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The Impact of Daylight Saving Time Transitions on Domestic Violence Call Volume

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Introduction

Daylight Saving Time (DST) is a longstanding practice in many countries, involving the seasonal adjustment of clocks by one hour forward in the spring, and one hour backward in the fall. Although DST was initially introduced to promote energy conservation and maximize daylight hours, it has become a subject of debate, given its impact on physical and mental health, cognitive performance, and criminal behavior (Kountouris & Remoundou, 2014).

Gray and Jenkins (2019) provide historical context to understand the significance of DST as a policy within the United States (U.S.). The article emphasizes the alignment of DST with political ideologies and regional divides. Predominantly associated with liberal politics and urban constituencies, DST has been debated at both state and federal levels, with international considerations also influencing discourse (Gray and Jenkins, 2019). Gray and Jenkins' historical perspective shows an interplay of factors such as wartime necessity, energy considerations, economic interests, and public sentiment shaping the trajectory of DST.

DST originated from the ideas of Benjamin Franklin during the 18th century. In a letter penned to the editor of the Journal of Paris in 1784, Franklin proposed the concept by analyzing the expenses of Parisian families on candles, suggesting that significant savings could be achieved by utilizing sunlight more efficiently (National Archives, n.d). Reflecting on a moment of early awakening due to noise, Franklin contemplated the potential for extended daylight hours to reduce reliance on costly candlelight.

It was formally proposed by British builder William Willett in the early 20th century, and was eventually implemented during World War I to conserve coal (Gale 2022; Pollak, 1981). However, opposition, particularly from groups like farmers concerned about disruptions to fruit picking and morning milking, led to its repeal in 1919. DST resurfaced during World War II and

subsequently became a decision left to local and regional authorities after the war, resulting in a lack of uniformity (Gray and Jenkins, 2019; Pollack, 1981). To lessen the confusion people experience when traveling through different time zones, the Uniform Time Act of 1966 mandated DST for six months (Gale, 2022; Murse, 2022).

The federal government regulates DST under the authority of the Interstate Commerce Clause of the U.S. Constitution (U.S. Department of Transportation [DOT], 2024). This clause grants Congress the power to regulate commerce among the states, which includes the regulation of timekeeping practices that affect interstate transportation, communication, and commerce (U.S. House of Representatives, n.d.). Therefore, the U.S. DOT ensures widespread and uniform adoption of the same standard of time within each time zone, with legal enforcement to address violations (Gale, 2022).

Subsequent decades since DST's implementation experienced debates over the duration of DST. Despite the DOT regulating DST, states can exempt themselves without DOT approval (Chasan, 2024). Presently, only two states and four territories have opted out of DST, with Arizona citing hotter desert temperatures in 1968, and Hawaii deeming their ample daylight sufficient in 1967 (Chasan, 2024).

Any changes to DST must be approved by Congress, and there have been recent attempts to do just that. Florida Senators Marco Rubio and Rick Scott introduced the Sunshine Protection Act in 2019 to make DST permanent nationwide (Tumin, 2023). Requiring majority votes in both chambers of Congress and presidential approval to become law, the bill experienced initial success in the Senate in March 2022 via unanimous consent (Suni, 2024). However, its House counterpart languished in committee, resulting in the Act losing momentum and ultimately failing (Suni, 2024; Suter, 2023).

In 2022, Colorado enacted a law adopting year-round DST, contingent upon a federal law enabling states to maintain DST throughout the year as opposed to ST, like Hawaii and Arizona (Chasan, 2024). Meanwhile, Massachusetts officials deliberated in October 2023 on two bills: one seeking to establish permanent DST and another aiming to return to Standard Time (ST) year-round (Chasan, 2024).

The DST transitions are a contentious topic. One consideration that has largely been overlooked is the effect of DST changes on domestic violence (DV), which is not fully understood. As discussions surrounding the future of DST unfold, there is a pressing need for policymakers to acknowledge and address this overlooked aspect. Research on the potential link between DST and ST changes and DV could contribute valuable insights to inform future decisions and ensure a more thorough understanding of the broader implications of DST changes.

Literature Review

Physical and Mental Health:

DST transitions, and in particular the "spring forward," have been found to disrupt the body's internal circadian rhythm, which leads to an increased risk of weight dysregulation, diabetes, cardiovascular diseases, and mental health decline (Cruz et al., 2019; Giuntella & Mazzonna, 2019; Hansen et al., 2017). In the week following the springtime DST transition, there is a modest increase in acute myocardial infarction (heart attacks) and thrombolysis treatments (the breakdown of blood clots formed within blood vessels), emphasizing the potential physiological disturbances associated with the time change (Folyovich et al, 2020; Manfredini et al., 2018). Folyovich's (2020) analysis, however, concludes that psychosocial

factors, such as the anticipation of the end of the month, may be a bigger contributor than the disruptions to the circadian rhythm to stroke incidence.

In addition to physical health impacts, studies suggest a decrease in mental health following DST. Previous studies show that an 11% increase in the rate of unipolar depressive episodes during the transition to ST in the fall gradually decreases over ten weeks, suggesting that the sudden advancement of sunset and shorter days may contribute to an increase in depressive episodes (Hansen et al., 2017). On the other hand, reports in the UK and Germany show that people experience a decrease in life satisfaction following the first week after the DST spring transition (Kuehnle & Wunder, 2016). While research findings may sometimes conflict, collectively, they indicate that both DST and ST transitions can have detrimental effects on society, impacting both physical and mental health.

The U.S. observes an uptick in suicide rates and substance abuse following the DST transition, which ties in with a body of research strongly suggesting a correlation between alcohol consumption and increased incidents of violence (Gortner et al., 1997; Osborne-Christenson, 2022). Research indicates that a significant majority of violent men perpetrate assaults against their partners while intoxicated, with a smaller percentage doing so while under the influence of drugs (Boutilier et al., 2017; Gortner et al., 1997). Other findings show that abusers with alcohol or drug problems face a 70% to 158% increased risk of severe violence and that the most violent and antisocial abusers are often affected by alcohol and drug challenges (Gortner et al., 1997).

Moreover, studies find that later sunset time significantly reduces sleep duration, negatively influencing cognitive skills and symptoms of depression (Giuntella et al., 2017; Reis et al., 2023). According to Cheng and Jaffe (2021), depression is a top risk factor associated with

domestic homicide. Depressed DV perpetrators are found to be nearly 1.5 times more likely to engage in homicide-suicide, and exhibit a higher prevalence of associated risk factors compared to nondepressed counterparts (Cheng & Jaffe, 2021).

Studies have consistently reported a link between depressive symptoms and violent behavior in men, with one study showing that a 20% increase in depressive symptomatology is associated with a 30% higher chance of mild aggression and a 74% higher chance of severe aggression (Gortner et al., 1997). Collectively, these studies indicate an association between DST-derived sleep disruption and increases in violence and aggression.

