Grass-Mud Horses to Victory:
The Phonological Constraints of Subversive Puns

Seth Wiener[1]
The Ohio State University

In 2008, Chinese netizens began creating *subversive puns.* These puns, including the well known "grass-mud horse," were designed to engage in a satirical online movement against internet censorship of vulgar or politically sensitive words. By examining online subversive puns' birth and development, this paper presents a phonological analysis of the growing Chinese internet lexicon. First, the relevant phonological features of the puns are identified, which underscore how the game plays with the inherent characteristics of Mandarin. Next, a series of rules or constraints are identified; these highlight both the formulaic nature of subversive puns as well as the flexibility of the language. Finally, using Optimality Theory as a descriptive tool, this paper explores the interaction of universal constraints with several possible new language game constraints. Through this examination, this paper identifies implications for Mandarin lexical access and Mandarin word form encoding.

1. Introduction

The Chinese language has a rich history of word play. Language game research dates back to Chao's (1931) preliminary study in which he outlined a series of 反切语 *fanqieyu* 'secret languages' that made use of the syllable onset and fixed rime spelling system. Branner (2010) has suggested that these games are, in fact, rooted in an even earlier military *fanqie* cipher dating back to the 16th century. Furthermore, these Chinese language games are not restricted to one 'regional dialect' or 方言 *fangyan*. In addition to the secret languages and games Chao cites, research into Taiwanese (Li 1985), Hakka (Branner 2010), Shanxi dialect (Hou 1988), and Cantonese (Bolton and Hutton 1995) has underscored the ubiquitous creativity and metaphor inherent in speakers throughout China.

Language games and secret languages are by no means restricted to Chinese. Laycock (1972) first coined the term ludling by combining the Latin word for 'game'

---

[1]Several people have shared their time and suggestions in order to improve this paper. Rebecca Morley was especially helpful with regards to the OT framework. Heather Inwood was equally invaluable, reviewing earlier drafts and offering encouraging feedback on the Chinese internet. Any errors that remain are those of the author.

ludus with the word for 'language' *lingua*. Davis (1993:1980) defines this concept as "a widespread language play phenomenon in which phonological forms of words are systematically altered so as to disguise what they are."

According to Bagemihl (1995), ludlings are found in nearly every human language. Yet, due to their small speaker population and restricted linguistic function, linguists were originally hesitant to use ludlings for insight into phonological processes. It was only when ludling data from English Pig Latin was used by Chomsky and Halle (1968) to argue for the necessity of rule ordering that ludlings began to gain legitimacy as a linguistic tool.

With the rise of nonlinear phonology and morphology, ludling studies were finally recognized as a worthy area of theoretical investigation (Bagemihl 1995); phonological theories could use ludling data as supporting evidence (Bagemihl 1987; Vago 1985). Furthermore, it was argued that using ludlings as a linguistic tool could help reveal phonological traits not otherwise accessible (Pierrehumbert and Nair 1995; Treiman 1983; Yip 1982).

While ludling data lacks the same significance that natural spoken data carries, there is a growing number of studies which show that ludling data can corroborate phonological theories. Recent research has suggested that ludlings may help uncover not only the *covert ranking* of constraints – rankings that play no role in the spoken language but which emerge via ludlings, loanwords and second-language acquisition (Davidson et al 2004) – but also the sonority and perceptibility of segments (Moreton et al 2006).

This paper connects the two aforementioned threads by first introducing the newest Chinese ludling – an online game designed to circumvent internet censorship – and then examining this data via a constraint-based approach. In doing so, this paper identifies implications for Mandarin lexical access and Mandarin word form encoding, and proves their importance to the teaching and learning of Mandarin as a second language. The remainder of this paper briefly introduces the online Chinese linguistic parameters, outlines the new internet ludling, and proposes the phonological constraints along with a proper framework by which to examine them. The final two sections examine the data through this constraint-based framework, concluding with the study's implications, limitations and future direction.

2. Chinese internet regulations

As the number of Chinese netizens has increased, so too has the number of internet regulations and online censorship. Internet regulations started in China in 1993 with the passing of the "Temporary Regulation for the Management of Computer Information Network International Connection" at the 42nd Standing Convention of the State Council (Qiu 2000). In 1997 China had approximately 25 direct international network lines (Coale 1996). Shortly thereafter, China imposed what *Wired* called "the world's largest firewall… the Great Firewall of China" (McKay 1998).

