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Promoting Bottom-Up Processing Through Literature

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PROMOTING BOTTOM-UP PROCESSING THROUGH LITERATURE: *THE SOUND AND THE FURY* AND EMPATHY

A thesis submitted to
Regis College
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by

KC Moore

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Thesis written by

KC Moore

Approved by

_____

Thesis Advisor

_____

Thesis Advisor

_____

Thesis Reader

Accepted by

_____

Director, University Honors Program

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Introduction: Processing types and the role of art

My cross-categorical confusion

At the end of the summer before my senior year of college, J.K. Rowling released *Harry Potter and the Cursed Child*. In high school, my friends and I used to re-read all of the first seven *Harry Potter* books annually, so, as an avid fan of the original stories, those close to me assumed that I would be deeply invested in—or would at least generally know about—this new addition to that universe.

"Do you know how many copies of it have been sold so far?" my friend Dani asked me. We were in her living room, amid the awkward socializing of her middle-aged relatives, trying desperately to distract ourselves.

The two of us always managed to keep pace with each other when re-reading the first seven books, and although we had read those countless times, neither of us had touched the newest addition yet; we had only heard about it indirectly through articles online. One such article was about the book's success, and coincidentally, I remembered having read it earlier that week. Because it was theoretically still fresh in my mind, I felt fairly confident when I quickly answered, "A billion."

Michael, Dani's cousin, shot me an odd look, as though I were somehow an idiot for responding correctly. "A billion?" he asked, confused. After waiting for his question to sink in, he then added, "You're not very good at math, are you? How could a billion people buy it already when it just came out a few days ago?"

And, yes, with seven billion people in the world, I can see now that it would be unlikely that 15% of the entire earth would go out to buy J.K. Rowling's newest installation in the *Harry Potter* universe after only a few days, no matter how popular the book series is. At the time, though, I was a bit too peeved at being called dim-witted to logically think through this, and I remained irrationally defensive of my original answer.

Dani, having known me for years by that point, immediately took my side. "I think it was like 680,000. That's still a lot." Not close to a billion, but she was kind enough not to point that out.

Michael clearly still doubted my intelligence.

I realized what had happened moments later. 680-thousand—a bright green number, a deeper green number, and a bright green letter. *6-8-t.* It was so similar to the deep green of *b* and the bright green of *l* in "billion"—similar enough that I was unable to get to the actual answer, instead hung up on the physical stimulus of the color green.

You see, I have synesthesia, a neurological condition that is named for its tendency to bring sensations together. Some estimates posit that it affects approximately 4% of the general population, although the actual number of those afflicted is unknown given that many people do not know they have it (Banissy, Jonas, & Kadosh, 2014). It "involves the automatic activation of unusual concurrent experiences in response to ordinary inducing stimuli" (Meier & Rothen, 2015). In other words, one stimulus causes someone to experience two or more responses that may not normally go together. And these are not just any automatic responses to stimuli; instead, synesthesia includes "certain stimulus in one modality" that causes automatic "unusual extra sensations in

other modalities, such as seeing or feeling colours while listening to music or personifying of letters and numbers" (Mikuš, 2013). This crossing of modalities can occur in any number of combinations, with up to 60 known variants (Banissy, Jonas, & Kadosh, 2014). Colors are often associated with numbers, letters, smells, and sounds. Tastes can be induced by certain words. Pain can even have a certain color and texture to it. In their review of synesthesia, Rocco Chiou and Anina Rich (2014) make the following claim:

> Although subjective experiences vary across individuals, the majority of [non-synesthetes] seem to perceive the world in a similar way, providing a common ground for communication…For individuals with *synesthesia*, however, the experience of the environment can be quite different from the rest of us.

This definition does indeed touch on very important issues, but it should also be noted here that there is no established uniformity in either synesthetic or non-synesthetic thoughts. In other words, those without synesthesia have unique viewpoints in that their life experiences impact the ways in which they interact with their world, and those with synesthesia have these same variable experiences as well as their own unique form of cross-modal thinking. Although these issues with such an assertion of general uniformity across people's perceptions of the world do exist, the fact that synesthesia fundamentally alters experiences of set stimuli remains salient in this claim by Chiou and Rich. Synesthetic encounters, varying even from synesthete to synesthete, often result in a blurring of schematic categories that pushes outside of top-down processing and induces bottom-up. Indeed, one theory regarding the neural cause of synesthesia "suggests that

synesthesia results from a 'glitch' of the inhibitory circuitry that fails to suppress crosstalk between brain areas, which is normally inhibited in the non-synesthetic brain" (Chiou & Anina, 2014). Although the hypothesized correlates for such cross-talk are still up for debate, the effect posited in their article is confirmed by synesthete's self-reports. This "crosstalk between brain areas" allows for cross-modal and cross-categorical perceptions of the world that deviate from the "norm."

As a result of this, for me, the numbers *8* and *6* and the letters *b* and *l* all produce an involuntary feeling of green in my mind. Being synesthetic, having my senses crossed like this, I was unable to perceive six hundred and eighty thousand without simultaneously recording the colors of each aspect of that number. It was such a green number, after all, and when recalling the information, I could only remember the green of it. I consequently responded with the first intensely green number I could think of—a billion.

Top-down processing and categorizing the world

When we perceive a stimulus, we automatically categorize—that is to say, we interpret a stimulus as being part of some pre-existing conceptual category. Because there are so many sights, smells, sounds, and more that we experience on any given day, such categorization allows us to process our exterior world quickly and efficiently. For example, we see a dog, and although it may be a different breed of dog than any we have seen before, we still place it under the general overarching term of "dog." The same thing occurs when we hear a number, or see a color, or perceive an emotion on

someone's face. External stimuli are classified "according to certain principles, such as perceptual similarities, semantic rules or theories, implications for goal states, or evoked emotional responses" (Brosch, Pourtois, & Sander, 2010). This categorization allows us to discriminate between types of objects, permitting us to distinguish a cat from a dog based on their differences while recognizing that Australian Shepherds and German Shepherds still belong to the same group, despite their variations from one another.

Top-down processing, wherein certain schemata are imposed upon a stimulus, is especially important in the categorization of our external world, and its goal is to make our observation of these externalities more efficient (Brosch, Pourtois, & Sander, 2010). These schemata are flexible enough to allow Australian Shepherds and German Shepherds—two very different breeds in appearance—to both be classified as dogs, while still maintaining the differences well enough to separate this group from cats. Similarly, if we see a light in the sky, it is through the imposition of schemata and the establishment of distinct categories that we are able to differentiate between, say, the sun, the moon, stars, and a street lamp. Top-down processing is therefore instrumental in allowing us to know the distinctions between discrete categories, which may include letters, numbers, and colors. Imposing these categories and creating that mental efficiency certainly have adaptive advantages for humans. Hullinger, Kruschke, and Todd (2015) note that one advantage of only selectively attending to stimuli is to keep external "input complexity within an organism's processing capacity limitations." In other words, imposing categories on the exterior world allows for less over-stimulation in an individual. Utilizing top-down processing additionally permits humans to grasp rule-based tasks

more quickly, as top-down processing essentially involves the formation and commitment to a given set of rules. Smith et al. (2012) believe that the emergence of "rule learning could have been an important step in primates' cognitive evolution," with "rule learning" being associated with top-down categorization. This ability to impose and follow rules in perception has likely proven advantageous throughout our evolutionary history, leading to its near-fixation in our species. By creating a more efficient mode of perception, we are less susceptible to sensory overload or to over-stimulation.