Sleep Deprivation and Cognitive Performance:

Urbatsch (2014) explores how sleep patterns influence voter turnout. His research suggests that counties and states in the US witness higher voter turnout when people gain an extra hour of sleep just before an election—a boost comparable to the influence of factors like the presence of a gubernatorial race on the ballot. Urbatsch's (2014) findings suggest potential implications for forecasting American elections, with the electoral calendar potentially benefiting Democratic candidates through increased turnout among marginal voters. Additionally, the study delves into the influence of sleep on voters' preferences, finding incumbents perform better when voters receive additional sleep during the transition to ST.

Conversely, sleep deprivation is associated with poorer mental acuity and cognitive performance. Using the end of DST as a natural experiment, researchers find as little as one extra hour of sleep results in substantial health benefits, including reduced hospital admissions for cardiovascular diseases (Jin & Ziebarth, 2020). Similarly, studies show poorer vehicle control and more eyelid closures during the DST transition, which correlates with a higher incidence of fatal accidents (Fernandes et al., 2023; Guo, 2023; Orsini et al., 2022).

Using a driving simulator, Fernandes et al. (2023) demonstrate that heightened fatigue levels following the DST transition, as indicated by worsening vehicle control and increased eyelid closure, went unperceived by study participants. This hinders their ability to employ fatigue-coping strategies, which leads to decreased road safety. Similarly, other researchers using a driving simulator conclude that driving was negatively affected by a disruption in circadian synchrony due to the DST transition (Orsini et al., 2022). Both studies suggest an elevation in risk-taking behaviors during sleep deprivation.

While there is research that finds an increase in car accidents during the springtime transition, a study using regression analysis from crash data accessed through state data portals shows an 18% decrease in crashes during the DST transition, with an increase of crashes by 6% following the transition to ST (Zhou & Li, 2022). The authors list potential factors that could contribute to crash risks and influence traffic exposure, including psychological effects, such as increased relaxation during extended daylight hours, and changes in trip patterns from daylight to nighttime.

Criminal Behavior and Violence:

The impact of DST on criminal behavior and violence is complex. More ambient light reduces the incidence of robberies (Doleac & Sanders, 2015). Despite that, an increase in ambient light during DST is associated with a significant rise in the likelihood of robbery arrests (Domínguez & Asahi, 2023; Kaplan, 2020). Although DST-derived sleep loss is associated with negative mood, studies find a decrease in the incidence of assault due to lack of motivation and reduced energy (Munyo, 2018; Umbach et al., 2017).

Likewise, a study on the transition to DST in Brazil found a decrease in firearm-related homicides (Toro et al., 2019). Having a firearm in a household in which DV is present is

associated with a 20-fold increase in the risk of homicide compared to homes with DV where a gun is not accessible, which could indicate the role of DST on DV (Goodyear et al., 2020). This interplay between DST, ambient light, and criminal behavior underscores the importance of considering the effects of DST transitions and their implications for DV.

Environmental and Economic Impact:

DST and ST transitions not only impact natural occurrences like wildfires and wildlife collisions, they also have far-reaching effects on societal aspects. Researchers found a 30% increase in human-caused wildfires in the US following the DST transition (Kountouris, 2020). For the transition into ST, a spike of vehicle collisions involving white-tailed deer was observed (Abeyrathna & Langen, 2021). Researchers find that remaining on DST year-round would prevent approximately 36,550 collisions between deer and vehicles, while adhering to standard time year-round would result in an additional 73,660 collisions annually (Prugh, 2024). Along with the natural impacts of DST and ST transitions, studies show broader societal repercussions linking time changes to economic variability.

Economic adversity and inequality have long been considered a factor of DV (Griffiths et al., 2020; WHO, 2020). A study by Gibson & Shrader (2018) establishes a direct link between a one-hour increase in average weekly sleep and a 1.1% improvement in short-term earnings, along with a significant 5% enhancement in long-term earnings. Further, studies by Kamstra et al. (2000) reveal statistically significant stock market declines following DST transitions. Collectively, these findings demonstrate the influence of DST and ST transitions on economic dynamics, potentially contributing to DV.

Gender Differences and DV:

Interestingly, studies suggest men and women have different responses to DST. Chudow et al. (2020) found a significant increase in atrial fibrillation hospital admissions during the week following the springtime DST transition, particularly in women. Another study found that the DST transition has a negative effect on mood, which is more prominently seen in full-time employed men (Kountouris & Remoundou, 2014). Orsini et al.'s (2022) driving-simulator experiment demonstrates a heightened impact on driving fatigue among young male drivers following the DST transition. While some studies investigate gender differences in reaction to DST transitions, Manfredini et al. (2018) stress the limited data on this subject.

DV is a pervasive issue characterized by abusive or aggressive behavior within romantic relationships, as defined by the Centers for Disease Control (CDC) in 2022. Recent statistics from the CDC (2022) indicate that 41% of women and 26% of men in the US will experience IPV at some point in their lives. External factors, such as major events, holidays, and sporting events have been shown to increase reports of DV against women (Forsdike et al., 2022; Swallow, 2017; Williams & Neville, 2014). This hints at the possibility of gender-specific responses to DST changes, which could indirectly affect DV dynamics.

Data and Methodology

This study investigates the potential relationship between Daylight Saving Time (DST) and Standard Time (ST) transitions and domestic violence (DV) call volume. This connection is explored using data on call volume, including calls received and answered by DV advocates obtained from two primary organizations: the National Domestic Violence Hotline (NDVH) and the YWCA Golden Gate Silicon Valley Chapter (YWCA).

The NDVH provided a good starting point as it represents aggregate calls nationwide. To capture potential changes around transitions, data from the NDVH were collected for five days

before and after both DST and ST transitions spanning five years (2018-2022). Each observation represents a single day in a specific year, and as such, this process yielded a panel dataset consisting of approximately 110 day-year observations.

Additionally, data were collected from the YWCA, focusing on a specific region and offering a more extensive dataset. In addition to national data provided by NDVH, it is important to consider data from the YWCA Golden Gate Silicon Valley Chapter for two key reasons. First, the YWCA serves a specific region, ensuring all victims within that area actually experience the DST and ST transitions, unlike potential variations in a national sample. Second, the YWCA provides direct services to local victims. Analyzing their data can reveal if these transitions affect calls to the YWCA, potentially indicating more serious needs requiring immediate support. Call data spanning 16 days before and 6 days after daylight savings, covering both DST and ST transitions over the same five-year period, were obtained. This approach resulted in a panel dataset comprising approximately 220 day-year observations.

A paired-sample t-test was utilized to compare the change in average call volume before and after DST and ST transitions. The outcome variable is the daily call volume at either the NDVH or YWCA, which is measured by the number of calls received and answered by a DV advocate. The null hypothesis (H_0) posits that there is no significant difference between call volume before and after DST and ST transitions, while the alternative hypothesis (H_1) suggests a statistically significant difference in call volume following DST and ST transitions. Although the paired-samples t-test does not directly capture immediate post-transition changes, the analysis extends across a week after the transition, aiming to discern potential impacts of DST and ST transitions on call volumes over this period. Utilizing a 2-tailed test for the difference in means, the study seeks to determine whether these transitions mitigate or exacerbate call volumes.