MacKinnon points to late 2004 and early 2005 as the beginning of a spike in Chinese internet use and blogging (2008). In response, online service providers began to implement regulated censorship software tools and business models that acquiesced to the government's demands. By 2005 the Chinese government decreed that anyone hosting a "non-commercial website" had until June 30th 2005 to obtain an official registration number to be displayed on their website (French 2005; OpenNet Initiative 2005). By fall of 2005 a much broader set of regulations governing any "Internet News Information Service" website was issued (MacKinnon 2008). This forbade any site from posting content which "violated the basic principles as they are confirmed in the Constitution… jeopardized the security of the nation… divulged state secrets… subverted the national regime or jeopardized the integrity of the nation's unity"; similarly, sites were forbidden from "inciting illegal assemblies, associations, marches, demonstrations or gatherings that disturb social order… or any other content prohibited by law or rules" (Hu 2002).

In 2005 this herculean task of monitoring and censoring Chinese web pages was outsourced to individual businesses (including foreign companies), implying that the Chinese government was ambivalent with respect to how these regulations were implemented, so long as the end result was successful (MacKinnon 2008). Most companies began to use blocking technologies such as IP address-based packet filtering, DNS poisoning and cache filtering (Zittrain & Edelman 2003). Some blog-hosting companies used keyword monitoring and filtering software which drew from lists of forbidden words (Qiang 2004). According to the *Washington Post*, one such list of forbidden words contained 236 items – the majority of which was political – including 18 words which were considered obscenities (Pan 2006). In 2011, the Chinese government established the State Internet Information Office, a new central agency designed to supervise and oversee online activity (Wines 2011).

In response to this prevalent online censorship, Chinese netizens devised their own new internet secret language. A ludling this paper calls *subversive puns*. These new lexical items were invented as a humorous way around the draconian censorship of Chinese internet forums, blogs and BBS's (electronic bulletin board systems). Seemingly innocuous homophones took the place of Chinese words which could not be typed due to their vulgar or politically sensitive nature. Over time these words have spread as online memes, gaining momentum in the form of online protests against the nature of censorship and the absurdity of online keyword filters. As more netizens take part in this ludling, Esarey and Qiang (2011) see this online word play as not just a game, but a form of "digital resistance."

3. Subversive puns

In 2006 China's President Hu Jintao formally called for the creation of a "harmonious society." This vision of China in the twenty-first century signaled a policy shift away from all-out economic growth and toward a policy designed to fix many of the

increasing social tensions in Chinese society (Fan 2006). Aside from fostering more democratic and financial opportunities for the Chinese people, the proposal called for a return to morality and social correctness (Geis and Holt 2009).

The reach of Hu's "harmonious society" quickly extended to the internet where it was used as the impetus for broad censorship. Any web content which was deemed inappropriate was now considered to go against "constructing a harmonious society" and thus the content was "harmonized" (Qiang 2007). The Chinese word, as seen in (1), is made up of two morphemes and typically glossed as 'peace' or 'harmony.'

(1)　　和谐　　　　　　　hé xié　　　　　　　'harmonious'

This notion of "harmonizing" the internet may be considered the watershed moment in netizen attitudes towards online censorship. Before this 2007 campaign (leading up to the Beijing Olympics in 2008), very little online resistance to censorship had been documented. As a result of the intensified censorship, Chinese netizens responded with their own campaign – a subtle and nuanced response which took the form of an animal.

(2)　　河蟹　　　　　　　hé xiè　　　　　　　'river crab'

The "river crab" in (2) is a understated play on the characters for 'harmonious.' This nearly identical homophone (which is comprised of wholly different characters) quickly became the new satirical slogan for what Chinese netizens called "River Crab Society" (Qiang 2007).

This clever invention of similarly sounding, albeit entirely different characters to take the place of banned words, was the beginning of a larger online movement that manifested itself in the form of online subversive puns. The so-called "river crab" meme can be thought of as the first major subversive pun invented strictly for online use in China. These satirical puns are used in exactly the same way the original banned word was used. (3) and (4) show how "river crab" can be used as a proxy for "harmonious" in the verb form.

(3)　　网页被和谐了　　　wǎng yè bèi hé xié le
　　　　'the webpage has been harmonized'
(4)　　网页被河蟹了　　　wǎng yè bèi hé xiè le
　　　　'the webpage has been river-crabbed'

Despite the seemingly nonsensical sounding English gloss, (4) is a common phrase on the internet. A cursory search for (4) yielded 1,630,000 web pages containing that exact phrase.[2]

Using this framework of building nearly homophonous words with different characters, Chinese netizens developed a fully flexible lexicon of subversive puns including nouns and verbs aimed at satirizing the absurdity of the keyword filters and protesting the exacerbation of online censorship. In 2009 the Chinese web portal Baidu became home to the most popular collection of these subversive puns. The Chinese

---

[2]Search done on http://www.baidu.com, 5/26/11

language collaborative web-based encyclopedia Baidu Baike (analogous to Wikipedia) was anonymously edited by users who began posting what they called "the ten mythical creatures" (Wines 2009). This spawned an internet movement which tied the new satirical lexical items to Baidu Baike and thus gave the impression that the words were real (and thus anchored in reality outside of the internet).

