scattered exceptions, then a run of performances with “tween” from September 15, 1985, to May 11, 1986, with a mix for the final performances.

Thus a common expressive variation on line 2 would be “I can’t see much difference ’tween the dark and light.” In verse 1, line 3, nine early performances (13%) ending April 26, 1972, had “hear” for “feel”: “I hear the wind.” Another early variation, heard on the first two performances and on December 4, 1971, or 4%, contracted “so much pain” into “such pain” in verse 1, line 4. The one substitution in verse 2, line 1, was substituting “slide” for “ride” on October 15, 1976, and May 16, 1976: “just letting it slide.” There was one rock and roll ad lib inserted, “got an empty cup—yes you do,” on October 22, 1971.

"Here Comes Sunshine:" 1973–74

Structural Variations

"Here Comes Sunshine" was introduced in concert on February 9, 1973, and recorded that August for *Wake of the Flood*, released in October 1973. After an eighteen-year gap (from February 23, 1974 to December 6, 1992), the song was reintroduced with a new arrangement. Both arrangements merit consideration, individually and in comparison.

Introduction

There were several variations on the introduction to the 1973–74 version of "Here Comes Sunshine," all built around the introductory riff. Garcia played a three-note pick-up (a lead-in to the introduction) on the first three performances. We do not know about the introduction to the next two performances, because there is no recording or the beginning was cut. The performances on March 21, 22, 24, and May 20, 1973, have an instrumental build-up: Garcia played the introductory riff, then Kreutzmann and Lesh came in with him on the second repetition, and by the fourth repetition everyone was playing. For all but four of the remaining performances, everyone started together on the introductory riff. The performances of March 28, September 26, and November 17, 1973, and the final performance on February 23, 1974, have a short drum pick-up. Given the gaps between these shows, this looks like an expressive variation on the typical introduction.

First Jam

There were three jam opportunities in the 1970s arrangement of "Here Comes Sunshine." After the second verse, there was always a substantial jam built on C and B♭. The early performances featured Garcia solos reminiscent of his playing on the song "Starship" on Jefferson Airplane's 1970 album *Blows Against the Empire*, which is also a C–B♭ jam. By May 1973, his solos were moving away from this, and the first jam from June 10, 1973, begins with a determined attempt to be different, involving guitar effects. The end of this section was almost always signaled by four repetitions by Weir and Lesh of their counterpoint to the intro riff. Garcia sometimes played single note solos over this, but usually

switched to high chords by the end. Then there was an eight-beat drum fill, followed by a descending riff played by the entire band. There were typically four repetitions of the full two-part phrase (except for March 26, 1973, with three repetitions), up to October 30 and November 9, 14, and 21,1973, with six repeats, and November 30 and December 6, 1973, with seven repeats. They returned to four repeats for the last two performances. Beginning in March, the later melody repetitions by Garcia became more variable. This was often a bass solo opportunity.

Second Jam

The next section, a jam on G and F with an eight-beat phrase length, varied widely from performance to performance. It ranged from four to thirty-eight phrases, up to 4:45 min. Usually there was a Weir solo. Garcia sometimes played rhythm, sometimes came out wailing, sometimes came in after Weir, and sometimes both—a highly varied role. The length of this section was the most important factor in determining the overall length of the performances of "Here Comes Sunshine." Although tempo is also a factor governing length, the tempos remained relatively consistent. Some slower versions were performed on May 26, June 22, and October 30, 1973, with the two longest performances on December 6 and 19, 1973.

Third Jam

After the third verse and chorus, there was a third jam section. The first two performances begin this section with four repetitions of the descending chord pattern, then a jam on G and F. Beginning with the third performance, the descending chords were dropped and they went right to the jam. Beginning with June 26, 1973, they reinstated the descending chords. From November 14 to 21, 1973, they doubled the length of the descending section, and they used it as the basis of extended jams on September 7, October 30, November 14, December 6, and December 19, 1973, as well as on its final performance on February 23, 1974. In that last performance, the third jam was almost wholly based on the descending chord progression. A total of twenty-five performances end this section with four repetitions of Weir and Lesh's intro counterpoint, then into a final chorus and closure. Two performances segue from the G–F jam into other songs: on February 17, 1973, it was "Here Comes Sunshine" > "China Cat Sunflower," and April 2, 1973, featured the phenomenal

suite “Here Comes Sunshine” > “Space” > “Me and Bobby McGee” > “Weather Report Prelude” > “Eyes of the World” > “China Doll.” Three versions go directly from G–F to the chorus: February 9, September 7, and September 26, 1973. At Watkins Glen on July 28, 1973, the counterpoint riff was repeated eight times to cue the final chorus.