Main Results

To isolate the impact of DST and ST transitions on call volume during typical business days, the initial analysis primarily focused on weekdays. This approach avoids potential biases arising from differences in call volume patterns between weekdays and weekends. Since 1) DST and ST transitions always occur on Sundays, 2) weekends tend to have lower call volume compared to weekdays, and 3) the effects of the transition are likely most salient in the immediate weekdays following, using a balanced pre- and post-period that includes both weekdays and weekends (Monday-Sunday) could introduce bias due to the weekend effect. To minimize this, the analysis compares call volume on weekdays only, specifically focusing on Monday-Friday in both the pre- and post-transition periods.

IRB Exemption

This research does not involve human subjects and is therefore exempt from IRB review.

Findings

First, NDVH data was examined to investigate a potential correlation between DST and ST transitions and average daily call volume. To explore this, the central tendencies (mean and median) of call volume for weekdays before and after each DST and ST transition across the five years (2018-2022) was calculated. This info is presented in Table 1. Average call volume for weekdays before and after each transition, categorized by DST and ST transitions for each year is shown in Figure 1. A paired-sample t-test is used to assess the statistical difference in call volume. The results align with the visual inspection of the bar graph. The test indicates no statistically significant changes in average weekday call volume associated with either DST or ST transitions (based on 10 paired comparisons). The analysis of NDVH data suggests that DST

and ST transitions do not correspond to a significant change in average weekday call volume to a national DV hotline. As such, H_0 is not rejected.

Next, YWCA data was analyzed, which could provide a more nuanced view due to its focus on a specific region and its ability to direct resources. Central tendencies (mean and median) are presented in Table 1, and average call volumes are visualized in Figure 1. While the lower daily call volume at the YWCA can lead to less precise estimates, the bar graph displays interesting variations.

Generally, there appear to be inconsistent changes in call volume following DST transitions (Figure 1). This suggests that an extra hour of sunlight or an hour less sleep might not significantly impact the likelihood of calling the local YWCA, at least in the Silicon Valley area. Interestingly, the average number of calls in 2022 nearly doubled in the week following the DST transition. Indeed, a paired-sample t-test reveals no significant change in average YWCA call volume following a DST transition, with the exception of the 2022 DST transition where average call volume rises statistically significantly following the transition.

The unique finding for 2022 warrants further investigation. Some possibilities: 1) specific events occurred that influenced how Silicon Valley residents responded to the transition, encouraging residents to contact local advocates 2) specific events occurred that triggered a rise in domestic violence incidents and subsequent calls to the YWCA, 3) data quality or collection procedures might have differed in 2022 compared to other years.

The ST transition shows a more interesting and cohesive pattern. We see that in 2018 and 2019, there is a dramatic increase in average call volume following ST transition (Figure 1). However, during 2020-2022, this behavior is not observed, which is supported by the paired sample t-test. Taken together, ST transition analyses suggest that from 2018-2019, an extra hour

of darkness or an additional hour spent “at home” increases the likelihood of calling the local YWCA in the Silicon Valley area. Though speculative, it could be that DV abusers are more likely to act when they are more “well rested,” or when there is an additional hour spent at home. In 2020-2022, call volume may have been affected by the COVID-19 restrictions, where work and home life blurred, potentially impacting abusers' behavior or victims' access to resources.

Admittedly, call volume data in both datasets have weaknesses that need to be acknowledged. First, both NDVH and YWCA record a DV call only when a call is received and answered. Calls that are received but not answered are not recorded as a call in both databases. Therefore, this data definition is limited by the number of personnel that can triage calls per day. Second, calls categorized as requiring more urgent resources might not be reflected in the DV call volume data. For example, calls needing both DV services and seeking emergency housing assistance due to a recent sexual assault incident may be counted as a sexual assault call, and thus those callers would not be represented under DV calls. This could explain a smaller change in DV call volume if there is a concurrent increase in more critical needs following ST transitions during 2019-2022.

Analysis of the YWCA call volume averages pre- and post-transition revealed a notable rise in calls following the transition, particularly evident when considering weekend data for the switch to ST. Additionally, an elevation in calls was observed when assessing the median, with the most substantial increase occurring during the transition to ST, also including weekend data.

For a more comprehensive analysis, consideration is given to results obtained from a full work week before and after DST/ST transitions, including the weekend. However, it is important to acknowledge a potential limitation, as stated above, 1) these transitions always occur on Sundays, 2) weekends tend to receive fewer calls, and 3) The effects are suspected to be most

salient on the immediately following weekdays, using Monday-Sunday as the pre- and post-periods might introduce bias.

Weekend Analysis

A second set of analyses, including weekends, was performed. Since the previous analyses included only the 5 weekdays directly preceding and after DST and ST transitions, these analyses compared DV call volume between Tuesday-Saturday (5 days before DST and ST transitions) and Sunday-Thursday (5 days after DST and ST transitions). Inclusion of the transition Sunday in the post- DST and ST transition group is consistent with the hour change occurring between Saturday/Sunday of DST and ST, thereby giving both groups one day of the weekend.

This analysis yields results that appear consistent with the weekday-only analyses. At NDVH, DV call volumes are largely similar. Interestingly, 2019 appears to have less DV calls after both DST and ST transitions (Figure 1). Other years, such as 2020 and 2022 exhibit a small decrease post-DST transition, and a small increase post-ST transition. In the YWCA dataset, this analysis also follows the same trend as the weekday-only analyses. Both 2018 and 2019 have similar increases observed post-ST transitions in weekday-only analyses. Almost all transitions have the same increase or decrease pattern between both analyses. Only 2020 and 2021 post-ST transitions observe an inverse in the direction of DV call volume (Figure 1).

Pre-DST/ST Simulation Analysis

To strengthen the analysis and rule out alternative explanations, a pre-DST/ST simulation analysis is conducted using the YWCA dataset, which offers more pre-transition days. This analysis involves simulating the DST or ST transition one week prior to the actual transition

date, effectively creating a "placebo" transition for comparison of call volume before and after this simulated transition. It is important to note that the sample is cut off just before the actual DST and ST transition to prevent the capture of any real-world effects.

The purpose of this simulation is to see if any significant differences in call volume emerge during a placebo transition. This approach aims to delineate whether there are cyclical or random patterns within the dataset that contribute to observed changes, rather than the effects of DST and ST. This simulation analyzed YWCA in both methods described above: weekdays only (Monday-Friday vs. Monday-Friday), and inclusive of weekends (Tuesday-Saturday vs. Sunday-Thursday).

Generally, this analysis does not find consistent patterns (Figure 2). However, the data of ST transitions in 2018 and 2019 are notable. In both years, a large increase of DV calls post-ST transition is observed. However, in this analysis, the comparison of the two weeks demonstrates a decrease in calls, which is consistent in both weekday-only and weekends analysis. This relationship is the inverse of what was observed in 2018 and 2019 pre- and post-ST transitions, suggesting the week immediately before the 2018 and 2019 ST transitions may be noisy data rather than a pattern. In addition, when comparing central tendencies, the simulation data observe decreases in call volume, while the DST and ST data consistently increase.

