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Beyond the Time Bind: Gender Inequality and the Tempo of Life in 87 Countries

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Abstract: This article explores the relationship between gender inequality and the tempo of life around the world. By directly situating tempo in sociological theory, I develop a more consistent, embodied, precise and generalizable measure for the tempo of public life, with gender on the forefront. To do so, I draw on the largest dataset to-date collected on the tempo of life around the world. This allows me to isolate how macro and micro level gender inequality matters in different contexts. Contrary to existing literature from the biosciences, my ordinary least squares regression results show that in countries with high levels of gender inequality, women often walk faster than men in public places. Monte Carlo cross-validation tests and parametric bootstrap analyses test the predictive accuracy of the full model. My results illustrate that the tempo of public life cannot be solely reduced to previously-explored economic, cultural and environmental differences between the northern and the southern hemispheres. The consideration of gender is imperative for understanding between-country and within-country differences in tempo. In addition to shedding light on the tempo of public life, my work serves as an important first step toward standardizing the tempo measure, allowing for meaningful comparisons in markedly different contexts.

We inhabit time as fish live water. Our being is being in time.
Rovelli

Walking is an integral part of life for most adults around the world, and walking is delineated by tempo and pace (Ko et al. 2011). During the last decade, the importance of focusing on the speed with which we navigate public spaces has started to gain traction, especially in public discourse and in the biological sciences (Reynolds 2018). This literature has noted that gender matters: women tend to walk slower, both because of their propensity to carry children and because of their hip geometry (Cho et al. 2004; Wall-Scheffler & Myers 2013; Bruening et al. 2015).

Researchers have shown that demographic, economic, geographic and cultural contexts also matter when it comes to how we walk (Levine & Norenzayan 1999; Ko et al. 2011). However, the extent to which the literal pace of everyday life is shaped by macro-sources of gender inequality remains unsettled. This is partly because social science research on the topic struggles with inconsistent measurements. For example, Levine and Norenzayan (1999) measure the pace of life in 31 cities through: estimating a 60 feet distance, then measuring the average walking speed over this distance. They additionally combine this measure with the accuracy of public clocks and the speed of postal workers. Wall-Scheffler and Bouterse (2018) focus on two cities, estimating pace via walking speed over approximately 30 feet. They then control for gender, approximate age, visible loads carried, and the presence of walking companions (Reynolds 2018). Clearly, these are very different measures, leading to incomparable results.

Thus, there is a paucity of information when it comes to understanding how the pace of life differs in different contexts around the world. We additionally still do not know how gender, gender inequality, along with other population-level variables matter for the overall pace or tempo of life in a particular country. This makes it hard to unpack how the ways in which we encounter public space is affected by larger structures of inequality. As such, it is hard to know how pace may affect other social processes, how it is affected by macro-level social structures of inequality, and how it may matter when it comes to the collective behavior of organized groups.

This article seeks to advance the existing literature both methodologically and theoretically. First, by directly situating walking in sociological theory, I develop more consistent, precise and generalizable measures for the tempo of life, with gender on the forefront. Second, I examine variations in markedly different countries. Finally, I test the robustness of my proposed measure and models by conducting post-regression diagnostic tests via cross-validation testing. To do so, this paper uses the largest dataset compiled to-date on walking tempo around the world. The data was specifically collected to study the tempo of public foot traffic in 87 capital cities. Unlike previous work on the topic, this study takes gender, seasonality, time-of-day, day-of-week and walking companions into account. Working with extensive data such as this presents the opportunity to better isolate how gender matters for the tempo of life in different contexts, along with how gender inequality may play a part in shaping how we move through the public landscapes of our lives.

In support of this, I find that there is a great amount of variation between countries when if comes to how fast women walk relative to men. Contrary to the existing literature from the biosciences, I find that in contexts framed by high levels of gender inequality, women often walk faster than men in public places. This work underscores the necessity to consider gender in conjunction with inequality when it comes to social explorations of the tempo of life, its determinants, and its effects.

SITUATING TEMPO IN TIME

Time and temporal order undergird the social order of public life (Moore 1963). Living in time, we often conceptualize our experience of time as being both relational and absolute, relying on watches while also taking other people's temporal preferences and perspectives into account. The construct of 'time' encompasses a complex collection of structures (Fraser 1990). To situate individuals in the temporal order of the social world, social scientists often divide this construct into two broad categories: social time and clock time. Yet, social and clock time are different (Bergson 2014). While we often organize modern life by clocks, clock time and social time are seldom perfectly correlated. Social time illuminates the ordering of the social, with particular attention to the patterns of social groups and processes (Sorokin and Merton 1937). When thinking about *social time, synchronicity, rhythm, tempo, temporal orientation and perspective* come to the fore (Hawley 1950). Social time is co-created and experienced by individuals and groups as they navigate their social worlds. On the other hand, *clock time refers to the absolute and quantifiable time of clocks, captured by the rate, pace and speed of minutes passing*.

In our modern world, social time and clock time have a codependent relationship: clock time informs social time and social time informs clock time. However, their relationship is at times dysfunctional, as social time can be 'tyrannized' by clock time (Sorokin 2017; Sorokin & Merton 1937). An example of this would be the case of a group of coworkers having to rush back to work after a delightful lunch together, necessitating a faster speed of walking than desired. Social time may also take precedence over clock time, especially in more leisurely or less developed societies (Thompson 1967). To complicate this further, social meanings are often imposed on clock time, where different units of clock time are perceived markedly differently by individuals in different contexts (Zerubavel 1979). The takeaway from this is that though clock time can be measured independently of the social (such as in physics), social time cannot exist independently of the social world and its processes. Knowing this - to conceptualize the tempo of public life through the act of encountering the world while walking - the rest of this section differentiates between pace as it is governed by clock time and the social time of tempo.

Pace versus Tempo

Suppose that two individuals both traverse one mile (or 1.6 kilometers) in 9 minutes. This is their walking pace, closely related to speed, rate and the absolute time of clocks (Lauer 1981; Amato 1983). However, walking this mile could be a markedly different embodied temporal experience for our two individuals, despite their same walking speed. Knowing that one of them is significantly taller would intuitively imply that while one strolls, the other would have to rush to keep up with the pace of their long-legged companion. Though they walk with the same pace – covering the same distance in the same amount of time – their walking tempos are significantly different, in that one has to take multiple fast steps. Thus, we see that tempo is relational: situated in the social, but also directly in the particular body navigating the space in question.

Differentiating between pace and tempo is imperative for understanding how various individuals navigate public spaces. Without this, we risk relegating the embodied temporal experiences of large groups of people to the margins. The tempo with which we move through the public spheres of our lives – whether by choice or by force – influences how we perceive and internalize the world around us (Buonomano 2017). This is in turn reflected by how we reproduce internalized realities in our co-constructed social worlds. The objective tempo with which we move through a given public space is intimately intertwined with our subjective experiences of time.

