Investigating 5- to 9-Year-Old Children's Descriptions of Routine Tasks

Research Thesis

Presented in partial fulfillment of the requirements for graduation *with Research Distinction* in Speech and Hearing Science in the undergraduate colleges of The Ohio State University

By

Melike Gul Baspinar

The Ohio State University

April 2023

Project Advisors: Professor Laura Wagner, Department of Psychology, and Professor Rachael Frush Holt, Department of Speech and Hearing Science

Acknowledgements

I would like to thank so many wonderful people who helped make my thesis possible. First, thank you to my advisors, Dr. Laura Wagner and Dr. Rachael Frush Holt, who supported me and taught me so much. Thank you, Laura, for welcoming me into your lab and helping me grow as a student researcher over the years. Thank you to the Center of Science and Industry for providing the space to collect data. Thank you to all the participants. Thank you to the amazing Ohio Child Speech Corpus research team for helping collect and transcribe this study's data. Also, thank you to the Language Sciences Research Lab and my lab peers for supporting my goals. Thank you to Maram for your help with reviewing transcriptions. Thank you to Izabela, Kris, and Holly who encouraged me during this process. Also, thank you to my loving family for always supporting my dreams. Thank you to my friends, Noura, Ananya, Anya, Leah, and more, for all your support and motivational words throughout this journey. Finally, thank you so much to those who helped fund my research. Thank you to the College of Arts and Sciences Honors Committee for awarding me an Undergraduate Research Scholarship. Also, thank you to the National Science Foundation. I appreciate everyone who helped make this thesis possible and am forever grateful for this experience.

Abstract

Scripts provide insight into children's organization and perception of events (Reifel & Garza, 1983) and their understanding of relational terms (French, 1983). Previous work found that children are providing scripts at a young age, but five-year-old children still have difficulty sequencing actions (Verrier, 2000). Thus, this study investigates five- to nine-year-old children's descriptions of routine tasks to better understand children's script mastery and script organization. Sixty children and twelve adults looked at pictures of someone brushing their teeth and washing their hands to describe how they would perform these tasks. Adults provided standardized descriptions. Responses were coded for the number and type of steps provided as well as for the temporal terms included. Results found no age-related differences between the child groups, but adults included significantly more steps than the children. Also, contrary to the adults, children showed an interaction between the event type and step categories. Furthermore, participants used the temporal term *then* most frequently, and opportunities to use *then* were taken most at the transition points between step categories. Findings suggest that children structure their scripts similarly to adults but still do not include as many details. Also, participants identify distinct transition points within scripts and label them with the temporal term *then*. These findings are valuable because they may potentially contribute to research surrounding narratives and learning disabilities.

Introduction

Children's Use of Scripts

Language models, such as scripts, are a way children can share and organize their perceptions and experiences with events (Reifel & Garza, 1983). Like adults, children use scripts, and their script abilities grow over time. These scripts consist of two key components: the actions that are remembered from an event and the on-going feel of the event's steps (Reifel & Garza, 1983). This study's goal was to investigate which script elements children include in their descriptions of routine tasks and how children use temporal terms to organize their scripts.

In addition to learning about people's perceptions and recollections of events, scripts are a valuable tool because they provide information about which essential or optional event steps can be expected when referring to an event (Hudson & Nelson, 1983). Considering how children have the flexibility to include as many details in their descriptions as they would like, scripts may show which steps are consistently included and how much detail is provided for the event descriptions among the child groups. Thus, this study's goal was also to explore the number of steps children provide in their scripts and what type of steps they provide.

As mentioned earlier, scripts provide insight into the expected structure of essential or optional steps (Hudson & Nelson, 1983). Based on this knowledge, when children provide their script for the routine task of brushing their teeth, it might be expected that the literal action of brushing the teeth would be an essential step because it would be considered the event's goal. On the contrary, putting the toothpaste's cap back on would be an optional step because it is not necessarily the script's goal. Similarly, when children provide their script for the washing

hands routine task, it may be expected that the literal action of scrubbing one's hands would be an essential step to fulfill the hand washing goal, but putting the soap away would be considered an optional step since it is not the task's specific goal.