Three-Week Comparison

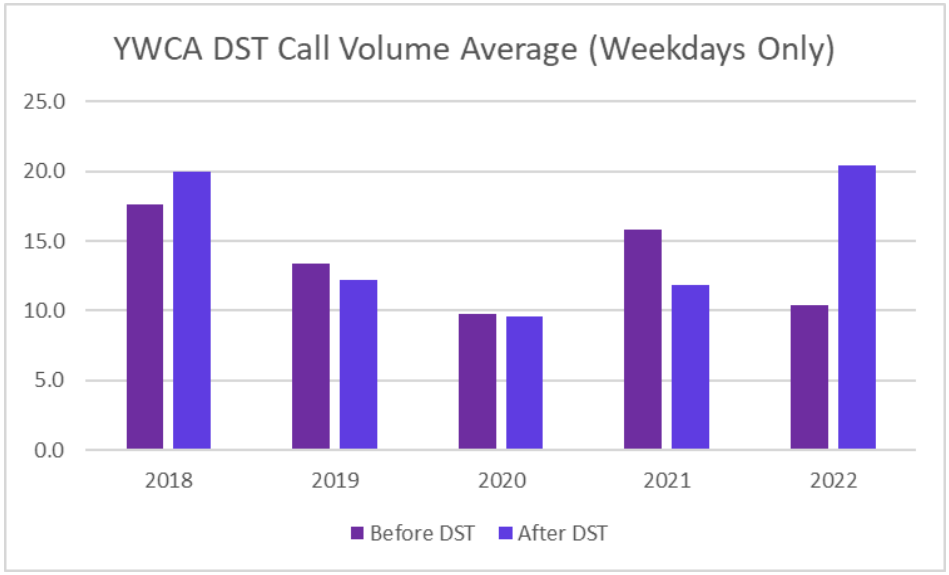
To help observe how DV call volume could fluctuate over time, the YWCA dataset was plotted as 3 separate weeks: 2 weeks pre-DST and ST, 1 week pre-DST and ST, and 1 week post-DST and ST transitions. Here, the observations noted above for the ST transitions in 2018 and 2019 are easily observed. In both 2018 and 2019 ST transitions, the week immediately prior

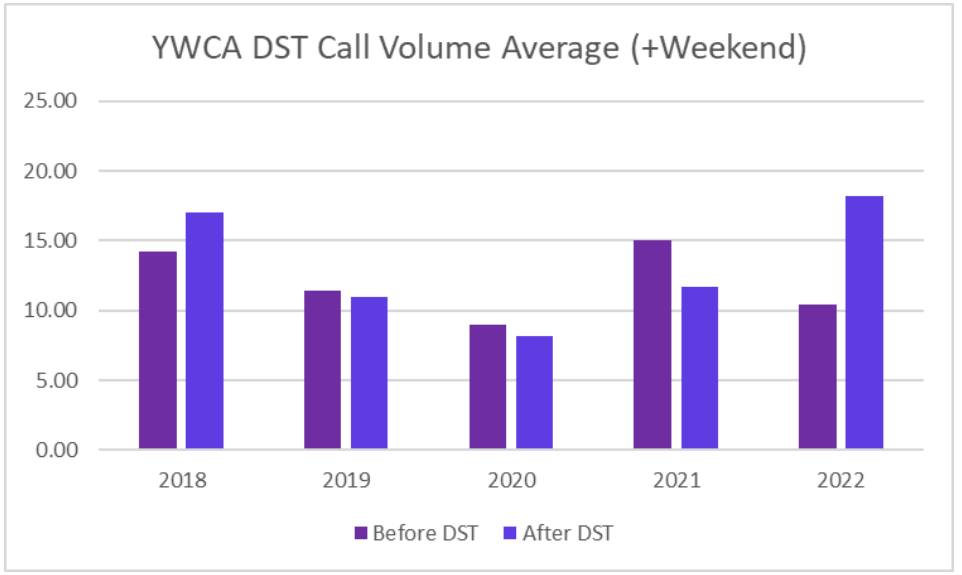
to ST has the lowest average DV call volume. Moreover, the call volume 2 weeks pre-ST and 1 week post-ST are similar, making it difficult to conclude whether there is a true increase in DV calls during those two transitions. This observed effect is also reflected in the 2022 DST transition, though the total number of calls the week after DST may still have a slight increase relative to two weeks prior to DST transition.

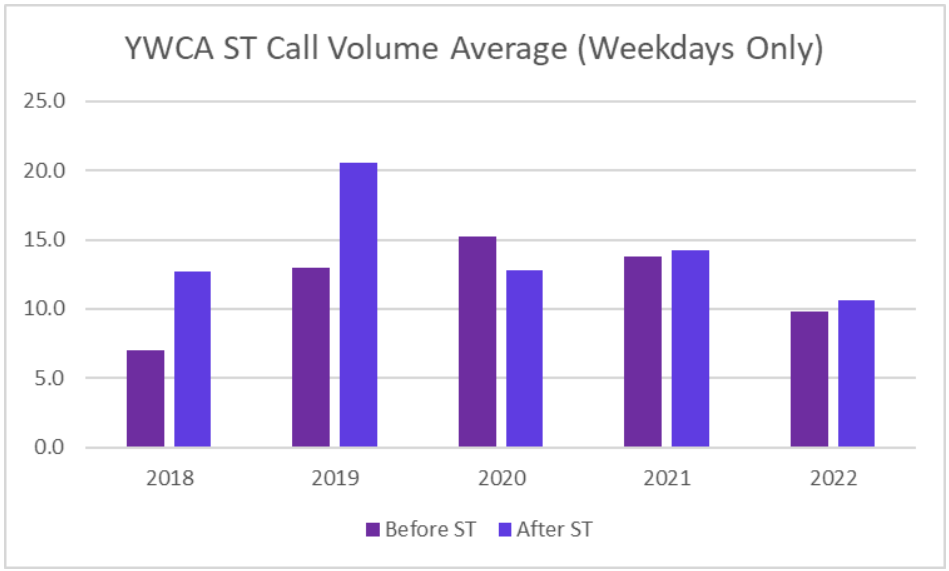
Table 1: Central Tendencies and T-Test Results