Top-down categorization is at work in every part of our lives. Even when trying to read over someone's messy handwriting, we are actively engaging in top-down processing, using our knowledge of context and syntax to fill in the areas in which the writing has become too illegible to actually read on its own (Barnhart, & Goldinger, 2010). And this method is definitely helpful, as I would have a much harder time deciphering the "chicken-scratch" that some of my professors put on the board without the use of these schemata. With regard to language specifically, top-down perception becomes increasingly prevalent throughout childhood development (Bitan et al., 2009). Many researchers have posited the nascence of heavy cross-modal connections, meaning that this developmental increase in top-down processing later in life represents a re-writing of our latent perceptive techniques (Spector & Maurer, 2009). As this re-writing continues, we increasingly rely on top-down schemata to assist us in understanding our environments.

Bottom-up processing and movement between categories

Of course, for me, these categories blur together more than they would for a non-synesthete, meaning that my cross-modal associations do not stop at such situations as the bouba/kiki effect. The letter *b*, the number *8*, and deep green are all intrinsically tied in my mind. Top-down processing glitches here, because the categories are not separate enough as to make my outward perception of the world more efficient. The resulting cross-categorical interaction was inexplicable to Dani and Michael, both of whom do not regularly deal with any dramatic disruptions in their top-down view of the world.

Although top-down categorization dominates much of non-synesthetic thought, it is by no means the only way in which to view the world, with bottom-up processing methods appearing at the other end of this perceptive spectrum. In the privileging of bottom-up processing, which breaks from the strict categorization of top-down, individuals unconsciously construct a world of experiences and materiality; in privileging top-down processing, conversely, individuals quickly dismiss the physical artifice or sensations elicited from their environments in order to get at the conceptual content that the stimulus conveys. The latter involves relatively barren efficiency, while the former creates a far richer and less efficient experience. Because cross-modality creates a situation in which non-categorical sensations are elicited with each stimulus, its disregard for categories and general focus on sensation and materiality allow it to be associated with bottom-up thinking in the same way that it is distanced from a top-down or categorical world.

Conditions such as synesthesia and autism spectrum disorders often increase the level of bottom-up processing—that is, processing based on the stimulus itself rather than on the schema to which the stimulus is subjected—until it becomes more common than it would be in so-called "neurotypical" individuals, or individuals without such conditions. In a study on visual reasoning in autistic children, Takesaki et al. (2016) found there to be "increased bottom-up connectivity from the visual areas," thereby making this sort of thinking more common in visual reasoning, something that might not be the case for a "neurotypical" individual. If we simply assume a top-down system, then, we are neglecting the viewpoints of entire groups of people for whom top-down is not necessarily the default mode of perception. This general adherence to a top-down mindset signifies a corresponding and often involuntary lack of empathy for those who differ from that mindset. Although this lapse is likely not meant maliciously, addressing it by increasing the variety of depicted perceptual techniques can still have a profound impact on allowing for more empathy for cross-modal, bottom-up thinkers.

Many things today—from sexuality to autism—are widely regarded as containing a spectrum along which people will fall rather than merely being a strict one-or-the-other situation (e.g., modern observations on sexuality). The same is arguably true for top-down and bottom-up processing. The aforementioned study discussing the increased bottom-up connectivity in autistic children arises in comparison to an average level of bottom-up connectivity in non-autistic children. People with autism or synesthesia would therefore stereotypically fall more toward the bottom-up end of the spectrum, and those without such conditions might stray toward top-down more often than not. Even still,

few people in either category mentioned (bottom-up-biased or top-down-biased individuals) would exist purely on one end of this spectrum. This is what I mean in calling top-down perception the default in a large portion of the population—not that it is the only way in which people without certain conditions can perceive the world, but that it is the mode of processing on which they rely more heavily. Top-down categorization assists many of us in sorting information efficiently and quickly, and it allows us to focus on the content of a given stimulus as soon as possible. That is not to say, however, that we do not occasionally focus on the exteriority of the stimulus rather than on what it means; this is where instances of bottom-up processing might temporarily take over. I, for example, enjoy listening to music in French, in spite of the fact that I cannot understand a single word of the language itself. The sound of it is sufficient, and I hardly care what the words mean. I am sure that many people have had similar experiences, regardless of how heavily they rely on top-down processing in their everyday lives.

Of course, even with this spectrum in existence, it would be difficult for me to simply expect Dani and her cousin to understand my thought processes all the time, as they see the world very differently than I do because they may fall further toward the top-down end than me. I engage in much more bottom-up thinking than they would ever need to, just as someone else with a different form of synesthesia might be even more involved in that sort of thinking than even I am. Although there is a spectrum of processing, it is much less common for those who favor top-down perception to be induced into abandoning those particular categorization methods than it is for those who engage in more bottom-up views to experience life from the other end of the continuum.

Dani and her cousin might therefore happily remain in their top-down-default world without ever seeing occasion to be forced out of that for long periods of time, while I am constantly reading books that force me to see the world in a far more categorized way than I typically do.

For Dani and Michael, it would have probably been less confusing for them if I had answered Dani's initial question with 1,000,000,000 simply because I remembered seeing a large number (680,000) in the article and responded back with another large number in order to fit that pattern. When my justification for my mistake was based on the color rather than the number, it was difficult for them to understand this crossing of categories. Confusion within a category is fairly standard (e.g., it would make sense for me to be unable to recall whether I had perceived dark green or light green), whereas confusion between categories is less common (Brosch, Pourtois, & Sander, 2010). As a result, my lack of distinction between numbers, letters, and colors was more difficult for Dani and Michael to understand. A particularly important method for forcing bottom-up processing in the place of top-down would therefore be to interrupt these categories or to engage in cross-modal language as a method of synthesizing a disruption of their top-down worldview.

Role of literature in the abandonment of top-down views

Engaging in cross-modal language and inhabiting a bottom-up-dominant mindset might be a difficult thing to accomplish on one's own, and thus some guided descriptions written from that cross-modal, bottom-up perspective might be useful. Literature can

very easily accomplish this task, as it creates a world the reader can temporarily inhabit that may be different from that which they generally know. Of course, such guided literature would need to include cross-modal language and would need to stray from the traditional categorical descriptions to which we have habituated over time.

While addressing an adjacent issue in his essay *Art as Technique,* influential literary critic Viktor Shklovsky establishes a clear distinction between poetic language, such as might appear in a work of art, and practical language, which would be used in everyday speech. Shklovsky saw practical language as preserving an "economy of energy," meaning that the speaker uses as few words as possible to get across their point (Shklovsky, 1965). Practical language generally aims at maximal categorization on all phonetic levels, with efficiency of communication as the main goal. Poetic language, on the other hand, is meant to "make objects 'unfamiliar,' to make forms difficult, to increase the difficulty and length of perception because the process of perception is an aesthetic end in itself and must be prolonged" (Shklovsky, 1965). Essentially, Shklovsky views artistic language as forcing the viewer to focus on a particular representation because the language makes the represented object unfamiliar to them. Because everyday life can become easily habituated, an observer may not have a profound experience from merely seeing or reading about another manifestation of all that they already know; however, such an experience might be had if the familiar objects were framed in such a drastically different way as to become unrecognizable. This mimics the distinction noted above between literature that allows us to inhabit an entirely different

mindset and that which merely perpetuates the same general top-down schemata on the environment.