Recently this ludling has gained increasing academic attention. In 2010 the China Digital Times, a self-proclaimed "bilingual news website covering China's social and political transition" run by a team at the University of California Berkeley, established the "Grass-Mud Horse Lexicon" (GMHL 2010). Additionally, Qiang (2008) has written extensively on the growing importance of these puns as part of Chinese netizen's online voice and role in politics.

In short, these subversive puns are the next ludling in a long history of clever, playful utilizations of the Chinese language. By embracing modern technology, these puns are the logical heir to what began as *fanqie* games and now continues as online satire. These puns, however, are not haphazardly constructed but rather follow a set of rules or constraints which will be examined in detail in the next section.

4. The innovative lexicon and its phonological constraints

It is important to recognize the role the written language plays on the internet. Wilbur points out that despite the increasing prevalence of video and audio clips, it is still predominately "a text-based affair" (1996). For this reason the features of a language's writing system such as the use of capitalization, spelling, punctuation and style (bold, italics, etc.) are emphasized more, whereas in a spoken language, phonetic features such as voice quality, vocal register and voice modality demonstrate a speaker's individuality (Crystal 2001). In text-based environments these features are eliminated as the orthography represents a user's voice. Presumably most online users do not read aloud, thus the pronunciation of a word is relegated to a lower tier online than it is offline. As a result the internet has placed a much stronger emphasis on the written form than the spoken form.

Mandarin is a phonologically unmarked language with a highly limited syllable structure CVX in which C is the onset, V is nucleus and X is the coda (Duanmu 2000). Considering the numerous restrictions placed on syllable formation – DeFrancis (1984) calculated 398 basic syllables the language could form – pitch contour is one way to differentiate syllables and provide speakers with a larger syllable pool. Spoken Mandarin differs from non-tonal languages like English in that any given syllable with a pitch contour can be produced in far more ways than its equal without a pitch contour. The text-based internet, however, evens this playing field and renders tonal languages toneless: chat rooms, blogs and email all reduce languages to their written form. And yet, this reduction of acoustic clues is what makes Mandarin so ripe for pun creation.

Consider the English word "see." Written in this form it has only one meaning, but if we disassociate the orthography from the phonology [si], there are three possible

interpretations: the act of visual recognition, the ocean, or the third letter of the alphabet. Phonologically English is much more marked than Mandarin; spoken English allows up to three consonant clusters in the onset and up to four in the coda (Ladefoged 2001). This in turn is one of the reasons English has fewer homophones than Mandarin.

Returning to written Chinese, consider the character "课." Written in this form it too has only one meaning (a class or lesson), but if we disassociate the orthographic from the pronunciation of the character [kɤ] and keep the same falling lexical tone – kè – then there are fifteen other possible interpretations. If we include the three other possible suprasegmental tones, suddenly the landscape on which subversive puns are painted becomes immense.

It is important, therefore, to note that the written forms of subversive puns are somewhat innocuous; only the phonological properties of the syllable are of value. It is when the words are said aloud that they resemble the target banned word. The characters are not entirely arbitrary since the proxy word is designed to be used online and therefore must maintain a modicum of meaning. To illustrate how this works, consider the banned obscenity in (5).

(5)   肏你妈   cào nǐ mā   'fuck your mother'

This fairly common profanity is censored throughout the Chinese internet. As a result the most prolific and well known subversive pun, the namesake of the China Digital Times "Grass-Mud Horse Lexicon" (6), was created.

(6)   草泥马   cǎo ní mǎ   'grass mud horse'

The "grass-mud horse" was one of the original mythical creatures to appear on Baidu Baike and easily the most popular. Videos, cartoons, songs, blog postings, mocumentary films and merchandise of this animal have appeared throughout the internet in both China and the West (Wu 2009).

On the surface, three rules appear to dictate the formation of this and all other similar lexical items. First, the orthographic representation must change. Crucially this is done to avoid keystroke monitoring and censorship. Thus the ludling at its core is a game designed to change the written form of banned words.

Second, the syllable must be preserved. Ostensibly this ensures phonological activation and without the preservation of syllable, the ludling would not work.

Third, the suprasegmental tone should be maintained, if possible, but can be modified. In (2) one of the two lexical tones is persevered, whereas in (6) all three original lexical tones are lost.

Given these three rules or constraints, how is an optimal form chosen? If one considers the combinatorics of the three syllables in (5), the math becomes fairly daunting[3]. The first syllable 'cao' orthographically has twelve discrete candidates - three first tone, six second tone, two third tone, and two fourth tone. The second syllable 'ni' has twenty-six orthographic candidates - one first tone, eleven second tone, four third

---

[3]Syllable count taken from online MDBG dictionary: http://www.mdbg.net/chindict/

tone, and ten fourth tone. The third syllable 'ma' has twenty-two orthographic candidates - two neutral tone, six first tone, five second tone, six third tone, and three fourth tone. Accounting for all possible orthographic representations, a total of 6,864 possible candidates are generated. If one takes into account characters that can be read with more than one tone (多音字 *duoyinzi*), the number of possible candidates reaches 7,436. Is it possible that all candidates were considered? How is it that those who know the rules of this ludling all seemingly converged on the same output?