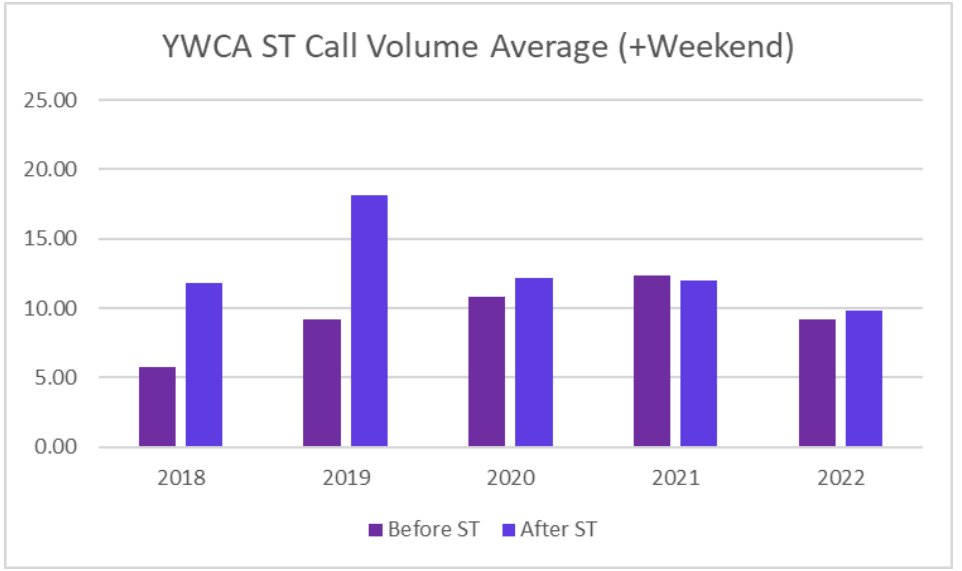
			Weekdays Only			+ Weekend		
			Pre-transition	Post-transition	Difference (p value)	Pre-transition	Post-transition	Difference (p value)
YWCA	DST All years (2018-2022)	mean (sd)	13.4 (3.4)	14.8 (5.0)	1.4 (0.588)	12.0 (2.5)	13.2 (4.2)	1.2 (0.563)
		median	11	14		11	13	
		N	25	25		25	25	
	ST All years (2018-2022)	mean (sd)	9.2 (2.9)	10.6 (3.8)	1.4 (0.245)	9.5 (2.4)	12.8 (3.1)	3.3 (0.137)
		median	10	14		9	14	
		N	25	25		25	25	
NDVH	DST All years (2018-2022)	mean (sd)	1218.9 (142.1)	1199.0 (137.4)	-19.9 (0.257)	1153.8 (155.1)	1139.0 (143.0)	-14.8 (0.17)
		median	1233	1179		1166	1132	
		N	25	25		25	25	
	ST All years (2018-2022)	mean (sd)	1180.5 (170.3)	1191.7 (155.9)	11.3 (0.765)	1101.7 (150.5)	1133.0 (145.3)	31.3 (0.394)
		median	1155	1184		1122	1159	
		N	25	25		25	25	
YWCA Simulation	DST All years (2018-2022)	mean (sd)	13.3 (2.1)	13.4 (3.4)	0.1 (0.956)	11.7 (1.6)	11.8 (3.2)	0.1 (0.954)
		median	14	11		13	11	
		N	25	25		25	25	
	ST All years (2018-2022)	mean (sd)	13.8 (5.8)	11.8 (3.3)	-2.0 (0.383)	12.7 (4.9)	11.0 (3.1)	-1.7 (0.373)
		median	12	11		12	9	
		N	25	25		25	25	

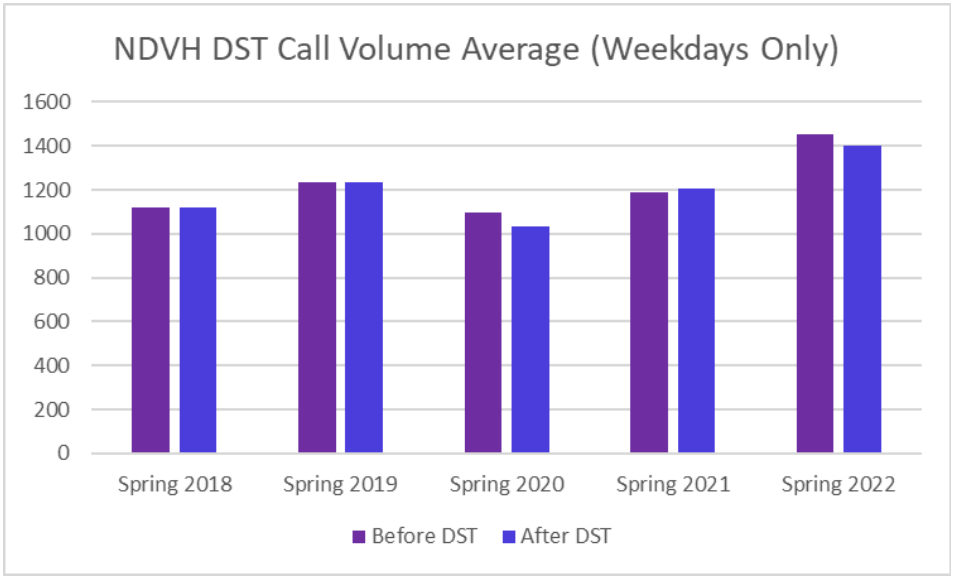
Figure 1: Annual Call Volume Averages by DST and ST Transitions