Also, in a study by French (1983), it was found that preschool children express an understanding for options and conditions within their descriptions. They use terms, such as "or" and "if", to indicate additional methods of completing an event (French, 1983). For example, in French's study, a child showed their understanding of options and conditions through their descriptions of events. One child stated, ". . . well, you see, after, if you eat your food up, you get dessert" (French, 1983). Another child stated, "You could, you could – get in dresses, or, you can get in pants or shorts. But if it's in the summer and you get on pants, too hot. But if you get in pants in the winter, medium. But if you get in a dress in the summer, that's good too" (French, 1983). This finding is interesting because it suggests that children as young as preschoolers can understand conditionality and provide additional details beyond the necessities in their scripts. It also suggests that children understand that event steps must follow a certain order to make sense.

Also, much of the previous research in this area has focused on young children. A longitudinal study by Verrier investigated children's scripts abilities each year from ages three to five. The study by Verrier looked at children's scripts of their school day. Verrier (2000) found that three-year-old children do not use scripts to share knowledge about their school day; whereas, four-year-old children begin using scripts and provide more complex content within their scripts.

Although four-year-old children use scripts, by age five, they still struggle to accurately sequence actions (Verrier, 2000). Five-year-old children's scripts are considered more whole with the increased inclusion of important actions and temporal terms in their scripts, but there is still room for improvement (Verrier, 2000). Considering children's growth of script abilities from ages three- to five-years-old, it is of interest to see how this growth continues as children's experiences with routine events increase with age. Furthermore, since children show considerable improvement in their scripts and sequencing of events at age five but still have flaws in their sequential ordering, this study focuses on five- to nine-year-old children's script abilities.

French provided some insight into children's use of temporal structures as well. According to French (1983), analyzing script structures can provide information about organization and cognition. Temporal relational terms may help create these structures. French (1983) found that children are typically using terms, such as *before* and *after*, correctly within their scripts. For example, when children are asked to describe a birthday event, they may include steps like, ". . . I just blow off the candles and eat it. And before I eat it, I just take out all the candles" (French, 1983). Here, the use of *before* is showing a connection between different events; however, *before* is not a term that is immediately understood and incorporated into speech by children during language development (French, 1983). Thus, it is understood that the use of these terms is a skill that is acquired throughout children's language development.

Contrary to French's analysis, Clark (1971) claimed that as children reach age five, they have an improved understanding of how to correctly use the word *before*, but they still struggle with the word *after*. Seeing the variance of findings regarding these terms, this study aimed to

investigate which temporal terms children used most frequently in their scripts and how they used these terms. Although it would be valuable to further investigate children's use of *before* and *after*, this study was decided to keep an exploratory approach for all temporal terms.

Another study looked at two- to five-year-old children's scripts for, "making cupcakes, going to the grocery, having a birthday party, going to a restaurant, getting dressed, and having a fire drill" (French & Nelson, 1981). Not only did French and Nelson's (1981) study find that older children provide more information in their scripts than the younger ones, but their study also found that children are aware of temporal structures in scripts. Interestingly, French and Nelson (1981) also mentioned that with younger children including less information in their scripts, they had fewer opportunities to implement a temporal structure. Also, French and Nelson (1981) found that within these scripts, *and then* and *then* were used frequently to create their temporal ordering of events. For example, a child used the temporal term *and then* to create a sequence of events by saying, "Well, you eat and then go somewhere" (French & Nelson, 1981). Thus, this suggests that children are recognizing and implementing temporal structures in their scripts.

In *Relating Events in Narrative: A Crosslinguistic Developmental Study* by Ruth A. Berman and Dan Isaac Slobin, the authors used data from Virginia Marchman and Tanya Renner's research to investigate children's sequential connectivity. From reviewing Virginia Marchman and Tanya Renner's research, the authors shared that *and then* is preferred most by five- to nine-year-old children (Berman & Slobin, 1994). More specifically, *and then* is preferred most by children for connection purposes and is valuable when creating narratives (Berman &

Slobin, 1994). As a result, it appears that children appreciate and utilize the term *and then* when forming their responses.

Furthermore, it is known that typically developing children naturally learn that language consists of complex, societally-determined rules which provide meaning in our messages (Feldman, 2019). Seeing that language is essential for communicating ideas, it is important to learn about how children incorporate their knowledge and language skills into conversations. It may be especially beneficial to understand how their language is organized during social interactions. Also, the information children have about their experiences can influence their behaviors (Reifel, 1985, p. 7). Thus, looking at children's scripts about everyday routine tasks can help us better understand their interactions with the world around them and increase our knowledge about children's behavior and language abilities.