The tempo with which we move through the world matters for multiple reasons. When one is rushing through space, the likelihood of interpreting this physical experience as time scarcity, or feeling pressed for time, skyrockets (Rosa 2013). Time scarcity is the subjective sense of “having less time than one needs” (Mullainathan & Shafir 2013: 86). When we feel pressed for time, we have a tendency to rush through physical space. We do so by either increasing our tempo, or by feeling that our pace of life has in fact increased (Flaherty 1999; Evans 2003; Scheuerman 2004; Wajcman 2015). Thus, how we experience and navigate space is intimately connected to how we experience time and vice versa. The physical experience of our walking tempos greatly influences the subjective experience of how much time we think we have (Buonomano 2017). This is especially so when this tempo is dictated by necessity instead of choice. Tempo additionally matters, because our experience of time animates our social relationships, as they are nourished by exchanges of time (Durkheim 1912).

Multiple researchers have argued for situating our objective measures of time in the social world (Mead 1932; Gell 1992). Yet, time has been a tricky subject to study for many structure-oriented sociologists, as by nature, it forces a focus on process. Time is also unforgiving when it comes to the operationalization of our measures: it is easy to misconceptualize without careful differentiation between the pace of absolute clock time, and the tempo of relative, embodied social time. Because of this, while studies have attempted to relate the pace of social life to other constructs (Levine and Norenzayan 1999; Bouterse 2018; Reynolds 2018), their measures remain incomparable. Some measure pace via a mix of clock time and social time, while others focus more on clock time, relegating the ‘social’ to control variables. To examine how the social construct of gender matters for how individuals navigate public spaces, we must extend the previous work on the topic by carefully differentiating between pace and tempo. This is imperative, as they are markedly different measures, with different relationships to clock time and social time.

PUBLIC TEMPO AND GENDER

The public tempo of life is intertwined with gender through the traditional axes of stratification that often concern social researchers: inequalities and power. Temporal inequalities achieve salience in the lives of gendered individuals as they interact with others (Bryson 2007). Gender matters in multiple ways when it comes to the tempo of public life. In a recent study, researchers relying on the smartphone data of over 700,000 individuals have found that in the 111 countries studied, on average, women walk significantly less than men over the course of a day. This finding is particularly salient in countries where women have to navigate the reality of encountering gender-based violence while walking in public (Althoff et al. 2017).

Gender is salient, because gender inequality greatly shapes the experiences and life chances of all genders, both in the public and in the private spheres of life. Gendered temporal inequalities manifest in women having overall less temporal autonomy and control over their time, though this is influenced by socioeconomic and demographic factors (Lyness et al. 2012). Temporal autonomy and control affect both the quantitative availability and the subjective perception of time. As women tend to perform more unpaid household and care labor, they are also more likely to freely donate their time to others in their social networks (Clawson & Gerstel 2014; Hochschild & Machung 2012). This would affect both their social time, and also how much absolute clock time they have left to tend to their own needs (Williams et al. 2016).

To estimate an overall measure of country-level gender inequality, the United Nations Development Programme formulated a Gender Inequality Index (GII). This composite measure is helpful when it comes to painting a broad picture of the macro-level gender inequality individuals are navigating in a particular context. The GII reflects inequality between women and men on three dimensions: reproductive health (maternal mortality ratios and adolescent birth rates), empowerment (political representation, education levels) and the labor market (labor force participation rates)[1]. Based on this measure, in 2017 Norway (0.048) had the lowest level of gender inequality, whereas Yemen (0.834) had the highest.

This measure is relevant when it comes to thinking about the tempo of public life, as one could easily posit that each component of the index might shape the gendered experience of time. Maternal mortality ratios and adolescent birth rates would slow the individuals in question down. Giving birth takes time and requires women to slow down to carry heavy babies, both inside and outside their bodies. Similar educational attainment levels should lead to similar workplace and public service participation rates, necessitating both genders to walk to work on a regular basis. This would presumably translate to similar walking speeds, especially when both are keeping up with the flow of pedestrian traffic. The consideration of this measure is in direct conversation with the biological literature noting the propensity of women to walk slower than men (Cho et al. 2004; Wall-Scheffler & Myers 2013; Bruening et al. 2015). The incorporation of the notion of macro-level gender inequality also extends and informs the current literature noting that environmental conditions, cultural values of individualism or collectivism, and economic conditions matter for the public pace of life (Levine & Norenzayan 1999; Ko et al. 2011).

Macro-level gender inequality has a tendency to manifest in everyday interaction (Herzog 2007; Ilahi 2009). This necessitates the direct consideration of a highly relevant micro-level, public component of gender inequality lacking from the GII index. As noted above, not everyone has the luxury of safely occupying public spaces. Researchers from multiple fields assert that public sexual harassment (aka ‘street harassment’) is a highly under-reported crime, and that

[1] http://hdr.undp.org/en/content/gender-inequality-index-gii

women and female-presenting individuals are disproportionally targeted (Mellgren et al. 2017). For example, in the world's largest survey on violence against women (looking at only the European Union), researchers have found that an estimated 83 to 102 million women (15 years and older) in the EU have experienced sexual harassment at least once (FRA 2014). Though largely ignored by law, street harassment has profound effects on how women experience the world, their physical wellbeing, feeling safe in public, their freedom of movement and fundamental rights (Thompson 1994).

Economic development has unintended temporal consequences, often leading to increased subjective feelings of time scarcity (Wajcman 2015). While economically developed countries also have lower crime rates, this does not translate to women also feeling safer in public.[2] 2011 Gallop survey data incorporating information from 143 countries shows that in nearly every country in the world, men feel considerably safer than women do when walking alone in public. This is an important consideration when it comes to thinking about the determinants of the tangible tempo with which we move through our public lives. It is reasonable to consider how our sense of public safety – as it is shaped by gender – could matter for how we experience public spaces, dictating our tempo accordingly. The objective tempo with which we move through a given public space is intimately intertwined with our subjective feelings about time. When one is depressed, they tend to move slower (Sanders et al. 2012; 2016). When one is scared, they likely run to safety. When one is feeling safe and happy, they might just slow down to smell the flowers.