Before reexamining the features of subversive puns, it is worth considering the architecture at work here. The selection of (2) and (6) out of the literally hundreds and thousands of candidates suggests that this is a comparative action: candidates are presented in some framework in which an optimal output is selected. Furthermore, whatever rules or constraints exist, they are clearly violable.

Given the violable nature of the rules or constraints and the comparative action of the candidates, it follows that a constraint-based approach like Optimality Theory (OT) may be an appropriate framework (Prince and Smolensky 1993). This Chinese ludling can be thought to start with the banned written form (the "input" in OT). Next, "GEN" generates all the possible candidates; similarly this ludling generates possible subversive puns in accordance with the constraints of the game ("EVAL"). In the end, an optimal "output" or winner is presented, which in turn becomes the new subversive pun.

Using a constraint-based approach allows for a clear delineation of each constraint and highlights how each constraint interacts with one another. The present analysis is a not a true extension of OT; these are not universal constraints that OT would recognize. Rather, these are only universal in the sense that native, literate Mandarin speakers who understand the ludling possess them. By using OT as a descriptive tool, and utilizing the strictly ranked constraint aspect of OT, the phonological constraints of subversive puns can be analyzed. This analysis can be thought of as either a re-ranking specifically for the ludling or a covert ranking emerging from the specific subversive pun constraints (Davidson, Smolensky, & Jusczyk 2004).

Given the aforementioned proposed surface rules or constraints, it is clear that additional new constraints must be proposed. First a semantic anti-faithfulness constraint *SEM is required. This is the "game constraint" – ostensibly subversive puns at their linguistic core involve a strict domination of *SEM over all other constraints, which in turn alters the orthographic representation of the banned word.

Next a lower ranked corollary semantic faithfulness "game constraint" ANI (animal) is required. This constraint reflects the precedent that animals (river crab, grass-mud horse, etc.) are the medium of choice for this ludling.

Two phrase structure constraints are required. The head=noun and modifier=adj constraints ensure that the output will (at the minimum) be a noun (animal) with each additional syllable serving as a modifying adjective.

Additionally, the following analysis makes use of two faithfulness Ident constraints: Ident(seg) which requires input and output segments to be identical and

Ident(tone), a context free faithfulness constraint proposed by Zhang (2001) to ensure that input and output lexical tone remain the same.

This creates the subsequent fixed hierarchy: *SEM >> MAX >> DEP >> Ident(seg) >> Modifier=adj >> Head=noun >> Ident(tone) >> ANI

5. Examples of the constraint-based framework

By utilizing the strictly ranked aspect of OT, the following analysis will illustrate how Chinese subversive puns are constrained and ultimately created out of online linguistic parameters. In doing so, two caveats must be made clear. First, it is worth restating that this proposal is not a true extension of OT by any means. What follows is built upon the set of constraints germane to the language game.

Additionally, this analysis examines subversive puns through a modular formation of individual syllables. The tableaus that follow present both input and output at the syllable or morpheme level, rather than the word level. It is well established that modern Mandarin words are predominately disyllabic (Duanmu 2000; He and Li 1987). Within the Grass-Mud Horse Lexicon (GMHL 2011) less than one percent of the lexical items created are monosyllabic words. However, given the combinatorics of the output and in order to present a succinct and comprehensible analysis, the subsequent examples look at subversive puns at a morpheme by morpheme level. There is no reason to think that cognitively, should a constraint-based mechanism exist, a morpheme by morpheme comparison of candidates could not be calculated concurrently. Similarly, if the cognitive process occurs at the word level, the following analysis still holds by simply combining two or more morphemes in each output.

To see how this constraint-based framework works, consider (7) which is a relatively recent subversive pun.

(7)   谷歌   gǔ gē   'Google'

In 2010 *The New York Times* reported that Google had decided to stop censoring its search results (Helft and Barboza 2010). As a result, Google began redirecting users to its Hong Kong servers. The debate that followed over free speech and Google's right to offer netizens unrestricted access to the internet ultimately caused (7) to become a banned or censored word. Netizens responded with the subversive pun (8).

(8)   古鸽   gǔ gē   'ancient dove'

This subversive pun is doubly effective since it is not only able to match both the segmental and suprasegmental units of (7), but also it playfully highlights the redirection of Google's servers "flying south" to Hong Kong in the way a bird might migrate.

The following set of tableaus shows how the formation of (8) was constrained by the aforesaid game constraints.