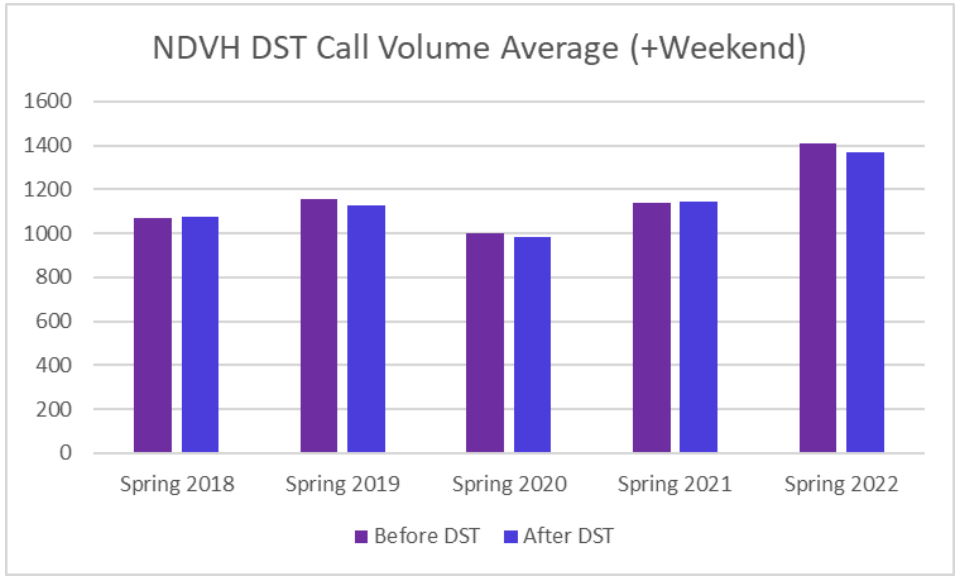


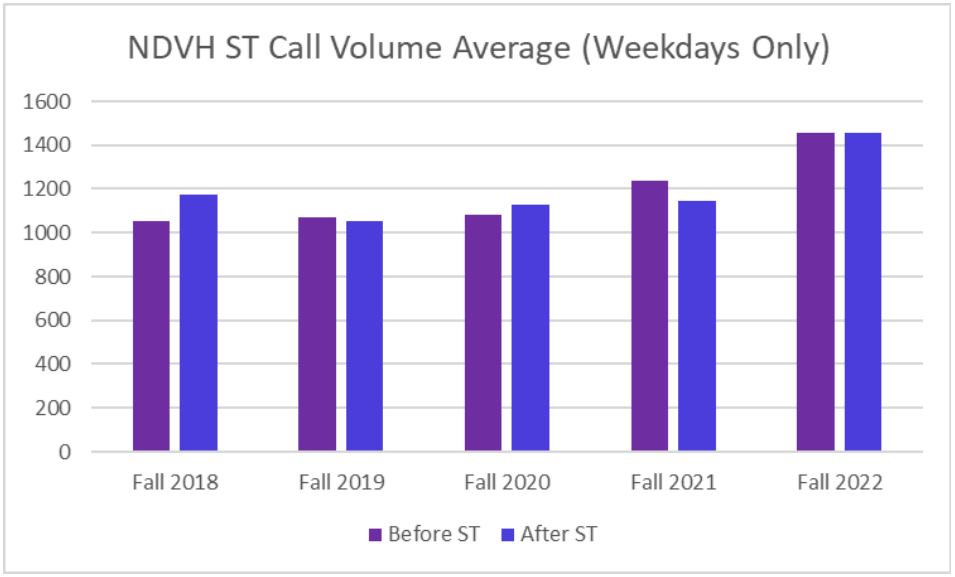







NDVH DST Call Volume Average (Weekdays Only)
1600
1400
1200
1000
800
600
400
200
0
Spring 2018
Spring 2019
Spring 2020
Spring 2021
Spring 2022
Before DST
After DST


NDVH DST Call Volume Average (+Weekend)
1600
1400
1200
1000
800
600
400
200
0
Spring 2018
Spring 2019
Spring 2020
Spring 2021
Spring 2022
Before DST
After DST


NDVH ST Call Volume Average (Weekdays Only)
1600
1400
1200
1000
800
600
400
200
0
Fall 2018
Fall 2019
Fall 2020
Fall 2021
Fall 2022
Before ST
After ST

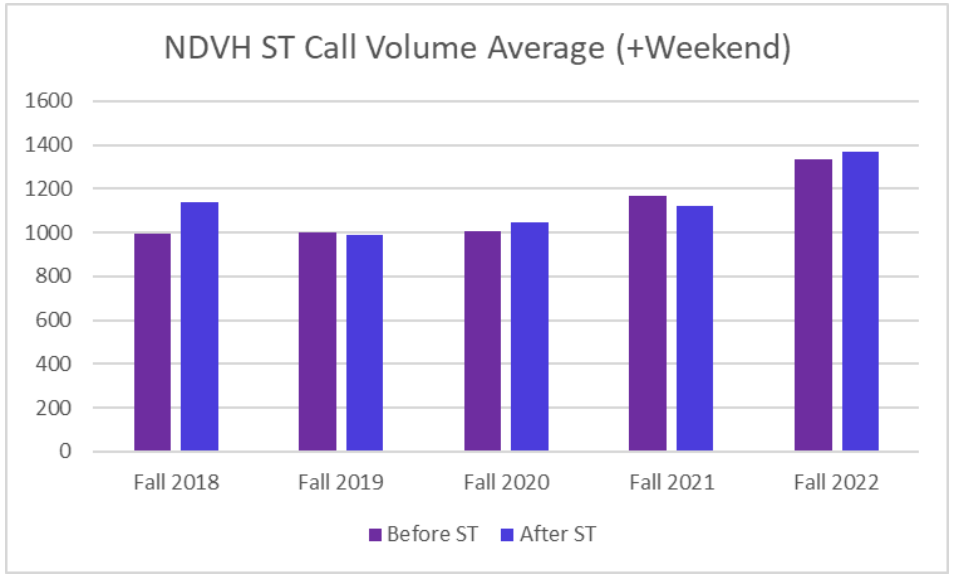
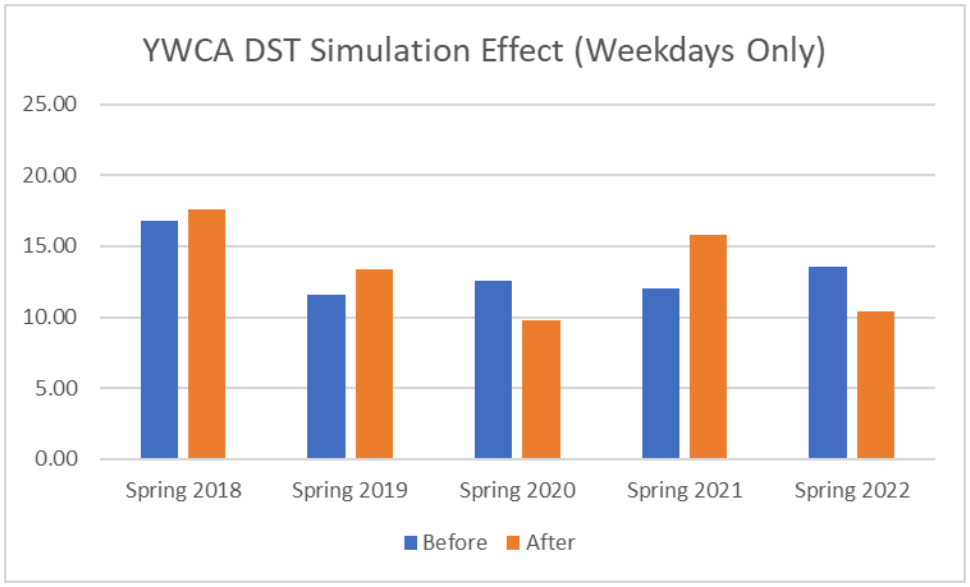
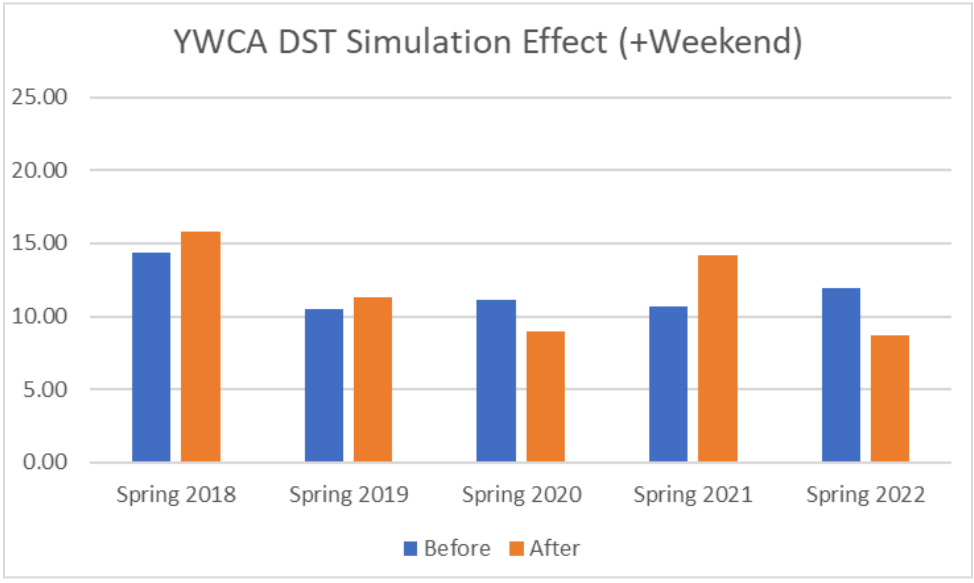
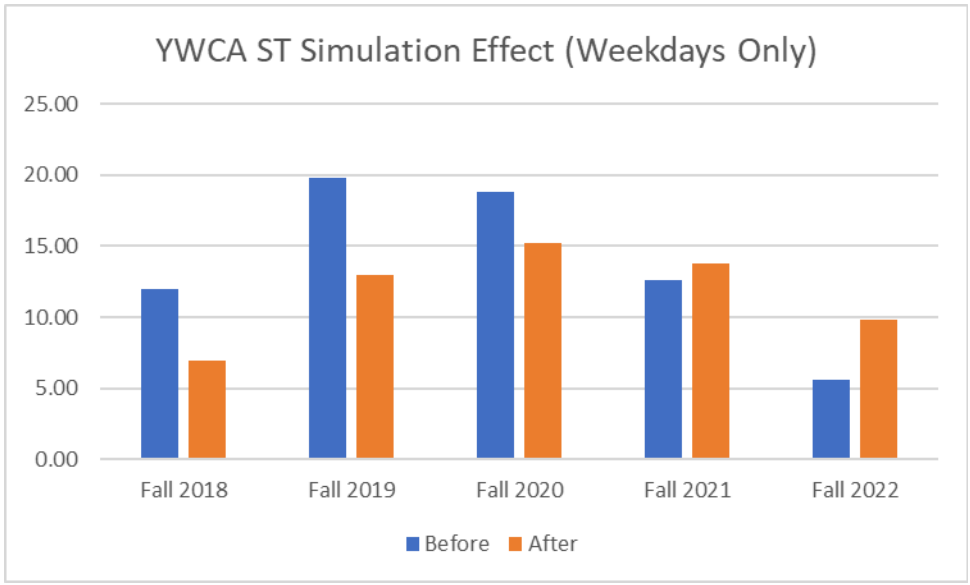