[2] https://news.gallup.com/poll/155402/women-feel-less-safe-men-developed-countries.aspx

HYPOTHESIZED EFFECTS OF GENDER INEQUALITY ON THE TEMPO OF PUBLIC LIFE

The social and individual experience of walking has been gaining scholarly attention in multiple fields. The current literature suggests that women would have a tendency to walk with an overall slower tempo than their male counterparts (Cho et al. 2004; Wall-Scheffler & Myers 2013; Bruening et al. 2015), and that cultural contexts matter for how we adjust our tempo to those of others around us (Wall-Scheffler and Bouterse 2018; Levine & Norenzayan 1999; Ko et al. 2011). However, the existing scholarly literature focusing on gender and walking tempo is lacking when it comes to examining the tempo of women and men walking alone in public in different contexts. While we know that gender inequality shapes both the public and private life chances of both genders (Bryson 2007), data limitations have precluded empirical analyses of how gender inequality matters for the public tempo of life (Mellgren et al. 2017; Sanders et al. 2012; 2016).

In addition to developing a more consistent, precise and generalizable measure for the tempo of life - with gender on the forefront - this study expands on the predictor variables noted in the existing literature. The following hypotheses are tested:

Hypothesis 1: Echoing existing findings from similar studies, macroeconomic contexts and country-level social characteristics matter, such that individuals of both genders living in more developed countries will walk with a faster tempo than those living in less developed regions.

Hypothesis 2: Prior research has shown that gender matters when it comes to how individuals encounter public spaces, but it has not put macro-level gender inequality in conversation with the public tempo of life. I expect that in contexts with higher levels of gender inequality as measured by the Gender Inequality Index, women will walk with a faster tempo than their male counterparts.

Hypothesis 3: Women in many parts of the globe need to navigate the daily reality of gender-based violence while walking in public. This intimate, yet very public experience, of gender inequality likely also affects the tempo of public life for women in these contexts. I expect that higher rates of reported street harassment against women will correspond to women also walking with a faster tempo than their male counterparts when alone in public.

MODELING GENDER INEQUALITY AND THE TEMPO OF LIFE

Data

The data was compiled between 2016 and 2017 via a multi-step approach: by utilizing existing publicly available datasets (for the independent and control variables) and publicly available walking tempo data (for the dependent variable). The tempo data was collected between 2016 and 2017, through the use of publicly available, live CCTV cameras and public broadcasting apps[3]. It consists of 87 countries, with a specific focus on their capital cities. It makes sense to focus on capital cities for this measure, as multiple researchers have noted that capital city walking speeds are highly correlated with the overall pace of life in the countries they are in. Additionally, their selection allows for meaningful cross-national comparisons (Bornstein 1979; Walmsley & Lewis 1989; Wirtz & Ries 1992; Levine & Norenzayan 1999). The countries were selected based on the availability of CCTV cameras, while keeping regional and economic

[3] See Appendix.

diversity in mind. The inclusion of all countries in the world was limited by CCTV camera availability. The pace data contains 100 individuals per city (50 male, 50 female).[4]

To collect the tempo data, each city was assigned a team of two independently and remotely observing undergraduate students, responsible for carefully recording CCTV camera footage. Two observers were assigned to each capital city to allow for the incorporation of validity and reliability checks. Walking tempo data collection was restricted to non-weekend (Monday through Thursday), non-rush hour times (2pm and 4pm local time). To control for seasonal variation and weather, data collection via CCTV cameras (by tuning into live public CCTV cameras) was conducted two-times over the course of the year, both during the local summer and local winter. We selected CCTV cameras overlooking public spaces through which individuals of both genders could walk in an un-interrupted manner. These included sidewalks (or at times dirt roads) leading toward markets or city centers and sidewalks located in city centers that still allowed for uninterrupted walking.

Other country level macro-indicators that have been shown to influence the pace of public life in previous research, or could reasonably matter, were collected by incorporating publicly available data from multiple sources (Levine & Norenzayan 1999; Reynolds 2018). These included the World Bank, United Nations Development Programme, Gallop Poll, International Energy Agency, Central Intelligence Agency, and the World Population Review.

The final dataset includes the above tempo data, accompanied by the country-level gender inequality index measures, country-level sexual harassment/public safety sentiment measures, per capita Gross Domestic Product (GDP), overall population size and total fertility rates (TFR).

[4] See Appendix A for the full list of cities included in our data.

Dependent Variable: Tempo

In order to standardize the tempo measure, while also situating it in gendered bodies, this paper uses steps per minute. This is a continuous variable. This operationalization makes sense for multiple reasons. Steps are easy to count with high accuracy. Additionally, individuals socially experience time when moving through space through the tempo of their walk (Adam 1990). Measuring walking tempo through steps per minute also allows for comparison across different contexts. Because women and men often have different stride lengths – which the previous literature does not account for when considering how fast 30 to 60 feet may be traversed – this method is able to incorporate a tangible tempo measure situated in the body of the individual walking through a public space.

This study also standardizes this measure through multiple other considerations: 1) Data consists of people walking between 2pm and 4pm local time. This avoids the artificial tempo inflation of rush hour, or a potential slow down right after a big lunch, or after a long day at work. 2) Data collection was restricted to Monday to Thursday. This avoids potentially biasing results by tired Fridays, leisurely weekend walkers, or people who may walk faster on Friday in anticipation for the weekend. 3) Individuals walking without companions, not carrying children, through an un-interrupted public space, generally in a city center or large market monitored by a public camera were the only ones included in the data. 4) To account for the seasonal variation in walking speed illustrated by the existing literature (Levine & Norenzayan 1999), step counts for men and women were collected during both local summer and winter conditions.

Independent Variables: Macro and Micro Level Gender Inequality Indicators

As touched on above, the widely used *Gender Inequality Index* is a fitting measure of the macro-level gender inequality characterizing the environment of each country in the data.[5] The index measures gender inequality in three important aspects: reproductive health, empowerment and labor force participation. The 2017 GII is constructed to capture the differences in the distribution of achievements of women and men in 160 countries. For technical details and sensitivity analyses, see the publicly available and extensively detailed technical notes published by UNDP.[6]

The micro-level, public component of gender inequality is captured by our data via a popular, publicly available source. To account for subjective experience of public safety, this study uses the latest and largest source of data available on the topic, collected by Gallup Polls[7]. The relevant Gallup Survey incorporated into our dataset queried respondents in 143 countries regarding their feelings about walking in public spaces. Specifically, respondents were asked: "In the city or area where you live, do you feel safe walking alone at night?" Responses were coded into dichotomous yes or no variables, indicating percentages by gender. Though this is not the same as having tangible data on street harassment around the world, it is the closes we can get to this extremely prevalent, yet under-reported crime against women (Thompson 1994).