谷 /ku3/	*SEM	MAX	DEP	ID(seg)	Mod=aj	Head=n	ID(tn)	ANI
谷 [ku3]	*!							
[u]		*!						
[kun]			*!					

(9) Summary tableau one: 谷 /kǔ/ → 古 [kǔ]

Tableau (9) highlights the semantic anti-faithfulness constraint's dominance over all the lower ranked constraints. In (9) *SEM is required to eliminate the input form and effectively produce an output with a different semantic (or orthographic) value. As previously mentioned, this constraint serves as the "game constraint" which creates a new subversive pun. Both MAX and DEP are also violated in (9) showing how the loss (MAX) or addition (DEP) of a phoneme can not occur in this language game. Thus these output forms (though illegal syllables in standard Mandarin) are eliminated.

谷 /ku3/	*SEM	MAX	DEP	ID(seg)	Mod=aj	Head=n	ID(tn)	ANI
笔 [pi3]				*!				
股 [ku3]					*!			
骨 [ku3]					*!			

(10) Summary tableau two: 谷 /kǔ/ → 古 [kǔ]

Tableau (10) shows the need for Ident(seg) which ensures that the segmental input matches the segmental output. (10) also illustrates how the phrase structure constraint Mod=adj is required to eliminate outputs like 股 /kǔ/ 'portion' and 骨 /kǔ/ 'bone' which are both nouns.

谷 /ku3/	*SEM	MAX	DEP	ID(seg)	Mod=aj	Head=n	ID(tn)	ANI
☞ 古 [ku3]						*		*
孤 [ku1]						*	*!	
固 [ku4]						*	*!	

(11) Summary tableau three: 谷 /kǔ/ → 古 [kǔ]

Tableau (11) shows the winning output which, along with the other outputs in (11) violates another phrase structure constraint, Head=n. Given that all three outputs violate the same constraint, the lower ranking constraint, Ident(tn) is considered. Only the winning output maintains the suprasegmental tone and consequently wins by default. Tableau (12) shows the first morpheme's full output.

谷 /ku3/	*SEM	MAX	DEP	ID(seg)	Mod=aj	Head=n	ID(tn)	ANI
☞ 古 [ku3]						*		*
谷 [ku3]	*!							
[u]		*!						
[kun]			*!					
笔 [pi3]				*!				
股 [ku3]					*!			
骨 [ku3]					*!			
孤 [ku1]						*	*!	
固 [ku4]						*	*!	

(12) Summary tableau four: 谷 /kǔ/ → 古 [kǔ]

The second morpheme repeats the same comparative action as the first morpheme. Tableau (13) shows the "game constraint" at work.

歌 /kɤ1/	*SEM	MAX	DEP	ID(seg)	Mod=aj	Head=n	ID(tn)	ANI
歌 [kɤ1]	*!							
[ɤ]		*!						
[kɤn]			*!					

(13) Summary tableau five: 歌 /kɤ̄/ → 鸽 [kɤ̄]

Tableau (13) effectively eliminates the output from having the same input. MAX and DEP limit the output to segments identical to the input.

歌 /kɤ1/	*SEM	MAX	DEP	ID(seg)	Mod=aj	Head=n	ID(tn)	ANI
笔 [pi3]				*!				
胳 [kɤ1]					*!			
盖 [kɤ3]					*!			

(14) Summary tableau six: 歌 /kɤ̄/ → 鸽 [kɤ̄]

Tableau (14) again shows the need for the Ident(seg) constraint. Additionally both 胳 /kɤ̄/ 'armit' and 盖 /kɤ̄/ 'family name Ge' are nouns and therefore they are eliminated in this tableau (in a later tableau it will become apparent that these outputs suffer different fatal violations).

歌/kɤ1/	*SEM	MAX	DEP	ID(seg)	Mod=aj	Head=n	ID(tn)	ANI
☞ 鸽 [kɤ1]					*			
哥 [kɤ1]					*			*!
蛤 [kɤ2]					*		*!	

(15) Summary tableau seven: 歌 /kɤ̄/ → 鸽 [kɤ̄]

Tableau (15) shows the winning output by virtue of the fewest violations. A few points must be made here. First, as mentioned with tableau (14), multiple outputs violate the phrase structure constraint, Mod=adj. As such, later constraints are fatal. In the case of 蛤 /kɤ́/ 'clam' it is an Ident(tone) violation. In the case of 哥 /kɤ̄/ 'elder brother', however, something more interesting is happening. Here the lower ranked corollary "game constraint" ANI comes into play. Because a precedent was set by which subversive puns involve animals, netizens converged on 'ancient dove' rather than 'ancient elder brother.' Although both 'dove' and 'elder brother' perfectly maintain the segmental and suprasegmental features of the input, it appears that the 'dove' is merely following the tradition established by the river crab and grass-mud horse. Of course, the additional metaphor of Google redirecting its searches to its Hong Kong server much like a bird flying south may have played a role in the formation of (15). Tableau (16) summarizes the second morpheme (note the different fatal violations).