Furthermore, practical language, which strives to achieve that "economy of energy," would simply present the world in familiar and accepted categories so as to convey a message in the clearest possible way. Such language allows us to impose our pre-determined schemata on the world and to maintain our categorical perceptions. So, if we view top-down operational speech as simply maintaining familiar groupings of stimuli, then cross-modal literary techniques (i.e., those that induce a blurring between groupings) are therefore considered aesthetic under Shklovsky's definition, as these techniques de-familiarize their subjects enough to disrupt the standard top-down processing someone might attempt when exposed to a story. Again, this suggests that a story involving unique, de-familiarizing cross-modal connections ought to be considered more poetic than one that offers the same connections in the same categories as exist in daily life.

This distinction between the language of speech and the language of art can be easily observed in our everyday experiences. The other day, I was talking to my friend about someone who sits next to me in one of my classes. "He seems like a nice kid," I told her, "but he's been sick for about two weeks, and I can smell it on him." This is a fairly straightforward description, and it would hardly require my friend to mediate on it for more than a second or two before working out precisely what I meant in saying it. According to Shklovsky, prose, or practical language, is "economical, easy, [and] proper" (Shklovsky, 1965). Because this statement is so easy to comprehend, and because it

would require minimal mental effort from both my friend and myself, my statement about the smell of a kid with a cold would be considered practical language.

If I intended to document this incident in the form of a short story, however, I would almost certainly approach the description differently. Instead of being so direct in my statement, I might say, *Every day he sits beside me, and as nice as he is in personality, I cannot get over the smell of him. That smell. That sickly, grainy orange hue laid overtop an equally sickly olive green. The scent of it has hung heavy over him for two weeks now.* This is not quite so straightforward as my practical conversation with my friend, if only because it is never explicitly states that the smell of illness on my classmate is the thing that is invoking these sensations in me. This therefore de-familiarizes the scent of an illness on someone. Additionally, smell and color overlap here in a way that they naturally do in my mind, but for someone without synesthesia, this statement might be a bit more jarring. Even to a synesthete, this description of colors would still cause prolonged perception of the image (the associated color of the smell), as synesthetes tend to vary in their color perceptions. Normative descriptions of smell—and even "normative" descriptions of smell for someone who links that to color—are disrupted and made unfamiliar here, and mental effort is prolonged rather than economized. Consequently, this is aesthetic language.

In order to induce bottom-up thinking in someone who might otherwise avoid it, then, artistic language can be an excellent method, especially artistic language according to Shklovsky's de-familiarizing definition. Because of this ability to de-familiarize traditional structures, literature is the prime place in which to induce bottom-up

processing instead of top-down processing. When encouraged to view the text from this different lens, even those who favor top-down thinking in everyday life will be able to witness what the alternative viewpoint might be. Because we see the lives of others through reading, literature already helps us to cultivate empathy by exposing us to different personalities and situations than those to which we have become accustomed (Turner, 2013), where empathy is defined as "the ability to understand and appreciate another person's feelings, experiences, etc." (*OED*, 2014). By employing cross-modal language to promote bottom-up processing, literature can further serve as a great promoter of empathy by allowing us to adopt the mindset of someone else, both in terms of their opinions and in their very method of viewing their environment.

Going forward

Throughout the remainder of this work, my own definitions of the different language types will be based upon Shklovsky's views on this subject: "practical language" will be that which allows both listener and speaker to limit mental effort while adhering fairly strictly to a top-down or categorical structure with regard to information processing, and "artistic language" will be that which de-familiarizes formerly familiar things or groupings for the reader and requires an increase in the process of perception that deviates from the norm established by practical language.

In the upcoming chapters, I will begin by noting some of the limitations of uni-modal techniques—or those that do not interfere with categorical perceptions—in literature. I will then explain the ways in which cross-modal techniques avoid these

limitations and more effectively de-familiarize the reader. Upon establishing cross-modal devices as clearer examples of true artistic language than uni-modal devices, I will explain the ways in which the resulting change in processing mimics the way in which many people (e.g., synesthetes and those with autism) naturally process the external world. In causing readers to truly take on the mental perceptions of someone else, artistic language is therefore in the unique position of being able to cultivate real empathy after simply reading a literary work.

Limitations of pure top-down processing

Habitualization of imagery

      "Art is thinking in images." Shklovsky quotes this particular maxim in his influential work, *Art as Technique.* He, of course, disagrees with the simplistic view that art is reducible to thinking in images. In fact, when addressing this school of thought, he claims, "But we find that images change little; from century to century, from nation to nation, from poet to poet, they flow on without changing. Images belong to no one" (Shklovsky, 1965). Even in this statement, it is possible to feel the habitualization occurring. Time flows on; people pass through; images remain constant. With this constancy of the image itself and the continual movement of humanity, what once might have been a unique perception of the world is soon internalized to the point where it is no longer novel: "After we have seen an object several times, we begin to recognize it. The object is in front of us and we know about it, but we do not see it—hence we cannot say anything significant about it" (Shklovsky, 1965). In other words, as we are repeatedly exposed to certain objects and situations, we become habituated to those sources of stimulus in our environment. Habituation presents itself as one form of top-down categorization in that it allows for the quick and efficient perception of certain common stimuli. Over time, those stimuli and images—most of which appeal to only one sense modality—quickly become exhausted. Because they fall so easily into discrete categories, and because they are so common, they eventually become entirely

overlooked. This is especially prevalent in regard to literature, as our employment of top-down processing—and consequently our ability to habituate—in language increases with development (Bitan et al., 2009). While language and literature are indeed different, the use of language in literature is essential, as the latter cannot exist without some use of the former. As we gradually rely more and more on top-down processing when involved with language, we also alter the ways in which we perceive how that language is used, meaning that we might expect some corresponding change in literary perception as a result of this over-writing reliance on top-down processing.

With this increasing default of categorical perception of language, with the overuse of certain stock images throughout literature, it is no wonder we have exhausted certain metaphors and modes of storytelling. These exhausted images that, according to Shklovsky, we no longer see as a result of their habituation become what is sometimes referred to as "dead metaphors." A dead metaphor is merely that which "has become commonplace and idiomatic" to the point of losing literary meaning (Postnikoff, 2010). The imposed category for such a phrase becomes so strong as to overpower the more literal sensation the phrase originally invoked. When a character speaks of "falling in love," for example, it is generally understood what emotion they are feeling, but the connotation behind "falling" into it is often lost in today's world. It has become such a standardized expression that there is no longer any recognition of the original idea of plunging down into an emotional state of attachment to another person. This phrase can arguably not be considered art any longer, as its arousal of sensation in the reader has been reduced to nothing beyond the accepted schematic created for it. Though certain

linguists do take issue with the term "dead metaphor," the principle behind the concept is undeniable (Postnikoff, 2010). Some images are repeated relentlessly by countless writers and become so easily recognized by readers that they lose much of their impact.

This habitualization of imagery is the result of top-down and categorical processing of the world, and because it allows for an economy of mental effort on behalf of the reader, it therefore changes historically poetic language into practical language. If literature fails to defy this top-down mode of thinking, then we risk poetic language devolving into purely practical language when readers can too easily habituate to it. Indeed, for Shklovsky, any language that fails to de-familiarize its readers is not literature at all, even if it occurs in a form that is recognized as literary.