Other Covariates

Models control for variables noted in the existing literature, indicating a predisposition to walk faster or slower (Levine & Norenzayan 1999; Reynolds 2018). These include population size of each city (continuous in millions), suicide rates (continuous, per 100,100 people, 2016),

[5] http://hdr.undp.org/en/content/gender-inequality-index-gii
[6] http://hdr.undp.org/sites/default/files/hdr2018_technical_notes.pdf
[7] https://news.gallup.com/poll/155402/women-feel-less-safe-men-developed-countries.aspx

GDP per capita (log, continuous, 2016) and total fertility rates (continuous, births per woman for 2016). For every control variable, either the latest data available that also overlapped with our 2016-2017 tempo data is included, or in the case of street harassment statistics, the latest comprehensive Gallup data source on the topic (2012). Table 1. shows the descriptive statistics for the sample.

[Table 1]

Analytic Models

Analyses begin descriptively, examining variations in the tempo of life around the world, with a focus on differences between the genders. Next, the results of ordinary least squares linear equations are presented, predicting the influence of both macro and micro level gender inequality on tempo. Separate regression models are used to predict the step-frequency increase in the tempo of men and women, controlling for other variables in the model. Least squares linear regression analysis is appropriate. The dependent variables under examination are continuous and normally distributed, the exact values of our independent variable are known, and the assumptions of independence, normality and homogeneity have not been violated (Freedman 2009). Results show the unit increase or decrease of the public tempo of life, based on the country-level environment characterized by macro and micro level gender inequality along with other relevant population-level variables. The above analysis is conducted in Stata 15.

Robustness

To test the predictive power of the regression models, estimating how accurately they may perform when it comes to the countries not included in the data (due to CCTV unavailability), the results of Monte Carlo cross-validation tests are also presented. This method involves partitioning the full sample of 87 countries into complementary subsets via 1000 random splits. The analysis is then performed on one subset (training set), while the other subset is used for the validation of the models (validation set). Considering the overall sample size, this method is an appropriate extension of the ordinary least squares linear models, as it allows for testing how accurately the models would predict step counts in practice (Dubitzky 2007; Geisser 1993; Kohavi 1995). Parametric bootstrap analyses are then used to estimate the amount of unknown bias in the sample (Hesterberg et al. 2017). These cross-validation tests were conducted in Python.

RESULTS

Of the 87 countries in the study, there is considerable variation between how many steps an average individual takes per minute. The overall mean between both genders is 134.26. Country-level average tempo ranges from 91 steps per minute in South Africa, to 169 steps per minute in Iran. *Male tempo* has a mean of 132.79, with ranges from 82 steps per minute in South Africa to 166 steps per minute in Germany. Across the 87 countries, *women's tempo* has a mean of 135.74, with ranges from 96 steps per minute in Austria, to 180 steps per minute in Jordan. There is variation between the countries when it comes to gender and tempo. In some contexts, such as in Jordan, women walk much faster than men, taking over 45 steps per minute more than their male counterparts. However, in other contexts, such as in Iceland, men walk over 35 steps per minute faster than women.

Public tempo around the world

Figure 1 shows the distribution and variation in the public tempo around the world. There are significant variations between the countries. Some of the slowest tempos can be found in the geographic south. However, as Figure 1 illustrates, there are multiple southern countries with faster tempos. Many of the fastest tempos are in Northern European countries (and in Japan). Yet, this too varies. As the map illustrates, Mexico is on par with the fastest tempos in Northern Europe. Average tempos range from 91.5 steps per minute to 169 steps per minute.

[Fig 1.]

Gender and the tempo of life

Figure 2 is in direct conversation with Figure 1. Figure 2 shows the comparison in walking tempo between the genders for each of the 87 countries. The figures illustrate that while some of the southern countries may walk at an overall slower tempo than particular northern countries (Fig. 1), in the same countries, women might walk with a faster tempo than men. However, this is not cleanly delineated by simple geographic location. For example, though Australia and South Africa have similar overall walking speeds, in South Africa, women walking alone walk with a faster tempo than do their male counterparts. Figure 2 shows that while in much of the developing world, women walk with a faster tempo when walking alone in public, this is not the case in every country. Chile is an example of this exception. When walking alone in public, here men walk with a faster tempo than do women.

[Fig 2.]

Gender inequality and the tempo of life

The distribution of gender inequality as measured by the Gender Inequality Index varies around the world, highlighting the position of women in 160 countries (UNDP 2019)[8]. Overall, more developed countries tend to have lower gender inequality, equating to high human development levels. Most of Africa and parts of Asia still have high to very high levels of gender inequality. This is reflected by their low human development levels.

Figure 3 puts this distribution in direct conversation with the tempo of life in each country. Panel 1 graphs the relationships between the GII and the tempo differences between the genders. A negative tempo indicates that in the particular country in question, men walk with a faster tempo. For example, if the tempo is -20, on average, men are walking 20 steps faster than women in the country. If the tempo is positive 20, on average, women are walking 20 steps faster than men. This illustrates that there is a positive and linear relationship between average walking tempo and the macro level indicators of gender inequality (measured by the GII) in each country. Specifically, as the country-level GII rises, so does the tendency of women to walk with a more rapid tempo than do men in the same country.[9]

[Fig 3.]

Panel 2 of Figure 3 graphs the relationship between women feeling safe when walking alone in public and the difference between how fast they walk compared to men in the same country. As the figure illustrates, there is a clear and positive relationship between feeling unsafe while walking in a public space and the intensity of women's tempo. Higher levels of feeling unsafe lead to higher walking speeds. Conversely, feeling safe from street harassment while walking in public leads to more leisurely tempos for women.[10]

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[8] See http://chartsbin.com/view/4319 for geographical distribution of the GII
[9] Figure 4a in Appendix shows this relationship for each country in the data.
[10] See Figure 4b of Appendix for country-differences between the relationship re. feeling safe in public and gendered tempo differences.

Population-level influences: gender inequality and the tempo of life

Table 2 shows the results of linear regression equations predicting unit increase of walking with a faster tempo, considering the effects of the covariates. Four sets of models were estimated: The first predicting the unit increase of women walking with a faster tempo, considering country level gender inequality as measured by the GII. GII is a statistically significant predictor of gendered differences when it comes to the tempo of public life. This model shows that in countries with extreme inequality as measured by the GII, women's tempo surpasses those of their male counterparts, walking 39 steps faster than men.

The next model predicts the unit increase of women walking with a faster tempo, considering their feelings about walking in public spaces alone. A significant negative value indicates that as women feel safer, they walk with a slower tempo. This micro level inequality measure is also a statistically significant predictor of the tempo of public life.

[Table 2.]

The third model examines the joint influence of both micro and macro level gender inequality on women walking with a faster tempo than men in a given country. Both macro and micro level indicators remain significant in our regression model when it comes to predicting gendered differences in the tempo of public life. However, in model four (the full model), we find that accounting for populations size, suicide rates and the consideration of our micro level gender inequality measure, overshadows the previously significant results of the macro level GII. In model four, we find that micro level gender inequality as measured by how safe women feel in public remains a significant predictor of walking tempo: when they feel safer, women walk with a slower tempo. As population size increases, so does the tempo of public life. When suicide rates are higher, women tend to walk slower.