Expressive Variations

There was one consistent omission: the word “but” in verse 3, line 2, was not said in fifteen of the thirty-one performances (48%). Given its prevalence and the fact that it does not substantially change the meaning of the lyrics, this seems like an expressive variation rather than an error. One error occurred eight times: instead of “get out the pans” in verse 1, Garcia anticipated the next line by singing “get out the way.” This was considered an error because it changed the meaning of the line.

“Here Comes Sunshine:” 1992–95

Structural Variations

In the 1973–74 era, “Here Comes Sunshine” was a set opener eight times (25% of performances); from 1992 to 1995, it was a set opener thirty times (91% of performances). The Grateful Dead’s set list conventions grew more restrictive over time (Shank and Simon 2000), allowing for less variation in song placement for “Here Comes Sunshine” in the 1990s. In both eras there were a few segues from “Here Comes Sunshine” into another song. In the 1990s, this was accomplished by finishing “Here Comes Sunshine” and starting the next song right away, as opposed to transitioning seamlessly from “Here Comes Sunshine” to the next song, as in the two 1970s segues.

The arrangements of 1970s and 1990s performances of “Here Comes Sunshine” are compared in table 3, showing changes in the introduction and the jams that led to shorter performances in the 1990s. The structure of performances of “Here Comes Sunshine” in the 1990s also varied much less than they did in the 1970s. One 1990s performance variation was the number of repetitions of the riff after the final chorus. At first this was a short guitar solo opportunity and varied from four to thirty-one repetitions (e.g., the December 13, 1992, concert). Beginning

in 1994, all but one performance had four repetitions—the same as the riff after the other choruses. The structure was tightened and that became the norm. The exception was October 15, 1994, with eight repetitions.

Table 3. Comparison of 1970s and 1990s Arrangements of "Here Comes Sunshine"

1973–74	**1992–95**
Intro riff	Chorus, largely a cappella
Verse 1	Verse 1
Chorus	Chorus
Verse 2	Verse 2
Chorus	Chorus
Extended jam section	Verse with guitar solo
	Chorus with melody on keys
Verse 3	Verse 3
Chorus	Chorus
Jam	Short jam
Chorus	Chorus over riff chords

The ending was slightly extended instrumentally on March 24, 1993. There were only three repetitions of the line "here comes sunshine" at the end of the song on May 15, 1993, and September 21, 1993. These cannot be errors, because all the singers stopped at once. On December 11, 1994, Garcia played through two cycles of verse and chorus instead of one. The final version, on July 2, 1995, also had a slightly extended ending, and Garcia improvised vocally over the last repetition of "here comes sunshine."

Expressive Variations

There was only one performance, on May 19, 1995, where the omission of "but" was the only performance variation for verse 3, line 2, and "but" was sung in 64% of 1990s performances. In the 1990s versions Garcia often delayed verse 2, line 3—"why hold out for more"—longer than he had in the 1970s. Verse 3, line 3, "no more," was sung only two times, becoming "go no more" thirteen times (39%); this was considered

an expressive variation. However, when Garcia began omitting this last line in some of the final performances (n=9; 27%), this could have been an error, or it may have been related to the introduction of teleprompters in December 1994 (Mattson, in preparation).

"Foolish Heart"

Structural Variations

"Foolish Heart" was played before it was recorded for *Built to Last* in 1989 and stayed in the repertoire through 1995. The introduction features a keyboard/guitar melody that is repeated after all verses except before the bridge. The number of times this riff is repeated is one structural variation across performances. On the *Built to Last* version there are four repetitions in the introduction, lasting about 15 seconds. Later introductions were consistently longer than one minute, with over two minutes on the August 3, 1994, performance. After all verses (except before the bridge) there were two repetitions of the keyboard/guitar melody line in the studio and early performances, increasing to four repetitions later.

The two jams vary in length. "Foolish Heart" generally increased in length over performances: r (42) = .754, $p < .01$. The studio version does not have a repetition of verse 4 and keyboard/guitar melody line after the second jam from A to D, which is found in 47 performances (55%).

Expressive Variations

The version of the lyrics published in *The Complete Annotated Grateful Dead Lyrics* differs from the lyrics as sung on *Built to Last*. In verse 1, line 7, the print version is "that you feel to be your part," where the studio and live recordings omit "that." "Unto a foolish heart" is repeated at the end of each verse in the studio and in performance. For verse 2, line 1, the print version is "leap from ledges," whereas the studio version is "dare to leap." Likewise, for line 5, the print version is "directly from the heart," as opposed to the studio version, which is "directly to the heart." There were two more closed-class word changes in verse 3: in line 5, "a" is used instead of "the" and "but" is omitted from line 8, a word that occurred only on verse 3 in the studio but was sung in all verses in concert. So these are all possible expressive variations in performances.