Alienation of cross-modal thinkers

In addition to risking the perpetuation of dead metaphors, writers who create works that are solely for top-down thinkers also alienate those who might not think in such a heavily schematized way. By limiting literature to a solely top-down perspective, writers promote an erasure of the "other" while privileging the more "normal" self. I previously mentioned how synesthetes might vary from non-synesthetes in terms of general perception, and it is fitting to reiterate that point here, especially given that synesthetic metaphor is often one method used to combat mere economical or practical language. Synesthetic brains may be more inclined to engage in non-categorical or bottom-up processing rather than categorical or top-down, making the use of strictly top-down structures in literature an unsatisfying experience for a synesthete: not only would

it be too easy to habituate, but it would also ignore the real-life modes of thinking that synesthetes might prefer.

I also previously mentioned that those with autism spectrum disorders commonly experience increased prevalence of bottom-up reliance. In addition to these general observations on the possible preference in those with autism for that particular end of the processing spectrum, similar experiences with cross-modality are frequently reported in autistic individuals. Indeed, the rate of synesthesia is three times higher in autistic individuals than it is in the general population (Baron-Cohen et al., 2013). Such results have led researchers to posit a genetic correlation between the two conditions (Neufeld et al., 2013). Beyond this likely genetic correlation, both autism spectrum disorders and synesthesia present with many similar neurological differences. Increased connectivity has been observed in the brains of both autistic individuals and synesthetes (Courchesne et al. 2009; Haenggi, Wotruba, & Jancke, 2011). With these increased neurological connections, there appears to be more entwined associations between local networks and adjacent areas of the brain in both of these conditions (Casanova & Trippe, 2009; Hubbard & Ramachandran, 2005). Not only are synesthetic and autistic brains different than the "norm," but the two conditions actually resemble one another in certain ways that indicate some genetic linkage between them. In both cases, cross-modality is more prevalent than in "normal" individuals, meaning that the overall rate of bottom-up processing likely increases as well. Reading top-down-biased literature, then, prevents both synesthetes and those autism from connecting fully to the story being told.

Subconscious alienation of the self

While top-down categorical language in literature may seem to only alienate cross-modal thinkers, it actually can restrict even a top-down-dominant individual's ability to engage with the work as well. In fact, in spite of their neurological differences, synesthetes and non-synesthetes share certain perceptions about the world. According to one prominent hypothesis, the cross-modality observed in early childhood, when not re-written fully, can manifest as synesthesia; synesthetic-like perceptions are therefore present in early childhood and can still "persist in muted form even in typical adults" (Spector & Maurer, 2009). While most prominent in bottom-up processors such as children and synesthetes, certain cross-modal connections may still appear in the general population. For example, Rich et al. (2005) surveyed 150 synesthetes and assessed patterns in their letter-color associations; interestingly, this study also found related patterns within the letter-color associations present in non-synesthetes who were interviewed and asked to pair letters with colors. In a similar study, Simner et al. (2005) observed relatedness between synesthete and non-synesthete participants in terms of grapheme-color links, and they concluded that synesthetes merely feel these associations involuntarily, whereas non-synesthetes are capable of coming up with similar color patterns but only when prompted. It seems that everyone might be capable of some sort of synesthetic experience, meaning that on some level non-synesthetes are able to understand synesthetic-type thinking if it were presented to them. This capacity for cross-modal experience might be heightened by the de-familiarizing effect that

Shklovsky attributes to poetic language, as this de-familiarization induces bottom-up processing in both synesthetes and non-synesthetes alike.

This latent capacity for cross-modal thinking in all people becomes especially apparent when looking specifically at the ability of sound symbolism to act as a de-familiarizing device. Sound symbolism "refers to the ability of particular word sounds or phonemes…to convey information and hence influence perceptions" (Coulter & Coulter, 2013). This is not a conscious choice on behalf of either reader or writer, but it instead represents a foregrounding of the materiality or stimulus of the sound itself. Because the materiality of the sound requires no knowledge of the sound's meaning, this represents a pre-categorical perception, or a perception that exists before top-down categorization of the sound occurs. Additionally, because sound symbolism emphasizes the stimulus itself rather than the content, this literary device is reflective of bottom-up and cross-modal processing methods. One of the most well-documented examples of this is the so-called bouba/kiki effect (Figure 1), wherein non-synesthetic individuals name a rounded shape "bouba" and a sharp shape "kiki" based solely on the inherent cross-modal associations that occur with the sound of each word (Köhler, 1929).
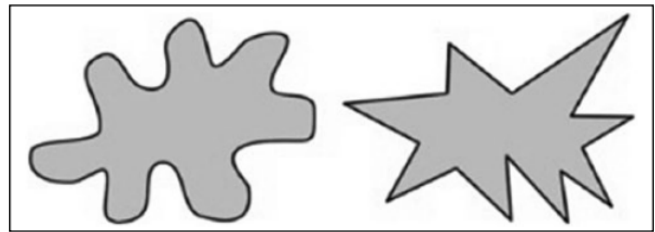

Figure 1: An illustration of the shapes deemed "bouba," on the left, and "kiki," on the right, with the sound of "bouba" lending itself to a universally more rounded shape, while "kiki" appears to resemble a universally sharper shape. This demonstrates the ability of sound symbolism to impact perception. Retrieved from Fort, Martin, and Peperkamp (2015).

Linguist Reuven Tsur (1992) explores this in his book, *What makes sound patterns expressive?: The poetic mode of speech perception.* Tsur notes that "people may have intuitions that certain vowel contrasts correspond to BRIGHTNESS~DARKNESS" and that "poets may more frequently use words that contain dark vowels in lines referring to dark colors, mystic obscurity, or slow and heavy movement, or in depicting hatred and struggle." Though there is nothing overt about back vowels (so named for the placement of the tongue in forming their sounds) that makes them appear physically darker, these innate associations are such that they come through in linguistic analysis and in the composition of poetry or prose. This sort of innate association is made even more prevalent during a so-called "thought-experiment" conducted by Tsur in which he asks his friends and family, "Which sound is more metallic, /b/ or /g/?"

Inspired by this, I immediately called my mom and asked, "Would you say 'ba' or 'ga' is more metallic-sounding?"

My mom answered, "Ga," without hesitation.

Later, when working with four of my classmates, I again asked, "Would you say 'ba' or 'ga' is more metallic?"

And, again, they all immediately answered, "Ga."

These results are hardly revolutionary, as Tsur, in his questioning of his own friends and family, found precisely the same thing. Everyone to whom Tsur spoke identified "ga" as the more metallic sound. This is interesting, as it suggests that there is some sort of automatic connection between metal and "ga" that many people are capable of perceiving.

More interesting than that, perhaps, is the fact that no one interviewed by Tsur—and indeed no one I interviewed either—was confused about the question.

"No one questions the question," I pointed out to my mom and later to my friends. "No one thinks it's weird for me to be asking for a metal sound in regard to two different letters."

At that point, and only then, did those to whom I was speaking actually ask me why I was interested in such a thing. Tsur similarly notes that any interrogation from his companions only occurred after they had given their response, meaning that the link between consonant sounds and varying degrees of metallic-ness was more easily recognized than the oddity of the categorical crossing that occurs when considering the question in the first place. The immediate response ("ga") and lack of immediate confusion ("why this question?") further strengthen the hypothesis of an innate blurring between categorical perceptions that goes overlooked in everyday life. The sound symbolism of more metallic sounds somehow fits with a pre-categorical perception of the phoneme /g/. When someone hears "ga," they do not register the metallic sound of it until they are questioned specifically about its similarity to metal. This shows the degree to which top-down processing filters out extraneous and cross-categorical stimuli. The connection is there in a pre-categorical context, but because it does not fit with the economical schemata set in place by this processing method, the brain fails to recognize it until prompted to do so.