Tempo, Fit and Bias

The average Mean Absolute Error (between the predicted value and actual value) across the 1000 Monte Carlo cross-validation trials is between 10 and 11. Figure 4 visually illustrates the difference in the absolute value and the test value results of a randomly chosen split from the Monte Carlo cross-validation tests. In a scenario with perfect prediction, all the predicted values would cluster on the regression line visible in the picture. The figure shows that there is predictive value in the regression model presented in this study, with a clear trend toward the diagonal line. The average Mean Absolute Error tells us that in a country without step count data - where men and women walk with the same exact tempo - the regression model in this study might under or overestimate walking tempo by approximately 10 steps.

[Fig 4.]

DISCUSSION

Theoretical and Methodological Contributions

This study made an effort to systematically link micro and macro level gender inequality and the public tempo of life in 87 countries around the world. How we move through the world matters. The experience of encountering public spaces through the embodied experience of walking influences how we understand and recreate our social reality. Despite the renewed focus on walking speed in the broader academic literature, contemporary social scientists are lagging when it comes to our understanding of how the tempo of public life is affected by larger structures of social inequality. Our conception of the public tempo of life remains incomplete without the incorporation of pervasive gender inequality, as this tangibly affects our experiences of belonging in the public sphere. Thus, it is important to systematically situate the experience of walking in social time, examining how the known differences between the genders when it comes to walking speeds may be affected by structures of inequality.

This study enriches the current literature both theoretically and empirically. My results are particularly meaningful when it comes to contributing to the literature on gender inequality, street harassment, and to advancing the efforts of temporal inequality scholars. This study shows that despite women's hip geometry and propensity to carry children, in some contexts, they walk faster than men do in public. This is in direct conversation with the largely treadmill-based literature looking at differences in walking speed and style between the genders (Cho et al. 2004; Wall-Scheffler & Myers 2013; Bruening et al. 2015). My work points to the necessity to examine how the embodied experience of gender inequality directly influences how we exist in public spaces, with very different results from how we may walk in a research lab.

My work also draws attention to the necessity to continue to engage both empirically and theoretically with situating time in social research, as only then can we fully differentiate between the nuances of tempo, pace, timing, duration and temporal orientation (Adam 1990). In addition to the above contributions, by grounding the measures in sociological theory, I was able to standardize the tempo measure so that it is: concrete, comparable and relevant for every context in the world, while also situating the measure directly in the bodies doing the walking, thus avoiding the accidental marginalization of women's experiences. This allowed me to illustrate that gender matters when it comes to the public tempo of life. My results represent a contribution to the existing literature focusing on the pace of public life. My study underscores the need for further research on the topic, especially when it comes to incorporating the perspectives of both genders.

Context Matters

Focusing on context – but controlling for time of day, day of week, weather, spatial interruptions and the presence of walking companions – allowed me to illustrate that walking tempo is a bit more complicated than described in previous work (Levine & Norenzayan 1999; Reynolds 2018). While I also found that some of the slowest tempos are in the southern hemisphere, we cannot readily assume that all of the south walks leisurely. There are multiple southern countries with tempos matching or surpassing those of some northern countries.

Gender inequality is a salient predictor of walking tempos around the world. However, in order to understand how it affects the embodied experience of walking in public, it is important to consider both the macro and micro level manifestations of gender inequality. My results inform the existing literature characterizing women as having a propensity to walk slower than men. I find that this is not the case when they do not feel comfortable or safe in public spaces. Unfortunately, women report often feeling unsafe in public in many parts of the world. By directly considering gender, the nuances in tempo come to the fore: I find that in most developing countries around the world, women tend to walk faster than men when walking alone in public, even in the middle of the day.

Future studies need to unpack this finding in more detail. As I have shown, the experience of gender inequality directly contributes to this. However, knowing that women still do more work than men in most countries around the world[11], it is also possible that these observed walking tempo differences are compounded by women rushing to juggle paid and unpaid labor. Though the Gender Inequality Index incorporates paid labor force participation rates, it does not account for the immense amount of invisible labor women still perform. It is

[11] https://www.theatlantic.com/business/archive/2015/12/the-invisible-work-that-women-do-around-the-world/420372/

highly plausible that both kinds of labor matter for the tempo of public life, and that they matter in ways distinct from each other.

Previous work on the topic of the public pace of life has shown that population size, economic development indicators, crime and suicide rates all influence the speed with which we walk in public spaces (Levine & Norenzayan 1999). Building on this literature, I find that as the population size increases, women have a propensity to walk faster than their male counterparts. However, they tend to walk slower as their suicide rates increase. This makes sense, considering that rates of depression and suicide rates are likely entangled, and depressed individuals tend to walk slower (Sanders et al. 2012; 2016). As illustrated by the Monte Carlo cross-validation tests, my full model shows promise when it comes to being able to extrapolate the results from the 87 countries in the data to other contexts around the world.

In short: (1) The public pace and the public tempo of life are markedly different measures. The former is related to clock time, and the latter is related to social time. (2) The tempo of life around the world cannot be solely reduced to previously explored economic, cultural and environmental differences between the northern and the southern hemispheres. (3) The consideration of gender is imperative for understanding between-country differences in tempo. Gender is salient, because gender inequality has a tendency to manifest in everyday interaction, shaping our experiences of public spaces. (4) The public tempo of life is shaped by larger social inequalities. As such, gender inequality affects how we encounter and reproduce time and temporal inequalities.

Implications

Despite the above theoretical, methodological and empirical contributions, this study highlights multiple opportunities for further research. When examining the public tempo of life, it is important to step outside a narrow leisure vs productivity-culture worldview (Levine & Norenzayan 1999). Considering its importance, it is imperative to incorporate a gendered lens for understanding temporal inequalities, along with unpacking the macro and micro level differences in walking tempo.

To allow for standardization between the countries, the publicly available tempo data collected from CCTV cameras in this study consists of individuals walking between 2pm and 4pm local time. Future work could incorporate individual data from Google or Apple Maps. These data sources would greatly aid in the collection of a more comprehensive measure of walking tempo during a 24-hour period and in specific weather conditions. By linking Google or Apple Maps data to individual users, researchers could also uncover how invisible loads carried (such as pregnancy or BMI) matter for the walking tempo of individuals. Additionally, this data would also allow for the exploration of the extent to which walking tempo may be a function of having access to other means of personal or public transportation.