Clinical Applications

Investigating typically developing children's scripts may offer educational implications. Since narratives often follow a temporal structure to tell a story, it is possible that understanding how children organize their scripts could provide insight into children's narration skills. Learning more about narratives is valuable because oral narration is a critical skill for academic and social success (Scott & Windsor, 2000). Thus, learning about scripts could potentially help children in their academic endeavors. Also, like scripts, oral narratives are useful tools to describe one's experiences with life events (Nathanson et al., 2007). Thus, this connection between narratives and scripts may provide benefits for educational approaches surrounding oral narratives.

Also, this study may offer clinical implications as well. Children with learning disabilities typically remember less information to include in their narratives than children who are typically developing (Nathanson et al., 2007). In a study, Narrative Elaboration Training (NET) was utilized to see if its application would help children with learning disabilities better recall past information to construct their narratives. NET teaches children strategies to organize event details into categories to have a better recollection of them later (Nathanson et al., 2007). In the study, NET helped children with learning disabilities remember 49% more details than their control group without an uptick in error productions (Nathanson et al., 2007). This finding is interesting and may suggest that descriptions of routine events could benefit from categorization as well due to their similar use of memory. Thus, it may be beneficial to understand how typically developing children create and organize their scripts because it may contribute to future research on NET and children's narration for both the typically developing and clinical population.

Experimental Overview

Although the potential clinical implications are compelling, this study focuses on typically developing children's language models. For this study, participants were instructed to describe how they would perform routine tasks. These routine tasks were of someone brushing their teeth and washing their hands. Children were split into age groups from five- to nine-years-old. They were shown pictures of these routine events as part of a larger study for the Ohio Child Speech Corpus (OCSC). Adults were included in this study, separate from the OCSC project, to create a standardized description of each event. Participants' responses were audio

recorded and transcribed. Once responses were transcribed, each utterance was coded to identify the type of step provided, the category of the step, and the temporal terms that were used.

Predictions

Based on previous literature, there were many predictions for this study. First, it was predicted that there would be an age-related difference between the child groups. As mentioned earlier, Verrier (2000) found children's scripts getting more complex as they got older, and French and Nelson (1981) saw older children including more events in their scripts than younger children. Thus, it was predicted that this trend would appear in this study's findings as well with children providing more steps in their descriptions as they got older.

Since scripts provide insight into essential and optional information (Hudson & Nelson, 1983), and children can use conditionality and options in their scripts (French and Nelson, 1981), it was also predicted that the number of details children provide for each step category would vary. It was predicted that children would include the essential steps as Core steps to fulfill the main purpose of the event. Also, it was predicted that these Core steps would be included the most in children's descriptions. Then, the other steps would be considered optional steps. These optional steps would be the Preparatory and Closure steps (also known as the steps that come before and after the Core steps, respectively). Although, it could be argued that the steps leading up to the Core could be considered essential since they are necessary for the Core steps to occur. Also, since children understand conditionality, it could be argued that children would exclude the Core steps if the Preparation steps do not occur. Children may feel

that there would be no Core if there is no Preparation. Hence, the steps before the Core could be considered essential as well. Thus, it was predicted that participants would include the second most steps as preparatory steps. The Closure steps would be included the least since they are considered optional.

Finally, there were no detailed predictions for how children would use temporal terms in this study. Instead, it was predicted that children would generally include temporal terms in their descriptions. There was no prediction for the amount, location, or type of temporal terms which would be included. With the predicted inclusion temporal terms, it was of interest to explore how participants specifically utilized temporal terms to organize their scripts.

Methods

Background

This study was approved by the Institutional Review Board at The Ohio State University. Participants were recruited at the Center of Science and Industry (COSI) in Columbus, Ohio. Data collection occurred in the Language Sciences Research Lab at COSI.

Participants

Seventy-two participants were included in this study. Sixty children and twelve adults participated. Within the experimental children's group, there were 34 females and 26 males ranging from ages five to nine years old. The children were split into groups by age – 5, 6, 7, 8, and 9-year-olds – with twelve children per group; there were a similar number of females and males per group. Within these groups, a majority of the children were White (n = 51), and the

rest were identified by their parents as members of minority groups: Black (n = 2), Asian (n = 3), White, Hispanic/ Latinx (n = 2), Black/ African American and White (n = 1), and American Indian/ Alaskan Native, Black/ African American, and White (n = 1). The adult group included 7 females and 5 males. The adult groups' racial demographics were not collected. The adult group's ages ranged from 21 years old to 47 years old. Adult participants served as a control group to create standardized descriptions for the study.