NDVH ST Call Volume Average (+Weekend)
1600
1400
1200
1000
800
600
400
200
0
Fall 2018
Fall 2019
Fall 2020
Fall 2021
Fall 2022
Before ST
After ST

Figure 2: Pre-DST/ST Simulation Analysis







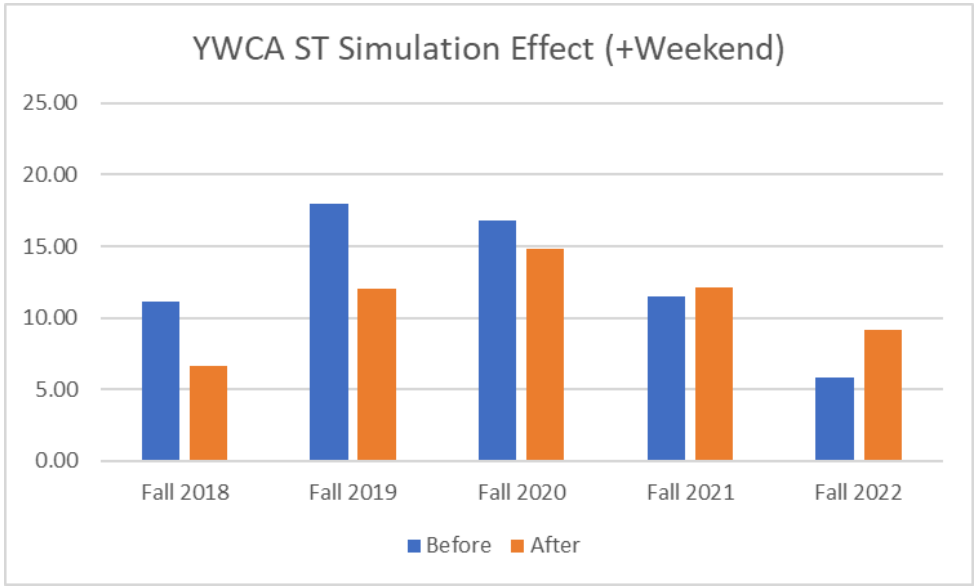
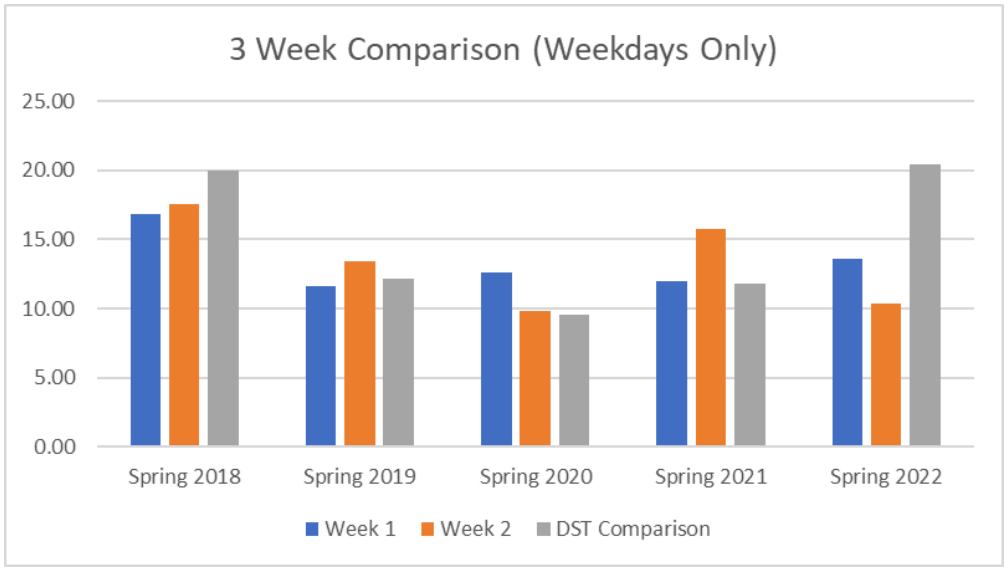
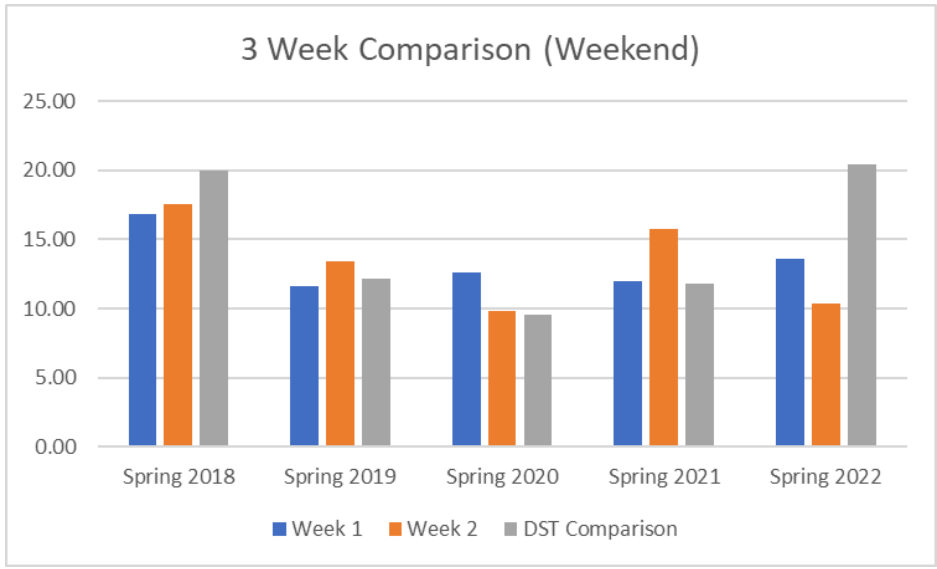
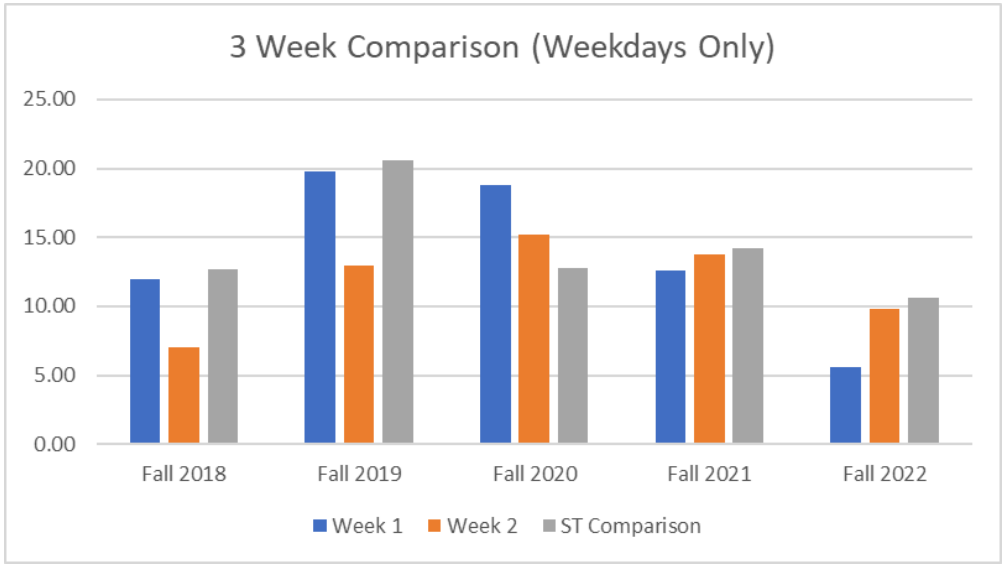
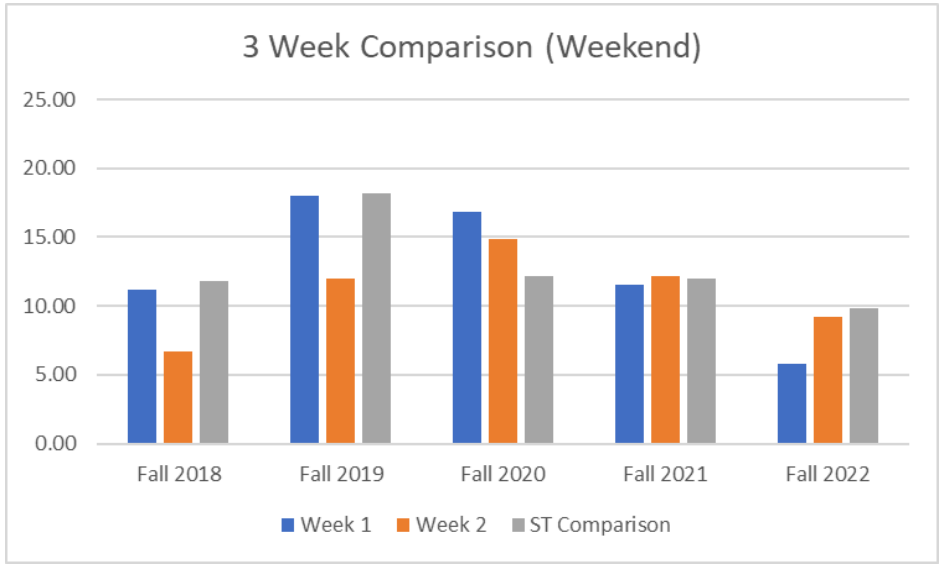