A limitation of my dataset is that it is cross sectional. As such, it is difficult to ascertain causal mechanisms. Future work needs to collect more comprehensive longitudinal data on tempo, taking different times of day, different weekdays, different localities (urban, rural, etc) and weather conditions into account more directly. For example, it would be interesting to compare weekday versus weekend differences in public tempo by gender, or even to untangle possible tempo differences between the various weekdays. The incorporation of longitudinal data would also allow us to trace how the tempo of public life might be changing over time in different countries, either speeding up or slowing down.

In addition to collecting longitudinal data on the tempo of life in different public spaces, this data needs to be supplemented by qualitative research. This would allow for a deeper understanding when it comes to how various individuals think about the tempo of their lives similarly or differently. It is also important to ask if there is such a thing as too fast or too slow when it comes to the collective public tempo of life in a particular context. Qualitative researchers focusing on the tempo of life could also explore how the intersection of race and gender may matter when it comes to the tempo of life in different contexts.

An additional limitation of my dataset is that it is impossible to accurately ascertain age via public cameras. Gender presentation was identifiable, but age was nearly impossible to guess accurately during our data collection. Considering the significant geographic variation in my dataset, I did not feel comfortable assigning people into subjectively determined age categories. This is a distinct variable that is lacking from the data. To compensate for this, I aimed for a larger sample size for each country. I also experimented in supplementary models with controlling for old-age and youth dependency ratios (these were not statistically significant for predicting walking tempo). This highlights the need for further data collection, with a direct focus on accurately incorporating age, possibly via the use of cell phone data.

In addition to considering age, future work needs to theorize and capture differences between the public tempo and private tempo of life. This study focused on the public tempo of life, though it is reasonable to wonder how gender inequality could also influence the private tempo of life. One could expect that the two temporal experiences would be related, though they could be related in multiple ways. For example, after a forced-rapid public tempo session (from feeling unsafe while walking), women might slow down at home to compensate and recuperate. Or alternatively, since gender inequality likely manifests in the home too, they might be forced to maintain a similarly rapid tempo in order to juggle all of their duties. Here too, we need to think about public and private tempos relationally, considering all genders and facets of the public and private spheres.

My study is the first to carefully incorporate gender inequality into research examining the public tempo of life. I was able to do so by utilizing the largest dataset to-date collected with a specific focus on the topic. My results are important in that very few prior studies touch on how gender inequality influences the public tempo of our lives. My findings show that the consideration of both macro and micro level gender inequality is pertinent when it comes to theoretical development in the area of temporal inequalities. In addition to shedding light on between-country and within-country differences in the tempo of public life, my work also serves as an important first step toward standardizing the tempo measure, allowing for meaningful comparisons in markedly different contexts. Knowing the ever-changing nature of the social world, there is continued need for further research on how macro-level inequalities influence the temporal aspects of our lives.

REFERENCES

Adam, Barbara. 2013. *Time and social theory*. New York: Polity Press.

Althoff, Tim, Jennifer L. Hicks, Abby C. King, Scott L. Delp, and Jure Leskovec. 2017. "Large-scale physical activity data reveal worldwide activity inequality." *Nature* 547(7663): 336.

Bergson, Henry. 2014. *Time and free will: An essay on the immediate data of consciousness*. New York: Routledge.

Bornstein, Marc. 1979. "The pace of life: Revisited." *International journal of psychology* 14(1-4): 83-90.

Bruening, Dustin A., Rebecca E. Frimenko, Chuck D. Goodyear, David R. Bowden, and Adam M. Fullenkamp. 2015. "Sex differences in whole body gait kinematics at preferred speeds." *Gait & posture* 41(2): 540-545.

Bryson, Valery. 2007. *Gender and the politics of time: Feminist theory and contemporary debates*. Bristol: Policy Press.

Buonomano, Dean. 2017. *Your Brain Is a Time Machine: The Neuroscience and Physics of Time*. New York: WW Norton & Company.

Cho, Sang-Hyun, J. M. Park, and O. Y. Kwon. 2004. "Gender differences in three dimensional gait analysis data from 98 healthy Korean adults." *Clinical biomechanics* 19(2): 145-152.

Clawson, Dan, and Naomi Gerstel. 2014. *Unequal time: Gender, class, and family in employment schedules*. New York: Russell Sage Foundation.

Dubitzky, Werner, Martin Granzow, Daniel Berrar. 2007. *Fundamentals of data mining in genomics and proteomics*. New York: Springer Science & Business Media.

Durkheim, Emile. 1915. *The elementary forms of the religious life.* New York: Joseph Ward Swain.

Evans, Vyvyan. 2003. *The structure of time: Language, meaning and temporal cognition*. Amsterdam: John Benjamins Publishing.

Flaherty, Michael G. 1999. *A watched pot: How we experience time*. New York: NYU Press.

FRA (European Union Agency for Fundamental Rights). 2014. *Violence against women: An EU-wide survey. Results at a glance*. Retrieved from http://fra.europa.eu/sites/default/files/fra-2014-vaw-survey-main-results-apr14_en.pdf

Fraser, Julius. 1990. *Of time, passion, and knowledge: Reflections on the strategy of existence*. Princeton: Princeton University Press.

Freedman, David. 2009. *Statistical models: theory and practice*. Cambridge, UK: Cambridge University Press.

Geisser, Seymour. 1993. *Predictive Inference*. New York, NY: Chapman and Hall.

Gell, Alfred. 1992. *The anthropology of time: Cultural constructions of temporal maps and images*. Oxford: Berg Publishers.

Herzog, Sergio. 2007. “Public perceptions of sexual harassment: An empirical analysis in Israel from consensus and feminist theoretical perspectives.” *Sex Roles*, 57, 579–592.

Hesterberg, T., Moore, D. S., Monaghan, S., Clipson, A., & Epstein, R. 2005. Bootstrap methods and permutation tests. *Introduction to the Practice of Statistics*, *5*, 1-70.New York: W. H. Freeman Publishing.

Hochschild, Arlie, and Anne Machung. 2012. *The second shift: Working families and the revolution at home*. London: Penguin Books.

Ilahi, Nadia. 2009. “Gendered contestations: An analysis of street harassment in Cairo and its implications for women’s access to public spaces*.” Surfacing—An Interdisciplinary Journal for Gender in the Global South*, 2, 56–69.

Ko, Seung-uk, Magdalena I. Tolea, Jeffrey M. Hausdorff, and Luigi Ferrucci. 2011. "Sex-specific differences in gait patterns of healthy older adults: results from the Baltimore Longitudinal Study of Aging." *Journal of biomechanics* 44(10): 1974-1979.

Kohavi, Ron. 1995. "A study of cross-validation and bootstrap for accuracy estimation and model selection". *Proceedings of the Fourteenth International Joint Conference on Artificial Intelligence*. San Mateo, CA: Morgan Kaufmann. **2** (12): 1137–1143.

Lauer, Robert H. 1981. Temporal man: The meaning and uses of social time. New York: Praeger.