Children's speech was collected as part of a larger study in the Language Sciences Research Lab to be included in the Ohio Child Speech Corpus (OCSC). The experimental group of children participants' speech was drawn from the OCSC. The OCSC had a total of 304 children ranging in age from four- to nine-years-old. To select participants for the current set of analyses, participants had to be between five- and nine-years-old with no history of speech and language issues. For the five- to nine-year-old children, for each age group, children were listed in chronological order of when their data was collected. Then, in the order in which they were run, children's audio was reviewed to determine which twelve children per age group fit the study's criteria. The criteria included attempting to provide or providing steps for how to perform the Brushing Teeth and Washing Hands events. The first children in each age group to fulfill this criterion were included in the study.

Materials

Experimental Pictures

Participants were shown experimental pictures of varied routine activities. Since children were part of a larger study for the OCSC, they saw up to a total of sixteen routine

activity pictures. Some children saw fewer pictures for reasons such as time constraints. Adults were only shown a total of four pictures. All child and adult participants saw pictures of someone brushing their teeth (Figure 1) and washing their hands (Figure 2). For the children, these pictures varied in order; however, they were near the beginning of the sequence of sixteen pictures. For the adults, they first saw the Brushing Teeth picture, and then they saw the Washing Hands picture. These pictures were selected due to their similar attention to personal hygiene. Thus, it felt appropriate to compare responses to these two pictures. Also, the pictures were printed on individual sheets of paper in black and white for the participants to view while providing their responses. Rebecca Hinkelman, an artist, was commissioned to create these pictures.

Figure 1: A person brushing their teeth.

Figure 2: A person washing their hands.

Procedures

Data Collection

Participants were shown the Brushing Teeth and Washing Hands pictures. Since the child groups saw these pictures as part of a larger study, they saw them after completing five unrelated tasks for the OCSC. These additional tasks included saying the alphabet, counting numbers and performing math operations, doing a Wug task, describing OCSC experiment pictures, and reading short passages. Adults were not part of the OCSC, so they only saw four routine activity pictures. Unlike the children, adults did not complete any of the other unrelated activities. Although the child and adult groups had different experiences regarding the amount and order of tasks, they all described how they would perform the Brushing Teeth and Washing Hands events. The investigator did not contribute to the participants' responses but did provide

occasional prompting, such as, "anything else?". Participants' responses were recorded using a clip microphone and an audio recording software named Audacity. These audio recordings were saved and stored in a OneDrive folder.

Transcription

Following data collection, the audio recordings were transcribed using CLANc software and CHILDES transcription standards. These transcriptions were reviewed by two research assistants. Research Assistant One listened to the full audio and transcribed the participants' speech. Research Assistant Two listened to the full audio and revised any transcription errors made by Person One.

Coding

Participants' data were coded for the Brushing Teeth (Figure 1) and Washing Hands (Figure 2) experimental pictures. Coding was intended to identify the linguistic elements and content included in the participants' responses (See Table 1 and Table 2). First, each utterance was coded to describe which step the participant identified in the procedure. Each step they identified was given a step name. For example, if someone said they would put toothpaste on their toothbrush, this step was labeled as "put on toothpaste". If a participant included utterances that were miscellaneous comments, some speech sounds, or not a step, they were labeled as "preamble", "N/A", or "comment". Even if the participant had an utterance within their response that did not include a step, their utterance was still reviewed and coded.

Next, each step name was placed into one of three categories: the Preparation, the Core, or the Closure category. The Core category for each event included the steps necessary to fulfill the main purpose of the event. It was considered the essential phase to fulfill the routine activity's purpose. For example, for the Brushing Teeth event, "and then I brush my teeth" was a Core step. Some other examples of the Core were brushing the top teeth and brushing the tongue. The Preparation category included any steps leading up to the Core. For the Brushing Teeth event, "put on toothpaste" was a Preparation step. A few other examples of Preparation steps were getting the toothpaste and toothbrush out, opening the water, and putting water on the toothbrush. Lastly, the Closure category included any steps that came after the Core category. For example, for the Brushing Teeth event, "and rinse the toothbrush off" was a Closure step. Other examples of steps included in the Closure phase were spitting mouth contents out and identifying completion of the event. The categories were the same for the Washing Hands event. For the Washing Hands event, "then scrub" was a Core step. Some other examples of the Core steps were scrubbing fingers, making bubbles, and washing hands. For the Preparation category, "then get soap" was a Preparation step. Some other examples of steps included in the Preparation category were turning the water on and getting hands wet. Finally, "then dry my hands" was a Closure step. Other examples of Closure steps were rinsing hands, turning the water off, and going to bed.