Both scientific and linguistic evidence suggest a sort of synesthetic experience that everyone is capable of having, but insistence on representing the world in this

economical way prevents people from engaging with this oft-neglected part of their own perceptions.   In order to encourage bottom-up processing in those that might not automatically engage in it, synesthetic language—also referred to as cross-modal language—becomes especially relevant.   Because there are so many latent synesthetic associations tied to language, foregrounding that in literature can allow the reader to connect with a typically concealed part of themselves and can also foster new insights into the minds of others by breaking them out of their traditional mindsets.

Through Benjy's eyes: bottom-up perceptions in The Sound and the Fury

Sound symbolism, cross-modal metaphor, and de-familiarization are all literary techniques that appear in many stories, though de-familiarization is perhaps the easiest to observe given the relatively simply adjustments to a narrative that can bring it about. Even altering the perspective from which the story is told can have a de-familiarizing effect. The most common perspectives used in literature—at least in my experience as an English major—are third person limited and first person. Both of these techniques allow the reader to track the progress of a specific character throughout a particular set of circumstances. With only one character to inhabit, the reader can become more deeply invested in that character and can better understand their particular worldview. And, generally, this is how stories are told.

Of course, deviation from this norm in the form of switching perspectives certainly has a de-familiarizing effect, especially if each perspective differs drastically from the rest. This is something that William Faulkner does in his novel *The Sound and the Fury*. The book takes place in four sections, each with a different narrator and, consequently, a different style. Breaking it up like this places emphasis on disorienting the reader by preventing them from becoming too involved in any particular character's set of experiences or style of storytelling. This creates that same de-familiarizing effect noted earlier while also theoretically allowing the reader to become briefly familiar with many different modes of perception.

The first chapter is arguably the most difficult to understand, as it is written from the perspective of a man, Benjy Compson, with drastic mental handicaps. As such, Faulkner constructs Benjy's narrative in such a way that we as readers are forced to only view the world in the cross-modal way that Benjy does, although this transition into his mindset might be more abrupt for someone of a "neurotypical" mindset. In this way, Faulkner disorients the reader further than a break in narration would otherwise allow by immediately thrusting us into the unfamiliar mind of Benjy. His particular brand of thinking promotes bottom-up processing of external stimuli in a way that deviates from the "normal" perceptual experience of many people, as I will demonstrate here.

Benjy and bottom-up disruption

There are several unique points of cross-categorical confusion that occur in Benjy's section of the novel, one of which happens when he notes, "The sun was cold and bright" (Faulkner, 1929/1994). We generally know that the sun is associated with brightness and *heat*, and the cold has no real place in our category "sun." This creates a moment of confusion for the reader as the actual object Benjy perceives becomes unclear. The words themselves are familiar, but the combination is essentially novel. This move is reminiscent of one of the final lines of William Wordsworth's poem, "The Idiot Boy," in which a mentally handicapped boy, after getting sidetracked in the woods for several hours, comments, "The sun did shine so cold" (Wordsworth, 1798/2008). In this poem, as critic Richard Cronin (2014) helpfully points out, the boy refers to the moon as a cold, shining sun, as this is simply what he knows it as in his own worldview: "The boy does

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not compare…the moon to the sun: he sees one as the other." The same occurs in *The Sound and the Fury* with Benjy, where his limited vocabulary allows him to focus on things in a new light. "Distant," "natural," "bright," "hot"—all of these descriptors are easily applied to "sun" in our minds. The schemata we impose on our perception of the sun allows for this. This is not an entirely flexible schema, however, as we cannot add "cold" into the list of descriptors and still hope to reconcile that with our perception of what the sun is. This is what makes the passage so de-familiarizing and so difficult for the reader to process. It branches out from our somewhat flexible category of sun-descriptions in a way that does not fit with what we know to be true about the sun. Here, our top-down approach fails. We cannot hope to see Benjy's world while struggling to reconcile all of his perceptions with rigid, known schemata. Because of this, we as readers are left to merely view the sun as Benjy sees it and to accept that it did shine bright and cold that day. In that moment, we take on an imperfect approximation of his consciousness, so different from our own that it at first seems challenging.

Here, I would like to take a brief moment to note the importance of this association between Benjy and Wordsworth's "Idiot Boy." Wordsworth's poem occurs in a collection he composed with Samuel Taylor Coleridge, wherein the two of them attempted a fairly novel task: "[These poems] were written chiefly with a view to ascertain how far the language of conversation in the middle and lower classes of society is adapted to the purposes of poetic pleasure" (Wordsworth, 1798/2008). This might seem like the exact opposite of the poetic language Shklovsky desires, given that Wordsworth admits to wanting to write in the common dialect. However, during

Wordsworth's time, such practical language in a poetic medium rarely occurred, so his use of simpler phrasing in his poems actually prolonged mental effort because of its break from the poetic norm in a way that Shklovsky might appreciate. It is significant here that Faulkner's words so resemble Wordsworth's, who at his time was striving to redefine the nature of poetry. While there is no direct evidence that Faulkner used Wordsworth's character as a model for Benjy, the correlation allows us as readers to draw parallels between Wordsworth's boldly "common" poetry and Faulkner's use of such a dramatically "atypical" narrator.

Moving back to *The Sound and the Fury*, Benjy follows his initial observation on the unfamiliar moon with descriptions of how he "could smell the bright cold" (Faulkner, 1929/1994). Smelling a temperature is a bit odd, though not overly difficult to imagine, but given that "bright" and "cold" are both descriptors used on the same page to describe the moon, this suggests that Benjy can smell the moon itself. Of course, as a reader, this claim is disorienting, as the moon really is much too far away to smell, but because Benjy cannot clarify his meaning, we are left to interpret this passage as showing his ability to smell the bright cold air and the moon. This is very different than the ways in which we would normally perceive both of these things—a chill in the air is typically felt, and the moon is typically seen—and as a result, it de-familiarizes each part of Benjy's environment from what we are used to seeing in our own everyday lives. Again, our usual schemata by which we categorize external stimuli becomes nearly impossible to impose, with "cold," "distant," and "sun" all being as irreconcilable as "cold," "distant," and "smell" are. With that, we sink a bit deeper into his materialistic world.

These two instances are not the only ones in which Benjy confuses his perceptual senses from what might be more recognizable to readers. Later in his section, he notes, "*I couldn't see it, but my hands saw it, and I could hear it getting night, and my hands saw the slipper but I couldn't see myself, but my hands could see the slipper, and I squatted there, hearing it getting dark*" (Faulkner, 1994). This is an incredibly rich passage, invoking a blurring of senses through its wording. Benjy "sees" the slipper he holds with his hands. He "hears" it getting dark. If I were to write about this scene in my own life, I might say, *I couldn't see the slipper, but I could feel it with my hands, and all I could see was the darkness*. Even more than just those de-familiarizing observations in themselves, Benjy *repeats* each phrase, meaning that he asserts his hearing-with-eyes and his sight-with-hands two and three times, respectively, in this sentence. Benjy's certainty that he is seeing the slipper with his hands and that he is hearing the darkness emphasize the way in which he differs drastically from our traditional narrator or even the other narrators in the novel.   Even my proposed top-down and schematized version of this observation cannot be definitively proven to be Benjy's true intent when thinking in this way. Because we have no way of knowing precisely what Benjy is experiencing during this scene, because we cannot be sure that he *isn't* seeing with his hands or hearing the darkness fall in some way, we simply are left to accept Benjy's view of the world, though it may differ greatly from our own.