Levine, Robert and Ara Norenzayan. 1999. "The pace of life in 31 countries." *Journal of cross-cultural psychology* 30(2): 178-205.

Lyness, Karen S., Janet C. Gornick, Pamela Stone, and Angela R. Grotto. 2012. “It’s all about control: Worker control over schedule and hours in cross-national context.” *American Sociological Review 77*(6): 1023-1049..

Mead, George Herbert. 1932. *The philosophy of the present*. Chicago: Open Court.

Mellgren, Caroline, Mika Andersson, and Anna-Karin Ivert. 2017. “It Happens All the Time”: Women’s Experiences and Normalization of Sexual Harassment in Public Space. *Women & Criminal Justice* 28(4):262-81.

Moore, Wilbert. 1963. *Man, Time and Society*. New York: Wiley.

Mullainathan, Sendhil, and Eldar Shafir. 2013. *Scarcity: Why having too little means so much*. New York: Macmillan.

Reynolds, Gretchen. “Faster. Slower. How We Walk Depends on Who We Walk With, and Where We Live.” *The New Times* 9, (2018).

Rosa, Harmut. 2013. *Social acceleration: A new theory of modernity*. New York: Columbia University Press.

Sanders, Joost B., Marijke A. Bremmer, Dorly JH Deeg, and Aartjan TF Beekman. 2012. A 16-year prospective study in the community.” *Journal of the American Geriatrics Society*, *60*(9):1673-1680.

Sanders, Joost B., Marijke A. Bremmer, Hannie C. Comijs, Dorly JH Deeg, and Aartjan TF Beekman. 2016. “Gait speed and the natural course of depressive symptoms in late life; an independent association with chronicity?” *Journal of the American Medical Directors Association* 17(4):331-335.

Scheuerman, William E. 2004. *Liberal democracy and the social acceleration of time*. Baltimore: Johns Hopkins University Press.

Sorokin, Pitirim and Robert K. Merton. 1937. Social time: A methodological and functional analysis. *American Journal of Sociology*, *42*(5):615-629.

Sorokin, Pitirim . 2017. *Social and cultural dynamics: A study of change in major systems of art, truth, ethics, law and social relationships*. New York: Routledge.

Thompson, Edward. 1967. “Time, work-discipline, and industrial capitalism.” *Past & present* (38):56- 97.

Thompson, Deborah. 1994. “The woman in the street: Reclaiming the public space from sexual harassment.” *Yale JL & Feminism 6*:313.

UNDP (United Nations Development Programme). 2019. *Country Profiles*. Retrieved from http://hdr.undp.org/en/countries

Wall-Scheffler, Cara M., and Marcella J. Myers. 2013. "Reproductive costs for everyone: how female loads impact human mobility strategies." *Journal of human evolution* 64(5): 448-456.
Wajcman, Judy. 2015. *Pressed for time: The acceleration of life in digital capitalism*. Chicago: University of Chicago Press.
Walmsley, D. Jim, and Gareth J. Lewis. 1989. "The pace of pedestrian flows in cities." *Environment and Behavior* 21(2):123-150.
Werner, Carol M., Irwin Altman, and Diana Oxley. 1985. "Temporal aspects of homes." In *Home environments*, pp. 1-32. Boston, MA: Springer.
Williams, Jason R., Yuta J. Masuda, and Heather Tallis. 2016. "A measure whose time has come: Formalizing time poverty." *Social Indicators Research*, *128*(1):265-283.
Wirtz, Peter, and Gregor Ries. 1992. "The pace of life-reanalysed: Why does walking speed of pedestrians correlate with city size?" *Behaviour* 123(1): 77-83.
Zerubavel, Eviatar. 1979. *Patterns of Time in Hospital Life. A Sociological Perspective*. Chicago: University of Chicago Press.

Table 1. Descriptive Statistics

	Mean	Min	Max
Tempo			
Average	134.26	91.5	169.5
Men	132.79	82.2	166.2
Women	135.74	96	180
Gender Difference	2.94	-35.4	45.6
Gender Inequality			
GII	0.307	0.39	0.69
Women feel safe walking	52.86%	21%	88%
Men feel safe walking	66.59%	34%	96%
Controls			
GDP per Cap	21,243.90	783.3	76,236.80
TFR	2.42	1.1	6
Population	72.44	0.3	1393.8
Suicide female	4.95	0.2	21.1
Suicide male	14.19	0.6	51

Table 2. OLS regression predicting step frequency for macro and micro level gender inequality, considering gender differences in the tempo of public life

Characteristics	Base Macro	Base Micro	Base Micro & Macro	Full Model
Intercept	-9.4 ***	21.84 ***	4.95 ***	14.31 ***
GII	39.02 ***		33.38 ***	25.90
Safe in Public		-0.36 ***	-0.23 **	-0.23 *
Population Size				0.02 *
TFR				0.017
GDP cap				-0.0001
Suicide Rate				-1.27 *
AIC	732.41	740.50	730.40	695.75
BIC	737.34	745.43	737.79	712.68
Adj R-squared	0.17	0.09	0.20	0.26

***p<0.001 **p<0.005 *p<0.05

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***p<0.001 **p<0.005 *p<0.05