Once step names and step categories were coded, temporal terms were investigated as well. Every time a participant included a temporal term in their steps, each word was identified and coded. Temporal terms included words that signaled a transition in time to mark the order in which events occur. For example, these were words, such as *then*, *next*, *first*, *before*, and

after. Once identified, the terms were coded for their location within the utterances, their Preparation, Core, or Closure category, and if they occurred at transitions between step categories. For example, when analyzing the word *then*, *then* was marked as occurring at the beginning, middle, or end of an utterance. It was also labeled as belonging to the Preparation, Core, or Closure category. Finally, *then* was coded for occurring within the same step category (e.g., Preparation to Preparation) or serving a transitional purpose (e.g., entering from the Preparation category into the Core category or from Core category into the Closure category).

The total number of each temporal term used was coded as well. For example, data was coded to identify how many times participants used the temporal term *first* or *then*. For these totals, all participants' data was combined to determine which temporal terms were used the most frequently within the Preparation, Core, Closure categories and while transitioning from the Preparation into the Core category and from the Core into the Closure category.

Table 1: Participant 5017 - Coding Example for Brushing Teeth

Participant's Response	**Step Category**	**Step Name**
I put toothpaste on	Preparation	put on toothpaste
then I brush	Core	brush teeth
then I spit it out	Closure	spit mouth contents
right?	N/A	question

Table 2: Participant 9012 - Coding Example for Washing Hands

Participant's Response	Step Category	Step Name
and you get your hands wet	Preparation	wet hands
you put soap on them	Preparation	put soap on
you rub the soap in	Core	scrub hands
then you wash the soap off with water	Closure	rinse hands

Results

Age Group, Step Category, and Event Type

Table 3 shows the average number of steps included by participants broken down by age group, event type, and the step category. The age groups are five- to nine-year-old children and adults. The table also shows the average number of steps for all the children combined for event type and step category. The event types are "Brushing Teeth" and "Washing Hands". The step categories are the Preparation, Core, and Closure categories.

Table 3: Average Number of Steps Per Category and Event by Age Group

		5 Year Olds	6 Year Olds	7 Year Olds	8 Year Olds	9 Year Olds	All Children	>18 Year Olds
Brushing Teeth	**Preparation**	1.58	1.58	2.08	2.08	2.17	1.90	4.50
	Core	1.08	1.33	0.75	2.00	1.58	1.35	2.75
	Closure	0.58	1.33	1.00	1.42	0.33	0.82	2.25
Washing Hands	**Preparation**	1.92	1.58	2.00	1.75	2.33	1.92	2.92
	Core	0.83	1.25	0.83	1.08	1.25	1.05	1.75
	Closure	1.42	1.25	1.08	1.25	1.67	1.33	2.42

A repeated measures ANOVA was administered with age as a between subjects variable and step category and event type as within subject variables. The dependent variable was the average number of utterances. The results of the ANOVA found a main effect for age group: $F(5,66) = 7.35$, $p < .001$. Post-hoc tests (Tukey's HSD) showed that the adult group was significantly different than the child groups; however, the child groups did not differ from one another.

Also, findings revealed a main effect for step category: $F(2, 69) = 16.64$, $p < .001$. Results did not find a significant interaction between age and step category: $F(10, 61) = 2.85$, n.s. The post-hoc t-tests, which compared the three step categories to each other, found that participants provided more steps in the Preparation category than either the Core category ($t(71) = 4.58$, $p < .001$) or the Closure category ($t(71) = 5.34$, $p < .001$); however, participants did include the same number of steps for the Core and Closure categories ($t(71) = 0.53$, n.s.).

Additionally, results showed no main effect for event type (F (1, 71) = 0.38, n.s.). Although there was no main effect for event type, results did find a significant interaction between event type and age group (F (5, 66) = 2.85, $p < .022$). There also was a significant interaction between event type and step category: F (2, 69) = 6.12, $p < .003$). Further analysis of the data found no significant differences between the Brushing Teeth and Washing Hands events for the adults. Yet, results found that children provided more steps for the Core category of the Brushing Teeth event than the Core category for the Washing Hands event. Whereas, for the Washing Hands event, children included more steps in the Closure category than the Closure category for the Brushing Teeth event.