One of the most well-known of Benjy's de-familiarizing moments occurs with a box his sister Caddy gives him to calm him down during a fit: "Caddy got the box and set it on the floor and opened it. It was full of stars. When I was still, they were still. When

I moved, they glinted and sparkled. I hushed" (Faulkner, 1994). Caddy's box full of stars is such a beautiful image. Benjy, when distressed, gets to look at these stars that mimic his movement. He only sees the way the light glints off of the box's contents. He does not see the contents themselves except in noting that they resemble stars. In class, I realized that this box of stars was, in reality, a jewelry box Caddy had opened up so that Benjy could watch the light from the fire glinting off the pieces within it. I almost wish I had not figured that out, because the idea of something so magical as a box fully of moving stars existing pleases me far more than does imagining a jewelry box open in the firelight. By the time this scene comes around, the reader is so invested in Benjy's perceptions of the world as to not *want* to return to top-down modes of perception. There is a disappointment there as some of the magic is taken out of the words, as the meaning of the image overshadows its materiality. We want to inhabit his mindset again. In this way, we ourselves become bottom-up thinkers even in our reading of the text. The words, rather than their significance, are more captivating than the "real" scenes behind them. The box of stars mesmerizes Benjy, just as the image and the poetic language mesmerize us.

But this is how Benjy sees the world, as something slightly more wondrous and beautiful than the rest of us are capable of seeing. It is possible that he would not even recognize his worldview as wondrous or beautiful, because this is his version of normal. As Cronin notes, "he sees one as the other," meaning that he sees stars in a jewelry box and the sun as cold at night (2014). This is not his way of attempting to find the right words but rather simply the reality he inhabits. For many of us readers, though, Benjy's

perceptions deviate greatly from our norms. Because we are so de-familiarized from ourselves and from our lives, Benjy's section truly can be considered an impressive example of artistic language, according to the previously established definitions of such language. Our mental perceptions are prolonged in the difficulty of understanding the stimuli he describes. We do not see "one as the other" so easily as Benjy does, and our version of reality seems much less interesting in comparison to Benjy's simply because we have become habituated to ours and are unable to habituate easily to Benjy's at all.

Through Jason's eyes: top-down consequences in The Sound and the

Fury

Jason's top-down habitualization

A stark and unwanted contrast to Benjy, the third of *The Sound and the Fury's* narrators is Jason Compson, Benjy's brother. Whereas Benjy focused on the materiality of his environment, using bottom-up methods of perception, Jason exclusively exists in a top-down, categorical world. In fact, he is all category, all the time, with few—if any—instances of cross-modal language in his narration. The problem with existing so far on one end of the perceptual spectrum is that habitualization occurs entirely too easily when strict categories are always in place. As Shklovsky points out, "Habitualization devours work, clothes, furniture, one's wife, and the fear of war" (Shklovsky, 1965). Habitualization, in other words, devours the everyday life that someone like Jason lives, a life absent of bottom-up thinking, a life dictated by schema self-imposed and never questioned. Benjy, in his unique perception of life, avoids all of this. Even his understanding of the moon varies significantly from how most others would describe it. By giving us an entirely new perspective, Faulkner ensures that the reader cannot habituate to Benjy's section, and, of course, by seeing the world from an entirely new and different perspective, the reader therefore gains a new experience of the world that in itself cannot fit with the reader's existing, habituated perception of it. Benjy's poetic observations are therefore more appealing, more outwardly artistic, than Jason's practical

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and efficient language. This creates a unique opportunity for the reader to feel more strongly for Benjy's beautiful prose, regardless of the difficulty that arises when trying to "make sense" of his section, than they do for Jason's economy of mental effort, because it is so standard in its top-down views.

Fittingly, Jason's chapter is perhaps the most comprehensible of all of the chapters, beginning, "Once a bitch always a bitch, what I say" (Faulkner, 1929/1994). Jason speaks and thinks in a way that is not difficult to understand for most readers. His thoughts and opinions may be despicable, as is probably evidenced by that opening line of his, but even still, his language is comprehensible. His section therefore offers the greatest opportunity for economical, top-down processing. There is nothing new about the sexism and racism he embodies throughout his narration. His descriptions are obvious and simple. His language, according to Shklovsky's definition, is largely practical and very unlike the poetic language observed in Benjy's chapter. This results in the reader being exposed to an already habituated mindset and a relative poverty of descriptive language in comparison to the previous two sections, making it that much more unremarkable.

Whereas Benjy, in his section, continually confused his senses, Jason is very straightforward in reporting particular sensations and the sense modality to which they correspond. He notes, "I could see the empty keyhole, but I couldn't hear a sound;" "There wasn't any light close and I couldn't see her face much. But I could feel her looking at me;" and "I couldn't hear him, only the bottom of his nightshirt and his bare legs in front of the sideboard" (Faulkner, 1929/1994). In each of these, a particular

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stimulus corresponds directly and exclusively to a particular sense modality. Jason *sees* the keyhole; he *feels* eyes on him; he *hears* the sounds of someone trying to be quiet at the sideboard. Jason's ability to separate the senses in such a way directly contrasts Benjy's assertion, "*I couldn't see it, but my hands saw it, and I could hear it getting night...*" (Faulkner, 1929/1994). Benjy is able to see things with his hands and hear darkness falling in a way that Jason—limited in his strict uni-modality—cannot do. Jason sees and hears and feels things in the barest, most realistic sense, never allowing two senses to infringe on one another.

Beyond merely keeping categories separated in this way, Jason also imposes schemata much more stringently upon stimuli in order to bypass all extraneous information. On two occasions, he specifically observes the effects of light on a scene, though he always knows precisely what is causing that light to be there: "She struck the match and lit the check and put it in the shovel, and then the envelope, and watched them burn"; "Only she couldn't see into the door because the sun fell straight into it and it was like trying to see through an automobile searchlight" (Faulkner, 1929/1994). In the first instance, he sees the flame and, though the light of it is undoubtedly striking, he only sees it for what it truly is in essence. In the second instance, he again notes a bright light, this time coming from the sun's reflection on the door, and, again, he is not distracted by the stimulus on his way to determining, through top-down processing, the cause of it. When Benjy finds himself faced with light stimulus in the form of the reflection of the fire on Caddy's jewelry, he does not impose this same sort of schemata onto what he sees; instead, he views the light-reflecting stimulus as being a box full of stars. Jason's

imposition of top-down schemata prevents him from viewing the world in a way that is as beautiful or as poetic as Benjy's. Instead, his plain realism provides the average reader with no outlooks different than their own and allows them to habituate to his imagery.