歌 /kɤ1/	*SEM	MAX	DEP	ID(seg)	Mod=aj	Head=n	ID(tn)	ANI
☞ 鸽 [kɤ1]					*			
歌[kɤ1]	*!							
[ɤ]		*!						
[kɤn]			*!					
笔[pi3]				*!				
胳[kɤ1]					*			*!
哥[kɤ1]					*			*!
蛤[kɤ2]					*		*!	
盖[kɤ3]					*		*!	

(16) Summary tableau eight: 歌 /kɤ̄/ → 鸽 [kɤ̄]

6. Implications, limitations and future directions

As the preceding analysis has shown, the creation of subversive puns reflects a comparative action constrained by specific rules to the game. Using the ranked constraint framework of Optimality Theory, a set of constraints was identified which then was ranked to produce the optimal output. This proposal has two important implications concerning the Mandarin lexicon.

First, as both the fixed hierarchy and phonological form of subversive puns have shown, tone is of secondary importance. Given the strict domination of Ident(seg) >> Ident(tone), it appears that the segment alone is enough for lexical activation. This finding supports Chen et al's (2002) study on word-form encoding of Mandarin, which showed that the syllable is the meaningful unit of information and that tone behaves more like metrical stress. The present framework continues to strengthen this claim by showing that reading a character seemingly activates phonological competitors with both identical segmental and suprasegmental information as well as those with only identical segmental information (but with different suprasegmental information).

If it is the case that the Mandarin lexicon is organized in such a way that the syllable is the useful unit for lexical storage, how should lexical tone be viewed? On one hand, as examples such as (2) and (6) have shown, tone is not required for native Mandarin speakers to activate the target (banned) word. However, on the other hand it is clearly the case that tone matters since Mandarin L2 speakers are continually misunderstood when first producing different tones. Is it the case that tone plays a different role between spoken lexical activation and written lexical activation? This is an empirical question that requires additional research, but the present findings certainly seem to suggest that the role of tone can be augmented or diminished given the language medium. Since text already presents the reader with a concrete segment with lexical tone, the reader may have a faster route to alternate tonal competitors as compared to a listener attempting to construct both the segmental and suprasegmental tiers. Related to this question is the role tonal competitors play in lexical activation; is it the case that within lexical activation dissimilar lexical tones are considered?

Second, the present study hints at an additional way in which the Chinese lexicon may be organized: concreteness versus non-concreteness. The proposed constraints seem to corroborate much the work done on processing concrete versus abstract words (Kiehl et al 1999). Native Mandarin speakers' ability to identify semantically relevant morphemes (in the case of subversive puns - animals) suggests that the lexicon may be organized in terms of concreteness. Nearly all of the subversive puns within the Grass-Mud Horse Lexicon are lexical items that can easily be pictured due to their concreteness (GMHL 2011). This may reflect the online tendency to design subversive puns that are animate or can be personified and thus drawn, made into cartoons, videos or webcomics as was the case with the grass-mud horse.

As the theoretical framework has shown, creating subversive puns is not an unsystematic process of choosing characters to make what at first may seem like drivel.

This framework highlights the means by which the Chinese writing system is reduced from its vast inventory to a more workable pool of characters. In doing so, a subversive pun is able to effectively maximize its playfulness and similarity to the banned word, while minimizing confusion and abstraction. Despite the present study's proposal, there are several limitations that must be addressed.

The constraint-based framework presented is a synchronic analysis based on the available data at the present time. This ludling is constantly evolving to reflect the political environment and current linguistic parameters of the internet. New subversive puns may challenge the proposed constraint ranking as the Chinese internet changes and censorship waxes and wanes. Furthermore, it may be the case that animals stop being preferred or that segments may be violated. Given the present data, neither ANI nor Ident(seg) has been violated, but it may be that a subversive pun with these traits has simply not yet emerged. For these reasons the relative ranking of some constraints such as ANI remains to be seen.

Additionally, the ludling examined in the present study is primarily a written ludling. A few words need to be said about the role the writing system plays in Mandarin. As DeFrancis (1989) has repeatedly shown, speech comes first; writing is secondary. This important point is often lost on scholars who place too much emphasis on the writing system. After all, subversive puns only work when the new lexical item is read and the phonology triggers the banned or censored lexical item. In this sense, the orthographic representation is merely a conduit to the phonology; the written form carries little importance.

Furthermore, as Mair (2011) has pointed out, it is often the case that the Chinese writing system further constrains and restricts Mandarin phonology. It is important to recognize the role orthography plays in this ludling but to not over exaggerate its significance. Could the ludling be played using pinyin? Arguably, yes, it could. The ludling is built upon the inherent homophony within Mandarin and that is a result of the phonology, not the orthography.