Temporal Terms

Participants' use of temporal words was analyzed as well. Table 4 shows the frequency of all the temporal terms used by all participants within each step category and at transitions from Preparation to Core and from Core to Closure. As seen in Table 4, there was a large variety of temporal terms used among the seventy-two participants; however, *then* was used most frequently and the rest of the temporal terms were used much less often. Due to these findings, further analysis focused only on participants' use of the temporal term *then*.

Table 4: Frequency of All Temporal Terms Used by All Participants

Temporal Term	Total
after	4
afterwards	1
before	1
begin	1
done	11
end	1
finally	1
first	31
once	4
start	6
starting	1
then	233
til	1
until	2

For the temporal term *then*, it was of interest to see when participants were using *then* and if they were using the term whenever there was an opportunity to do so. Thus, the number of potential opportunities for using *then* were calculated. Then, the percentage of opportunities for *then* which were used by participants were calculated.

Opportunities to use *then* existed within each step category (i.e., within the Preparation, Core, and Closure categories) and at transition points between step categories (i.e., when transitioning from the Preparation to the Core category and from the Core to the Closure category). For each participant, the number of opportunities within a specific step category depended on the number of steps they provided. Thus, percentages were calculated to compare participants' use of opportunities.

The number of opportunities at transition points between two step categories were different. For the transition point from the Preparation category to the Core category, there was a single opportunity to use the temporal term *then*. Similarly, for the transition point from the Core category to the Closure category, there was only one opportunity to use the temporal term *then*. The limited opportunities made these transition points unique; however, the presence of the opportunities depended on how many step categories the participants provided in their descriptions.

Figure 3 shows the percentage of opportunities to use *then* that were taken by participants across the event descriptions for both events.

Figure 3: The percentage of opportunities taken by participants to use *then* in their scripts across event descriptions for the Brushing Teeth and Washing Hands events. Among the event

categories, opportunities were taken most at the transition points between two different step categories.

An ANOVA was conducted for these percentages where age group, event type, and step categories were independent variables. Results found that only the step category had significant effects, thus, age group and event type were collapsed for the rest of the analyses. Upon examining Figure 3, the figure showcased that the participants used *then* most often at the transition points between step categories. A t-test was conducted to compare the frequency at transition points to the frequency within a step category and confirmed that Figure 3's suggestion was true: t (63) = 10.58, $p < .001$).

Analyses also examined any potential differences between the two transition points: Preparation to Core versus Core to Closure. Results found that there was a significant difference between these two transition points. Participants used a greater amount of the term *then* to transition from the Preparation to the Core category than to transition from the Core to Closure category (t (63) = 2.4, $p < .018$).

Furthermore, analyses investigated if there was a difference among the three within-step categories: Within the Preparation, Within the Core, and Within the Closure. Results found that participants' use of *then* Within the Core was significantly less than Within the Preparation (t (108) = 2.54, $p < .013$). Within the Core was also significantly less than Within the Closure (t (69) = 3.45, $p < .001$). On the contrary, results found no significant difference between Within the Preparation and Within the Closure (t (79) = =0.11, n.s.).

Discussion

The purpose of this study was to investigate children's descriptions of routine tasks to better understand how children organize their scripts. The study examined the number of steps participants included in their scripts, the type of steps they included, the temporal terms they used, and how they applied the term *then* to organize their scripts. Sixty children were split into five age groups from five- to nine-years-old. Twelve adults were included in the study to create standardized descriptions. Each participant saw a picture of someone brushing their teeth and washing their hands and described how they would perform the event.

Results found no age-related differences within the child groups; however, there was a significant difference between the child and adult groups for the number of steps included in their descriptions. Also, results showed that participants included most of their steps in the Preparation category with an equal number of steps in the Core and Closure categories. There was no significant difference between the event types, but an interesting interaction was found for the child groups. Children included more steps in the Core category for the Brushing Teeth event than the Washing Hands event, and they included more steps in the Closure category for the Washing Hands event than the Brushing Teeth event. Furthermore, among all temporal terms, *then* was used most frequently by the participants, and opportunities to use *then* were taken most at the transition points between the step categories.