Figure 3: Three-Week Comparison (YWCA)









Discussion

The impact of social constructs on human behavior is complex and poorly understood. This study examines the effects of DST and ST transitions on DV reporting frequency. Analyses of DV call volume from a local Bay Area chapter of the YWCA and the NDVH do not find increased DV call volume in the week immediately following DST and ST transitions.

Various factors could contribute to these observed results. First, the datasets analyzed were limited to DV call volume 1-2 weeks before and after the DST and ST transitions for five years at two organizations. If the impact of DST and ST transitions on DV call volume occurs beyond this time window, it would not be observed in these datasets. Additional data from days before and after DST and ST transitions, expanding the dataset across multiple years, and incorporating data from additional organizations could help identify possible statistical trends in DV call volume.

Second, in addition to calling DV hotlines, there are other forms of DV reporting, such as calling emergency services, police, confidential online chat platforms, and texting. This heterogeneity of DV reporting mechanisms could dilute the impact of examining only one outlet such as calling DV hotlines. It would be valuable to obtain similar datasets on other DV reporting mechanisms to add to this analysis. Finally, the demographic and socio-economic data of DV callers are not included in these datasets. This data would be interesting to examine how DST and ST transitions differentially affect gender, ethnicity, economic status, or geographic location in terms of DV call volume. While global call volume may be similar before and after these transitions, there could be heterogeneous effects on different populations.

More research is needed to fully understand the relationship between DST and ST transitions and DV. For example, response and impact to DST and ST transitions may vary based

on gender. The datasets examined here include years impacted by the COVID-19 pandemic, when typical patterns of human behavior may have been atypical. Moreover, the standard protocol for triaging DV calls may have changed at this time. Call priorities may have shifted, leading to calls that could have been classified as DV calls to other categories such as food, housing, or child care assistance. Though not identified here, the impact of DST may not be the same as the impact of ST, given that one moves an hour forward while the other moves an hour back. More analysis is needed.

This study introduces several implications for policymakers. It helps elucidate whether the economic benefits of DST outweigh the social and health impact on the overall community associated with DST and sleep changes. While not conclusive, this analysis encourages further exploration of the potential relationship between DST and DV.

This research also supports the importance of proactively planning, both in terms of resourcing and budget, for events such as DST, which could lead to a need for more community support. If research identifies increased DV support needs on key days of the calendar, then policy makers could leverage this data to plan increased resources to DV call hotlines and other supportive services. One strategy to ensure enough support for an increase in DV call volume would be to use flexible mechanisms to bring other government employees into these services, analogous to county employees being called on to be service workers during disasters (County of Santa Clara, 2023). However, any such changes based on these findings would be premature.

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