As the present study has shown, ludlings like Chinese subversive puns can play a key role in understanding a language's phonology, lexicon and word-form encoding. As this ludling continues to grow and new lexical items are invented, future studies will want to explore precisely how flexible these new innovations can be. Is it the case that segments can violate MAX or DEP? Is there a sense of how dissimilar a subversive pun can be from the targeted banned phrase? Is it possible to quantify segmental and suprasegmental units in a meaningful way to explain the activation of phonological competitors? In order to address these questions, future studies may want to design new subversive puns and test them on native speakers.

Additionally, using subversive puns and the Grass-Mud Horse Lexicon as a pedagogical tool for L2 learners could be very productive. Subversive puns incorporate both important cultural phenomena L2 learners may not be aware of, as well as advanced homophonic lexical knowledge that most L2 speakers lack. By integrating subversive

puns into the classroom, language teachers will be able to simultaneously teach L2 learners modern, humorous linguistic innovations while advancing their lexical knowledge of phonological and tonal competitors.

It is hoped that by outlining the background, genesis and constraints of subversive puns along with a framework by which to analyze them, future research can be carried out on their importance within Chinese linguistics. Subversive puns' popularity and growing academic legitimacy is well documented; as millions and millions of netizens can attest, this is not a temporary fad. Subversive puns are rapidly becoming a significant part of Chinese culture and language.

REFERENCES

BAGEMIHL, BRUCE. 1987. Tigrinya Speech Disguise and Constraints on Spreading Rules'. *Proceedings of the West Coast Conference on Formal Linguistics* 6.1-15, Standford, CA: Stanford Linguistics Association.

BAGEMIHL, BRUCE. 1995. Language Games and Related Areas. *The Handbook of Phonological Theory,* ed. by John Goldsmith, 697-712. Cambridge: Blackwell.

BOLTON, KINGSLEY, and CHRISTOPHER HUTTON. 1995. Bad and Banned Language- Triad Secret Societies, the Censorship of the Cantonese Vernacular, and Colonial Language Policy in Hong Kong. *Language in Society* 24(2).159-186.

BRANNER, DAVID PRAGER. 2010. Motivation and Nonsense in Chinese Secret Languages. *Luó Jiéruì xiānsheng qīzhì jìn sān shòuqìng lùnwénjí* 羅杰瑞先生七秩晉三壽慶論文集, ed. by Anne Yue-Hashimoto and W. South Coblin, 469-516. Hong Kong: University of Hong Kong Press.

CHAO, YUEN REN. 1931. Fānqieyǔ bāzhǒng 反切語八種. *Bulletin of the National Research Institute of History and Philology* 2(3).320-354. Academia Sinica.

CHEN, JENN-YEU.; CHEN, TRAIN-MIN.; and DELL, GARY S. 2002. Word-form encoding in Mandarin Chinese as assessed by implicit priming task. *Journal of Memory and Languages* 46.751-781.

CHOMSKY, NOAM and HALLE, MORRIS. 1968. *The Sound Pattern of English*. New York: Harper and Row.

COALE, KRISTI. 1996. China Shines Intranet Contract on Sun. *Wired* 4(12).

CRYSTAL, DAVID. 2001. *Language and the Internet*. Cambridge, UK: Cambridge University Press.

DAVIDSON, LISA; SMOLENSKY, PAUL; and JUSCZYK, PETER W. 2004. The initial and final states: Theoretical implications and experimental explorations of richness of the base. *Constraints in Phonological Acquisition*, ed. by René Kager, Joe Pater and Wim Zonneveld, 321–368. Cambridge: Cambridge University Press.

DAVIS, STUART. 1993. Language Games. *The Encyclopedia of Languages and Linguistics* 1980-1985. Oxford and New York: Pergamon Press.

DEFRANCIS, JOHN. 1984. *Chinese Language Fact or Fantasy*. Honolulu: University of Hawaii Press.

DUANMU, SAN. 2000. *The Phonology of Standard Chinese.* Oxford University Press.

ESAREY, ASHELEY, and QIANG XIAO. 2011. Digital communication and political change in China. *International Journal of Communication* 5.298-319.

FAN, MAUREEN. 2006. China's Party Leadership Declares New Priority: 'Harmonious Society.' *The Washington Post.* 12 October 2006.

FRENCH, HOWARD. 2005. China tightens restrictions on bloggers and web owners. *The New York Times*. 8 June 2005.

GEIS, JOHN, and HOLT, BLAINE. 2009. Harmonious Society: Rise of the New China. *Strategic Studies Quarterly* 3(4).75-94.

GMHL (Grass Mud-Horse Lexicon). 2011. 28 May 2011. Online: http://chinadigitaltimes.net/w/index.php?title=GrassMud_Horse_Lexicon&oldid= 1396.