Surprisingly, findings supported some but not all of the study's predictions. For starters, it was predicted that older children would provide more steps in their scripts than younger children. The results showed that this was not the case. Instead, the child groups all provided a similar number of steps in their responses and only the adults provided a significantly higher

number of steps. The similarity between child groups and their difference to the adult group's script length might suggest that children are not yet providing as many details in their scripts; therefore, they are still developing their scripts to match an adult level of script mastery. Although this may be the case, this difference does not necessarily mean that children are ill-equipped to provide successful scripts. Instead, it is possible that children may not have had as much experience as adults with routine tasks. Thus, they may have less information to include in their descriptions. Considering how the child and adult groups structured their step categories and use of temporal terms similarly, this further suggests that the age-related difference is due to a difference in experience levels. Although, it is also possible that children are still learning how much detail is needed in one's description of how to perform a routine task.

It was also predicted that participants would include most of their steps in the Core category, followed by the Preparation category, then the Closure category. Since the Core category consists of the steps that were essential to fulfill the event's main purpose, it seemed practical that this would be the category that is of most focus for the participants. On the contrary, results found that participants provided most of their steps for the Preparation category with less, but an equal number, of steps in the Core and Closure categories. Although this finding was unexpected, it is possible that participants felt it was necessary to set the scene for how one arrives at the Core by including more steps in the Preparation category. For example, for one to do the literal action of brushing their teeth to achieve its goal, one must first get their toothbrush ready with toothpaste. The Core cannot happen without adequate preparation for it. Thus, participants may have felt the need to show the buildup to the Core to

make their descriptions appear more realistic and logical to the listener. It is also possible that spending more time focusing on the Preparation gave participants more time to consider what they needed to include later in their scripts. This rationale would also help explain why participants had a similar number of steps for their Core and Closure categories. Since participants did not have time beforehand to prepare their responses, they may have spent more time in the Preparation category to do this but felt prepared to give shorter descriptions by the time they got to the Core category. On the other hand, it is possible that participants simply felt that the Core and Closure categories were more straightforward, so fewer details felt fulfilling to them.

Regarding the temporal term predictions, it was proved true that participants do use temporal terms in their scripts. Unexpectedly, further observation revealed that the temporal term *then* was used most frequently by participants. Considering how previous literature found *then* to be a utilized term among children (French & Nelson, 1981; Berman & Slobin, 1994), the frequent use of *then* among participants made sense. It is possible that *then* was popular among participants because of its flexibility and ability to be used in various points in a script. It is also possible that other terms may not be as preferred as *then*. For example, although children can use the term *before* in their scripts (French, 1983), this does not necessarily mean they will choose to use it often in their scripts.

The exploration of temporal terms also revealed an unexpected, fascinating finding: the temporal term *then* was used most frequently at the transition points between different step categories (i.e., going from the Preparation to the Core category and going from the Core to the Closure category). Since participants took the opportunity to use *then* most commonly at

transition points between the step categories, this suggests that participants agreed that there is a distinctive categorization of their event steps (i.e., the Preparation, Core, and Closure categories). It also suggests that participants agreed with the type of categorization this study implemented. It is possible that participants agreed with this categorization and felt the need to label these transitions to help organize their descriptions and show the listener a logical sequence of steps.

Additionally, there were no predictions for the event types; however, results found an interesting interaction between event types. Findings revealed an interaction between the event types and the number of steps children included in their step categories. Children included more steps in the Core category for the Brushing Teeth event than for the Washing Hands event, and they included more steps in the Closure category for the Washing Hands event than for the Brushing Teeth event. It is unclear why children included more Core steps for the Brushing Teeth event and more Closure steps for the Washing Hands event, but it is possible that the COVID-19 pandemic may have influenced these findings. With more focus on hand washing to stop the spread of infection during the pandemic, this may have encouraged children to focus more on the entirety of the hand washing script than the brushing teeth script. It is possible that children may have engaged in more conversations about hand washing, so they recalled more details to include in the Closure. Also, it is possible that the Closure category felt like an essential category due to the focus on accurate hand washing practices during the pandemic. On the other hand, they may have created their Brushing Teeth descriptions from only personal experiences of literally brushing their teeth, so they may not have thought to include as many Closure steps. Although it may be impossible to know, it is

intriguing to consider if this interaction between events and steps would disappear if brushing teeth had been a major focus of the pandemic as well.