One of the clearest contrasts between Benjy's bottom-up fixation on stimuli and Jason's top-down realistic interpretation occurs when Jason goes to find a special box of his own. He notes, "I told Mother goodnight and went on to my room and got the box and counted it again" (Faulkner, 1994). Jason does not even take a moment to consider the appearance of the box or its contents. He immediately goes about counting his money. Benjy, fascinated with Caddy's box of stars, moves in order to observe the light flickering in different contexts. He becomes so absorbed in the glinting and sparkling of these "stars" that he hushes, a feat not easily accomplished throughout his appearances in the novel. Jason spends no time becoming absorbed or entranced at the sight of his special box. His top-down, rigidly categorical view of the world does not permit that sort of intense distraction by a stimulus. These two boxes and their perceptual influences become symbolic of the narrators' worldviews themselves—one box is enchanting for the sensations it produces, for the stimuli it elicits; one is privileged only for what it contains. Bottom-up and top-down distinctions present particularly clearly here, obviously differentiating the two chapters.

All of what I have described of Jason's section so far indicates that he exists solely in the realm of top-down and uni-modal thinking, that his world can only be described using practical language and is therefore not considered true literature by Shklovsky's definition. There is at least one instance, though, wherein Jason uses a

rather colorful and unique simile to describe the look of his niece without make-up on: "She hadn't gotten around to painting herself yet and her face looked like she had polished it with a gun rag" (Faulkner, 1929/1994). To polish one's face with a gun rag implies a certain gun-ness in countenance, and considering the fact that guns are neither pretty nor feminine, we might assume that this observation about his niece is Jason's way of criticizing her appearance without make-up, perhaps suggesting that she looks harsh and undesirable like this. While his hateful criticism (coming after repeated snide comments about how she looks with her face "painted," meaning that his niece apparently cannot win in his eyes) might upset readers, this image is nothing if not colorful. It certainly prolongs mental effort in a way that makes it an example of poetic language. Even still, the use of simile here instead of stating her gun-rag-face as a fact still prevents the reader from being de-familiarized in the way that they are in Benjy's section. Jason compares one state to another—an absence of make-up to being polished by a gun rag—whereas Benjy, to again use Cronin's words, "sees one as the other" (2014). Because of this, the reader still remains firmly fixed in this practical mindset, not even inhabiting an alternate worldview for one vivid description, and this brief dalliance with artistic language is not enough to really pull Jason's section from the far, top-down end of the processing spectrum.

Because Jason's categorical perceptions are so rigid and so unmoving, his view of the world does not differ from the standard one that many people have. Granted, he is incredibly racist and sexist, which should and does appall readers, but there is nothing groundbreaking about the style of his thoughts. Whereas Benjy provides people with an

alternative outlook, one that hangs on every interesting smell or taste or sight without recognizing that it belongs to any of those categories exclusively, Jason's section presents life as any realist writer might present it. Because his perceptions align so closely with those of many people, his experiences generally become the sort of practical language Shklovsky warns artists against, the kind that shortens time of perception instead of lengthening it. To reiterate one of his main points, "After we see an object several times, we begin to recognize it. The object is in front of us and we know about it, but we do not see it—hence we cannot say anything significant about it" (Shklovsky, 1965). Jason's chapter is every bit this recognition of certain images and modes of perception. Nothing revolutionary occurs in reading his prose, save for that one compelling simile. Indeed, nothing revolutionary *can* occur, according to Shklovsky's theory, because we are so familiar with the images Jason presents as to have nothing new or novel to say about them.

The spectrum of processing, the spectrum of writing

This discussion of Jason's section and its dryness is by no means meant to aggravate Faulkner-lovers. Instead, it merely illustrates the ways in which one author might utilize different modes of perception across the same work. Writing does not always need to be one or the other, similar to how individuals do not necessarily need to fall wholly on one side of the spectrum of processing types. Writing, in all of its infinite possibilities, can incorporate pieces of both perceptual modes, making the work just familiar enough to establish a basis for the reader before de-familiarizing certain aspects of the world in order to still provide the reader with a different outlook on familiar objects and events. Faulkner exemplifies this particularly well, if only because he includes two extreme narratives from either end of the bottom-up-top-down spectrum within the same novel.

Quentin's top-down disintegration

Benjy and Jason are two extreme examples, but along with this principle of a processing spectrum, there are other ways to write which might incorporate both top-down and bottom-up modes of viewing the world. Quentin's section, which appears immediately after Benjy's, delves into cross-modal language as Quentin's logical thought processes begin to break down when he becomes overwhelmed with his memories.

Quentin is brother to both Benjy and Jason and is away at Harvard during his section, where his extreme introspection and depression plague him incessantly.

Quentin's section starts coherently enough: "When the shadow of the sash appeared on the curtains it was between seven and eight oclock and then I was in time again, hearing the watch" (Faulkner, 1929/1994). While being "in time" is not exactly straightforward, it does not take long for the reader to understand that Quentin means that he is transported back in his memory to a time when he heard a watch. We quickly learn that it was given to him by his father with a very specific message: "I give it to you not that you may remember time, but that you might forget it now and then for a moment and not spend all your breath trying to conquer it" (Faulkner, 1929/1994). Given that Quentin begins by discussing being "in time again," we can assume that he probably has not followed his father's advice. Even still, while these opening lines are descriptive about his character, just as Jason's opening line ("Once a bitch always a bitch") aptly describes him, they do not yet prolong mental effort to the point that Benjy's section did. While not practical in the least, these words still allow for top-down processing as we know it.

As the section progresses, this categorical language begins to falter. Constantly assailed by the past, Quentin's narration mirrors Benjy's when his invasive thoughts become particularly bad: "…*hands can see touching in the mind shaping unseen door Door now nothing hands can see*   My nose could see gasoline, the vest on the table, the door" (Faulkner, 1929/1994). As with Benjy's assertion that "*my hands saw it*," Quentin here gives his hands the ability to see. He goes slightly further, even, and claims that his "nose could see gasoline," which is similar to the way in which Benjy described being

able to "smell the bright cold" moon. Touch and sight are confused here, and smell and sight remain equally blurred. Interestingly, "the vest on the table, the door" are two additional objects described as being seen by Quentin's nose. With gasoline, we know that his nose can smell it, not see as he claims, but for these other objects, they likely cannot be smelled. Even within his distinct sentence confusing the senses, he is not consistent in what exactly is being confused. Here, instead of his nose smelling these things, it is his eyes seeing them—or, at least, it should be by normative definitions of senses and their capabilities. Like with Benjy's section, this creates a prolongation of perception and a materiality around the stimuli being described, therefore making these passages examples of poetic language.

Interestingly, Quentin's movement from top-down to bottom-up, from uni-modal to cross-modal, seems to correspond to his declining mental health. This makes no comments on the mental health of those who regularly engage in bottom-up or cross-modal thinking and instead merely reflects the ways in which top-down imposition of schemata is emphasized even in those who might not have preferred that mode of thinking themselves. In other words, Quentin's learned categorization appears not to be the way in which his mind generally works, as he is only able to maintain it when only one or two things are on his mind. He is unable to reflect on the past or on his life without devolving into increasingly poetic and de-familiarizing language. This might be an automatic response of his when he can no longer focus on thinking the way in which others have told him to think.