There were only eight performances (9%) of verse 1, lines 3 and 4, "search for where," including five of the six performances after the introduction of the teleprompter. A common substitute was "look to where" (n = 42: 48%). In nine cases (10%) "use" was substituted for "do" in verse 1, line 6: "do everything that's in you." There were only eight performances (9%) of verse 2, line 1 as "leap from ledges," four of which occurred after the teleprompter's introduction. The most common variation (n=53: 61%) was "learn to leap." "Queen" (n=13: 15%) was substituted for "king" in verse 2, line 6, with all but one on or before October 14, 1989.

Verse 3, line 2, had closed-class substitutions of "or" (n=30: 34%) for "and" in the line, "brother and a friend." Verse 4, line 3, had two substitutions for "dare to leap": "learn to leap" (n=16: 18%) and "look to where" (n=14: 16%), along with variations on each. Finally, expressive variations on the bridge included substituting "throw" (n=22: 25%) for "toss" in line 2; substituting "turn on you" (n=7: 8%) for "then turn around" and omitting "then" in line 3; substituting "things" for "you" in line 4 (n=19: 22%, with final performance August 19, 1989); and substituting "cause you grief" for "cost you sleep" in line 5 (n=10: 11%).

"Days Between"

Structural Variations

"Days Between" did not appear on a release until *So Many Roads*, after Garcia's death. The first seventeen performances of "Days Between" are the shortest, arranged as verses 1 through 4 followed by a jam. The longest performances (June 18–October 18, 1994) have verses 1 through 4, then a solo over the verse, then a repeat of verse 4 followed by the jam. There were also performances that were intermediate in length, with verses 1 through 3, a solo, verse 4, and the jam, all between March 27 and May 21, 1995. The tempos were compared by measuring the length of one verse: the slowest performance was March 11, 1993, and the fastest on June 22, 1993, and July 3, 1994. Performances generally increased in length over time: r (41) = .612, p < .05.

Expressive Variations

As published, verse 1, line 3, begins "Comes the shimmer of the moon." "Comes" was shortened to "come" in eleven performances (27%), and "lightning" was substituted for "shimmer" in fifteen performances (37%). "Comes" was also shortened to "come" in ten performances (24%) of verse 2, line 3. Verse 2, line 5, as published begins, "A hopeful candle lingers." "Lonesome" was substituted for "hopeful" in nine performances (22%), and "flickers" was substituted for "lingers" in sixteen performances (39%). In verse 3, line 2, "learn" and "love" exchanged places in fifteen performances (37%).

Closed-class word omissions began in line 1 of each verse (the refrain), where the first "and" was omitted in 93% of performances and the second was omitted in 32%. "And" was added to verse 1, line 2, exactly thirty-eight times (93%) and to line 6, thirty times (73%). In verse 1, line 6, the final tag was shortened from "anyone can see" to "one can see" in thirty-six performances (88%). "Once" was replaced by "when" in twenty-two performances (54%) of verse 3, line 3; "through" replaced "in" in twenty-eight performances (68%) of line 5; and "we'll" was omitted in every performance of the final tag in line 6. "As" was omitted in ten performances (19%) of verse 4, line 5, including the repeated instances of verse 4.

Conclusion

Across the six songs studied here there are a number of themes that emerge. In terms of how the Grateful Dead developed songs, some songs were tightened up structurally on the way to the studio, especially "Mason's Children" and "Comes a Time." In the case of "Mason's Children," the song was dropped from the repertoire, just as it was from the album, whereas the arrangement of "Comes a Time" was finalized once it appeared on *Reflections*. Some songs expanded over time, notably "Doin' That Rag," "Foolish Heart," and "Days Between," usually by expanding the jam sections but also by repeating verses and choruses. "Here Comes Sunshine" was rearranged in the 1990s, with a much tighter structure and shorter performances.

This study also provides insights into Garcia's approach to singing. He clearly improvised vocally as well as instrumentally, and those variants are often revealing. Closed-class words were frequently omitted and sometimes replaced by other closed-class words. Open-class word omissions were less frequently described herein because these were generally classified as errors, so open class words were replaced or exchanged. Garcia also added the occasional rock and roll ad-libbed insertion, such as "you know."

The introduction of teleprompters in December 1994 had an impact on expressive variations in "Here Comes Sunshine" and "Foolish Heart," and a further study (Mattson, in preparation) will discuss the impact it had on errors on these songs, "Days Between," and others. I am looking for information about what songs were available on the teleprompters, and ideally what lyrics were on the device for a given song. In "Here Comes Sunshine," the omission of the tag "no more" (verse 3, line 3) in 1995 performances could have been errors, expressive variations, or correct readings of the teleprompter, where the tag may not have appeared. This is an example of a variation that is hard to classify without additional information—a boundary challenge for our definitions of error and expressive variation. Another challenge was the repeated anticipation of "get out the way" for "get out the pans" in verse 1. It changes the meaning and appears to be an anticipation error, but it was repeated eight times. The way to handle these cases may be a category of ambiguous variations that can be combined, analyzed separately, or omitted, depending on the question being asked, and to look for additional ways to accurately classify performances.