This study had many exciting results, but it had several limitations as well. One limitation was the difference in procedures for the child and adult groups. The child groups completed the study's task as part of the OCSC; therefore, they completed five different tasks prior to seeing the Brushing Teeth and Washing Hands event pictures. Even when the children saw the Brushing Teeth and Washing hands event pictures, they did not see these in isolation. Instead, they saw these two pictures along with at least eight more pictures where they had to describe how they would perform the task. If time permitted, and if the child was willing, some children saw up to sixteen pictures. On the other hand, adults only saw and described how they would perform the routine task presented in four pictures. Thus, it is possible that the child groups may have felt more fatigued during their descriptions of the Brushing Teeth and Washing Hands events. Since these pictures came much later in the OCSC project, they may have had less energy to provide their best possible responses, which might have negatively impacted this study's findings and its generalization to the public.

Another limitation includes this study's inability to represent a diverse population. Most participants in this study were White and did not represent diverse backgrounds. More research is necessary to see if these findings are similar and applicable to a more diverse group of participants.

There also may be a limitation due to the number of research assistants who worked with the children. Throughout the OCSC project, many research assistants collected data from children; therefore, there may be variability in conversation due to the natural tendency of

human variability in conversations. Although this most likely did not influence the results much, it is possible that some research assistants may have provided more prompting such as, "anything else?", than others. If this is the case, then this may have potentially influenced the number of steps children provided.

Finally, another limitation may be regarding the selection of participants in this study. Some children were excluded from this study if they did not provide steps for the Brushing Teeth and Washing Hands event; however, it is possible that including these children in the analysis may have contributed to interesting findings as well. Further research should consider including all participants when investigating children's descriptions of routine tasks.

Investigating children's descriptions of routine tasks was educational and showed many valuable findings. Although many findings were unexpected, there is potential for this research to contribute in a meaningful way to both the clinical and typically developing populations. People are constantly performing routine tasks, often without a second thought; therefore, it is captivating to see how people perceive and recall these events when describing their process. It is especially exciting to see the sophistication of language abilities among the younger population.

References

Berman, R. A., & Slobin, D. I. (1994). *Relating events in narrative: A crosslinguistic developmental study*. Lawrence Erlbaum Associates, Inc.

Clark, E. V. (1971). On the acquisition of the meaning of before and after. *Journal of Verbal Learning and Verbal Behavior*, *10*(3), 266-275. https://doi.org/10.1016/S0022-5371(71)80054-3

Feldman, H. M. (2019). How young children learn language and speech. *Pediatrics in Review*. *40*(8), 398-411. https://doi.org/10.1542/pir.2017-0325

French, L. A., & Nelson, K. (1981). Temporal knowledge expressed in preschoolers' descriptions of familiar activities. *Papers and Reports on Child Language Development*, 20, 61-69. https://eric.ed.gov/?id=ED209930

French, L. (1983, April 21-24). *Language in scripts* [Paper presentation]. Biennial Meeting of the Society for Research in Child Development, Detroit, MI, United States. https://eric.ed.gov/?id=ED243566

Hudson, J., & Nelson, K. (1983). Effects of script structure on children's story recall. *Developmental psychology*, *19*(4), 625. https://doi.org/10.1037/0012-1649.19.4.625

Nathanson, R., Crank, J. N., Saywitz, K. J., & Ruegg, E. (2007). Enhancing the oral narratives of children with learning disabilities. *Reading & Writing Quarterly*, *23*(4), 315-331. https://doi.org/10.1080/10573560701501610

Reifel, S. (1985). *Children's views of kindergarten*. Institute of Education Services. https://eric.ed.gov/?id=ED264975

Reifel, S., & Garza, M. (1983, April 11-14). *Child care as script: Children's descriptions of daily experiences* [Paper presentation]. Annual Meeting of the American Educational Research Association, Montreal, Canada. https://eric.ed.gov/?id=ED229139

Scott, C. M., & Windsor, J. (2000). General language performance measures in spoken and written narrative and expository discourse of school-age children with language learning disabilities. *Journal of Speech, Language, and Hearing Research*, 43(2), 324–339. https://doi.org/10.1044/jslhr.4302.324

Verrier, N. (2000). Nursery school event representation and organisation: A longitudinal study in young French children. *European Journal of Psychology of Education*, *15*, 313-328. https://doi.org/10.1007/BF03173182