Dilsey's poetic perceptions

The final section of *The Sound and the Fury* once again alters the perspective from which the story is told. As previously noted, this automatically has a de-familiarizing effect while also presenting the reader with multiple different viewpoints to temporarily inhabit. With this final section of the novel, though, Faulkner also switches to third person narration, breaking from the established pattern of first person. This concluding portion of the narrative follows Dilsey, the matriarch of the Compson family's servants. While her language consistently dips into the poetic form, it does not always occupy that bottom-up mode of perception. At one point, for example, she notes, "[Benjy] came obediently, wailing, that slow hoarse sound that ships make, that seems to begin before the sound itself has started, seems to cease before the sound itself has stopped" (Faulkner, 1929/1994). This description of Benjy's cries is certainly colorful and interesting, and the reader—at least in my case—is struck by the seemingly haunted quality of the noise that ends before it ends and begins before it begins. However, the noise here is directly compared to other noise, keeping the description within one discrete category and comparing things rather than directly equating them. This is indeed poetic language, just as Quentin's opening is also poetic, but it still exists in a top-down realm.

Later in the novel, bottom-up processing is induced a bit more clearly, and at an Easter service at her church, Dilsey observes of the preacher,

> With his body he seemed to feed the voice that, succubus like, had fleshed its teeth in him. And the congregation seemed to watch with its own eyes while the voice consumed him, until he was nothing and they were nothing and there was

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not even a voice but instead their hearts were speaking to one another in chanting

measures beyond the need for words… (Faulkner, 1929/1994).

This, in contrast to the earlier example of Dilsey's descriptive language, certainly prolongs perception in its dismissal of top-down categories. "Voice" and "teeth" are generally not descriptors that intersect. "Biting" as a characteristic might be related to a voice or to words, but "teeth" generally is not. Additionally, "heart" and "chanting" are typically not associated, and while I have certainly read romantic poetry in which the heart is seen to speak, it is generally not in this religious, almost surreal moment of chanting to a priest that has been consumed by the power of his own voice.

Neither one nor the other

Both Quentin and Dilsey present examples of bottom-up and top-down language in their stories. Quentin appears to favor bottom-up throughout his introspection and remembrance, whereas Dilsey strays slightly more toward the top-down end of the spectrum. The existence of their sections in the novel serves as a perfect counterpoint to Benjy and Jason's extremist modes of perception. All together, these narratives help to clearly illustrate the different ways in which people perceive the world. Faulkner probably was not attempting to specifically show the effect of cross-modality and categorization on the induction of either bottom-up or top-down processing in turn, but even if it was unintentional, the characters here and the words that they use result in the reader experiencing all aspects of this spectrum. This provides a very realistic view of

the general composition of our world, in that binaries like top-down/bottom-up do not exist. There is always a spectrum, and assuming otherwise stifles certain perspectives.

Conclusion

Real-world significance of bottom-up processing

It is, of course, fascinating for someone studying literature like myself to examine the different techniques at work in a novel as variable as *The Sound and the Fury*, but the degree to which these implications carry into everyday life might not seem all that great at this moment. We have seen the different effects of cross-modality, as in Benjy's chapter, and uni-modality, as in Jason's, on our perception of how artistic a given selection of text can be. According to Shklovsky's definition of art as that which prolongs mental perception, Benjy is far more artistic a narrator than Jason, who provides the reader with the very basest economy of mental effort. However, Benjy's section, in all of its bottom-up, cross-modal glory, also plays an important role in providing a new way of thinking for readers that might allow them to feel empathy for those who think in a non-top-down way. Even Quentin and Dilsey, with their combination of processing styles, permit the reader to inhabit a slightly different mindset than might be typical in a lot of literature.

Those excluded in strictly categorical narratives

I have previously discussed the way synesthesia might link to cross-modal language in literature, so inducing a bottom-up processing mode when reading clearly can allow a non-synesthete reader to empathize with synesthetic experiences. Bottom-up

processing remains more prevalent than "normal" in those with autism as well. Both of these conditions involve increased local connectivity in the brain and may very well be genetically linked (Neufeld et al. 2013; Courchesne et al. 2009; Haenggi, Wotruba, & Jancke, 2011; Casanova & Trippe, 2009; Hubbard & Ramachandran, 2005). Categories are not nearly as rigid in these conditions, as that increased connectivity allows for "cross-talk" between certain modalities that might otherwise be kept distinct.

I also mentioned previously that this cross-modal thinking that occurs in synesthetes and those with autism is suspected to be latent and to be slowly over-written over time. Even still, some of these inherent connections remain into adulthood and manifest in the form of acknowledging sound symbolism or being able to form letter-color patterns when prompted (Coulter & Coulter, 2013; Rich et al., 2005; Simner et al., 2005). If literary tradition continues to solely perpetuate top-down views, then not only will those who favor the other processing type be alienated, but the top-down restricted writing will also limit "typical" people in their experiences. As seen with the "ba" and "ga" example, a certain degree of cross-modality is inherent in general in people (Tsur, 1992). Without literature that engages this cross-modality, that encourages bottom-up processing, everyone is restricted in their worldviews, even those who might assume that they fall on the Jason-esque top-down end of the spectrum. This strict adherence to only one's own worldview prevents an understanding dialogue to form between individuals, leading to a sense of isolation and an inability to successfully communicate with one another than can have real-world implications on such things as our political climate or general interpersonal relations.

Importance of empathy in the world

But why should we be worried about limiting ourselves to top-down views? The world is not a kind place to many people. Many psychoanalytic schools of thought posit that an individual's self-identification is based on differentiating who they are from some other, some not-self. Some suggest that, in terms of characteristics, "what is unwanted is split off and projected onto the other" (Layton, 2009). The stark polarization of "us vs. them" therefore becomes exaggerated through this process of projecting unwanted parts of "us" onto "them." Additionally, Hogg (2007) found that "people increase group identification in response to threats to self-certainty." Identifying with an "us" group consquently becomes an incredibly important part of individual identity, with a subsequent loss of certainty in identity when that "us" group identity is disrupted (Slotter, Winger, & Soto, 2015). Unfortunately, this can have negative implications for those perceived as a "them" group, including people with disabilities or those who just seem "different." With the possibility for such large group stratification between "us" and "them," empathy for the not-self groups can become jeopardized.

This is where literature can offer some assistance. Through cross-modal language, through stories that create an artistic confusion between senses, the mental effort of the reader will be prolonged, and they will become accustomed to viewing the world in a new way. This automatically blurs the line between "the self" and "the other," in that the reader now understands an alternative viewpoint that might have previously belonged to an "other." In doing this, literary works—especially those that utilize cross-modal language and promote bottom-up perceptions—provide a way to make the

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occasionally harsh dichotomy of "us vs. them" a bit less severe in its categorization. In reading works that promote bottom-up or cross-modal perception of external stimuli, the reader is consequently placed in the mindset of someone who sees reality through a slightly varied approach. Now, this might not cause a permanent shift in the reader's own perceptions, but it will at the very least provide a temporary change in which they are able to see through the eyes of another.

The Oxford English Dictionary (2014) defines empathy as "the ability to understand and appreciate another person's feelings, experiences, etc." So, if we can view the world through another's eyes, we are literally feeling empathy for someone else's experiences, and we can also begin to push back against "othering" someone or a group of people to the point of making their experiences inaccessible to us. In creating this temporary condition wherein we inhabit someone else's world while we read, literature therefore allows us as readers to become empathetic to individuals like the characters we are reading about.

All of this might not be the overarching goal of an author like Faulkner who does include such empathetic characters in his work, but it still is an important effect resulting from that particular writing technique. Because there are such a wide variety of individuals in the general population who might perceive their surroundings in a more cross-modal way, including this worldview in literature helps to invite these individuals into our literary tradition and allows us to more deeply connect with those we might have previously pushed away in our own quest for self-identification.

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