This article obviously does not exhaust expressive variations on lyric performances of these songs. Timing and melody were not considered, for example, and would be interesting studies in performance. There are also interesting relations between the correctness and the timing of responses that could be explored (e.g., Kalfaoğlu and Stafford 2014). Psychologists would do well to take up the challenge of tapping this amazing performance resource. For scholars interested in the interdisciplinary study of the Grateful Dead, the quantification and analysis of lyrical variations helps to frame the band's approach to composition and

performance. Most of all, this study suggests how experimental psychology can illuminate the Dead's signal achievement in creating a repertoire that sustained years of performance and attracted hundreds of thousands of fans for three decades.

Note

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Works Cited

Baars, Bernard J., and Mark E. Mattson. 1981. "Consciousness and Intention: A Framework and Some Evidence." *Cognition and Brain Theory* 4: 247–63.

Boone, Graeme M. 2010. "Dark Star Mandala." In *The Grateful Dead in Concert*, edited by Jim Tuedio and Stan Spector, 85–106. Jefferson, NC: McFarland.

———. 2014. "Dark Star: Biography of a Song." Paper presented at So Many Roads: The World in the Grateful Dead, San Jose State University, November 8, 2014.

Deese, James. 1984. *Thought into Speech: The Psychology of a Language*. Englewood Cliffs, NJ: Prentice-Hall.

Freud, Sigmund. 1960. *Psychopathology of Everyday Life*. Reprint, New York: Norton. Originally published 1901.

Fromkin, Victoria, ed. 1973. *Speech Errors as Linguistic Evidence*. The Hague: Mouton.

Garcia, Jerry. 1976. "Comes a Time." On *Reflections,* Grateful Dead Records GDCD40082, 1990, compact disc.

Grateful Dead. 1969. "Doin' That Rag." On *Aoxomoxoa,* Warner Bros. R2 74401 D, 2001, compact disc.

———. 1973. "Here Comes Sunshine." On *Wake of the Flood,* Rhino R2 76491 A, 2004, compact disc.

———. 1989. "Foolish Heart." On *Built to Last,* Rhino R2 76491 J, 2004, compact disc.

———. 1999a. "Days Between." On *So Many Roads,* Grateful Dead Records/Arista GDCD 4066, 5 compact discs.

———. 1999b. "Mason's Children." On *So Many Roads,* Grateful Dead Records/Arista, GDCD 4066, 5 compact discs.

Jackson, Blair. 1999. "Track Notes." In *So Many Roads*, by the Grateful Dead, 3–14. Grateful Dead Records/Arista, GDCD 4066, 5 compact discs.

Jefferson Starship. 1970. "Starship." On *Blows Against the Empire,* RCA 82876 67974 2, 2005, compact disc.

Kalfaoğlu, Çığır, and Tom Stafford. 2014. "Performance Breakdown Effects Dissociate from Error Detection Effects in Typing." *Quarterly Journal of Experimental Psychology* 67: 508–24.

Mattson, Mark E. 1987. "Sources of Competing Activation in Action Errors." *Dissertation Abstracts International* 48: 6.

———. (In preparation). "Lyric Errors in Musical Performances."

Mattson, Mark E., and Bernard J. Baars. 1992. "Laboratory Induction of Nonspeech Action Errors." In *Experimental Slips and Human Error: Exploring the Architecture of Volition*, edited by Bernard J. Baars, 151–193. New York: Plenum Press.

Norman, Donald. 1981. "Categorization of Action Slips." *Psychological Review* 88:1–15.

Palmer, Caroline. 1997. "Music Performance." *Annual Review of Psychology* 48: 115–38.

Schütze, Carson, and Victor Ferreira, eds. 2007. *The State of the Art in Speech Error Research*. MIT Working Papers in Linguistics, no. 53.

Scott, John W., Mike Dolgushkin, and Stu Nixon. 1999. *DeadBase: The Complete Guide to Grateful Dead Song Lists.* 11th ed., Cornish, NH: DeadBase.

Shank, Gary, and Eric J. Simon. 2000. "The Grammar of the Grateful Dead." In *Deadhead Social Science*, edited by Rebecca G. Adams and Robert Sardiello, 51–73. Walnut Creek, CA: AltaMira.

Steppenwolf. 1968. "Born to Be Wild." *Steppenwolf–16 Greatest Hits.* MCA, MCAD 37049, 1985, compact disc.

Trist, Alan, and David Dodd, eds. 2005. *The Complete Annotated Grateful Dead Lyrics.* New York: Free Press.

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