HE, KEKANG, and LI, DAKUI. 1987. *Xiandai hanyu san qian changyong ci biao* 现代汉语三千常用词表. Beijing: Beijing Shifan Daxue Chubanshe.

HELFT, MIGUEL, and BARBOZA, DAVID. 2010. Google shuts China site in dispute over censorship. *New York Times*. 23 March 2011.

HOU, JINGYI. 1988. Shānxī lǐfǎ shèqún hánghuà de yánjiù bàogào 山西理髮社群行話的研究報告. *Zhōngguó Yǔwen* 中國語文 203(2).103-112.

HU, JIM. 2002. Yahoo! Yields to Chinese Web Laws. *ZDNet*. 20 January 2010. Online: http://news.zdnet.co.uk/internet/0,39020369,2120830,00.htm

KIEHL, KENT A.; PETER F. LIDDLE; ANDRA M. SMITH; ADRIANNA MENDREK; BRUCE B. FORSTER; and ROBERT D. HARE. 1999. Neural pathways involved in the processing of concrete and abstract words. *Human Brain Mapping* 7.225-233.

LADEFOGED, PETER. 2001. *Vowels and consonants: An introduction to the sounds of languages*. Oxford: Blackwell.

LAYCOCK DON. 1972. Towards a Typology of Ludlings, or Play-Languages. *Linguistic Communications: Working Papers of the Linguistic Society of Australia* 6.61-113.

LI, PAUL JEN-KUEI. 1985. A Secret Language in Taiwan. *Journal of Chinese Linguistics* 13.91-127.

MACKINNON, REBECCA. 2008. Flatter World and Thicker Walls? Blogs, Censorship and Civic Discourse. *Public Choice* 134.31-46.

MAIR, VICTOR. 2011. Russian Loans in Northeast and Northwest Mandarin: The Power of Script to Influence Pronunciation. *Language Log.* 20 May 2011. Online: http://languagelog.ldc.upenn.edu/nll/?p=2921

MCKAY, NIALL. 1998. China: the Great Firewall. *Wired* 6(12).

MORETON, ELLIOTT; GARY FENG; and JENNIFER SMITH. 2006. Syllabification, sonority, and perception: new evidence from a language game. *Rutgers Optimality Archive* 829-0506.

OPENNET INITIATIVE. 2005. Internet filtering in China in 2004–2005: A country study. 3 March 2010. Online: http://opennet.net/research/profiles/china

PAN, PHILLIP. 2006. Keywords used to filter Web content. *The Washington Post*. 18 February 2006.

PIERREHUMBERT, JANET, and RAMI, NAIR. 1995. Word Games and Syllable Structure, *Language and Speech* 38.78-116.

PRINCE, ALAN, and SMOLENSKY, PAUL. 1993. *Optimality Theory: constraint interaction in generative grammar.* New Brunswick, NJ: Rutgers University

QIANG, XIAO. 2004. A List of Censored Words in Chinese Cyberspace. *China Digital Times.* 8 February 2010. Online: http://chinadigitaltimes.net/2004/08/the_words-_you_n.php

QIANG, XIAO. 2007. Under the Internet Police's Radar. *China Digital Times*. 13 February 2010. Online: http://chinadigitaltimes.net/2007/08/under-the-internet-polices-radar

QIU, JACK LINCHUAN. 2000. Virtual Censorship in China: Keeping the Gate Between the Cyberspaces. *International Journal of Communications Law and Policy* 4.1-25.

TREIMAN, REBECCA. 1983. The structure of spoken syllables: evidence from novel word games. *Cognition.* 15.49-74.

VAGO, ROBERT M. 1985. The treatment of long vowels in word games, *Phonology Yearbook* 2:329-342

WILBUR, SHAWN. 1996. An archaeology of cyberspaces: virtuality, community, identity, *Internet Culture*, ed. by David Porter, 5-22. New York and London: Routledge.

WINES, MICHAEL. 2009. A Dirty Pun Tweaks China's Online Censors. *New York Times*. 12 March 2009.

WINES, MICHAEL. 2011. China creates new agency for patrolling the internet. *New York Times.* 4 May 2011.

WU, VIVIAN. 2009. Censors strike at internet content after parody hit. *South China Morning Post 3* April 2009.

YIP, MORIA. 1982. Reduplication and the C-V Skeleta in Chinese Secret Languages. *Linguistic Inquiry* 13.637-661.

ZHANG, JIE. 2001. *The Effects of Duration and Sonority on Contour Tone Distribution--Typological Survey and Formal Analysis.* Los Angles, CA: UCLA Disseration.

ZITTRAIN, JONATHAN, and EDELMAN, BENJAMIN. 2003. Documentation of Internet Filtering Worldwide. *Spreading the Word on the Internet: reflections on freedom of the media and the Internet*, ed. by Christiane Hardy and Christian Moller, 137-148.Vienna: Organisation for Security and Cooperation in Europe.