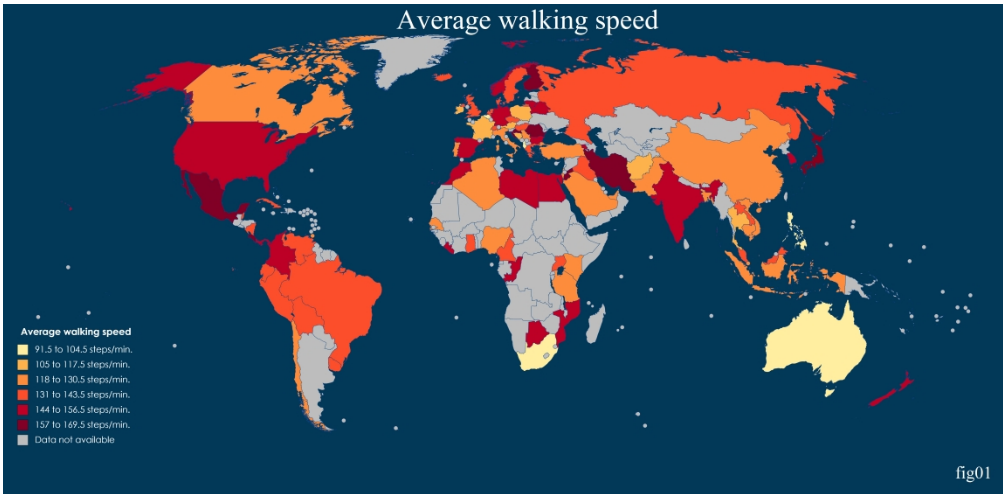


Figure 1
Average walking speed

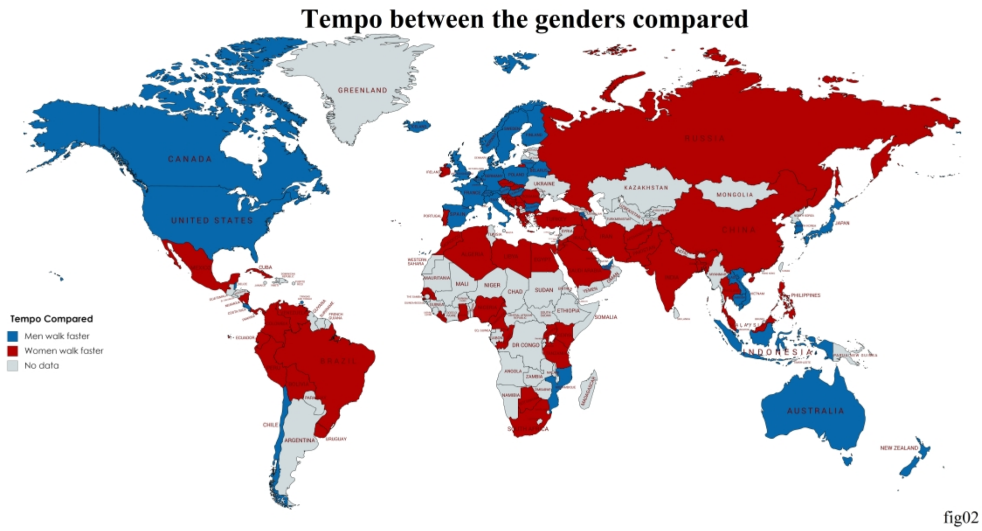


Figure 2
Tempo between the genders compared

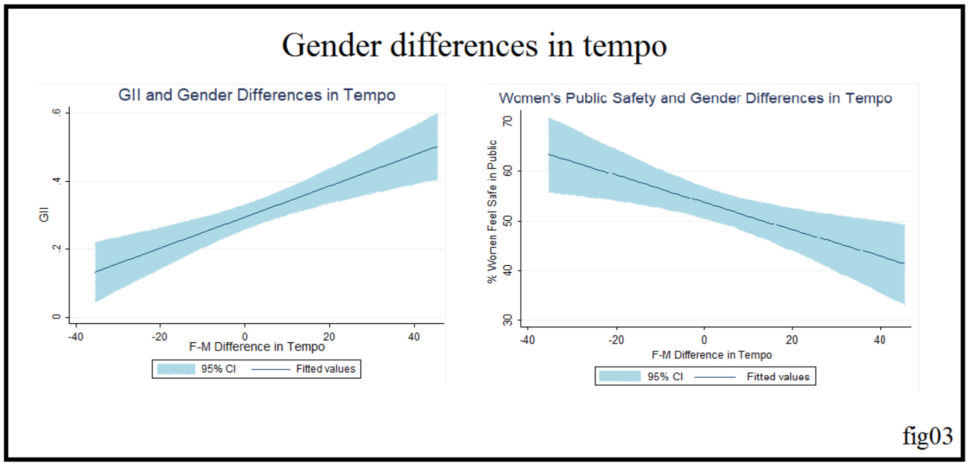


Figure 3
Gender differences in tempo

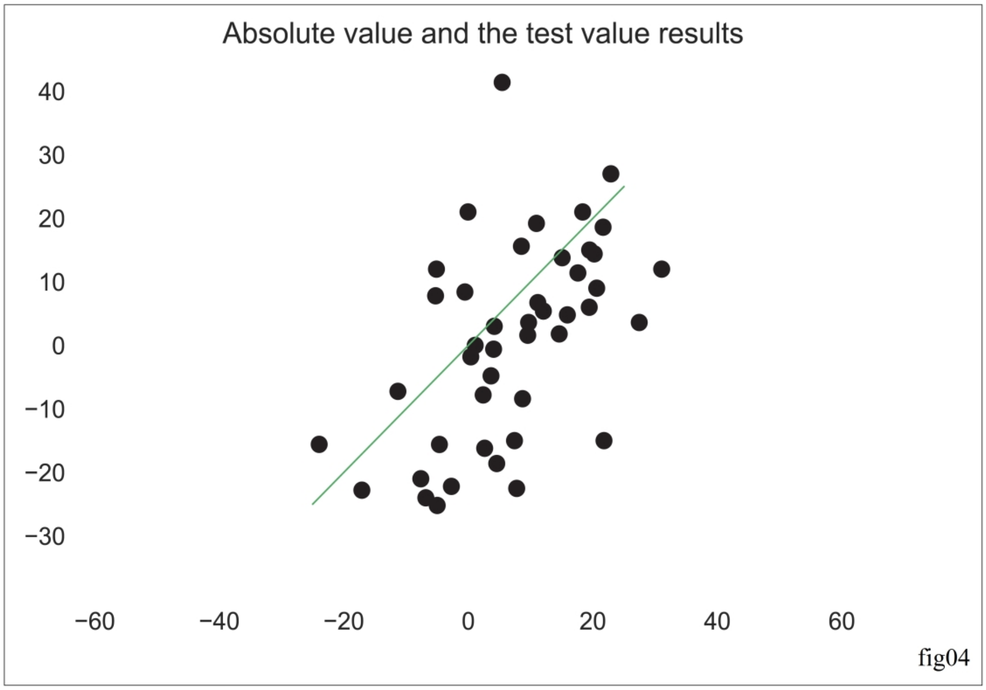


Figure 4
Absolute value and test value results

APPENDIX

A. The data includes the countries & corresponding capital cities of:

Afghanistan, Albania, Algeria, Armenia; Australia, Austria, Bangladesh, Belarus, Belgium, Belize, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Cambodia, Cameroon, Canada, Chile, China, Colombia, DR Congo, Costa Rica, Croatia, Cuba, Czech Republic, Denmark, Ecuador, Egypt, Finland, France, Germany, Ghana, Greece, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Japan, Jordan, Kenya, South Korea, Laos, Liberia, Libya, Lithuania, Malaysia, Mexico, Morocco, Mozambique, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Senegal, Serbia, Singapore, South Africa (Pretoria), Spain, Sweden, Switzerland, Tanzania, Thailand, Turkey, Uganda, UAE, UK, US, Uruguay, Venezuela, Vietnam and Trinidad and Tobago.

B. Links to public city cameras used in this paper:

https://www.earthcam.com/
https://cctvview.info
https://www.pscp.tv
http://www.opentopia.com
https://www.webcamtaxi.com

C. Supplementary figures

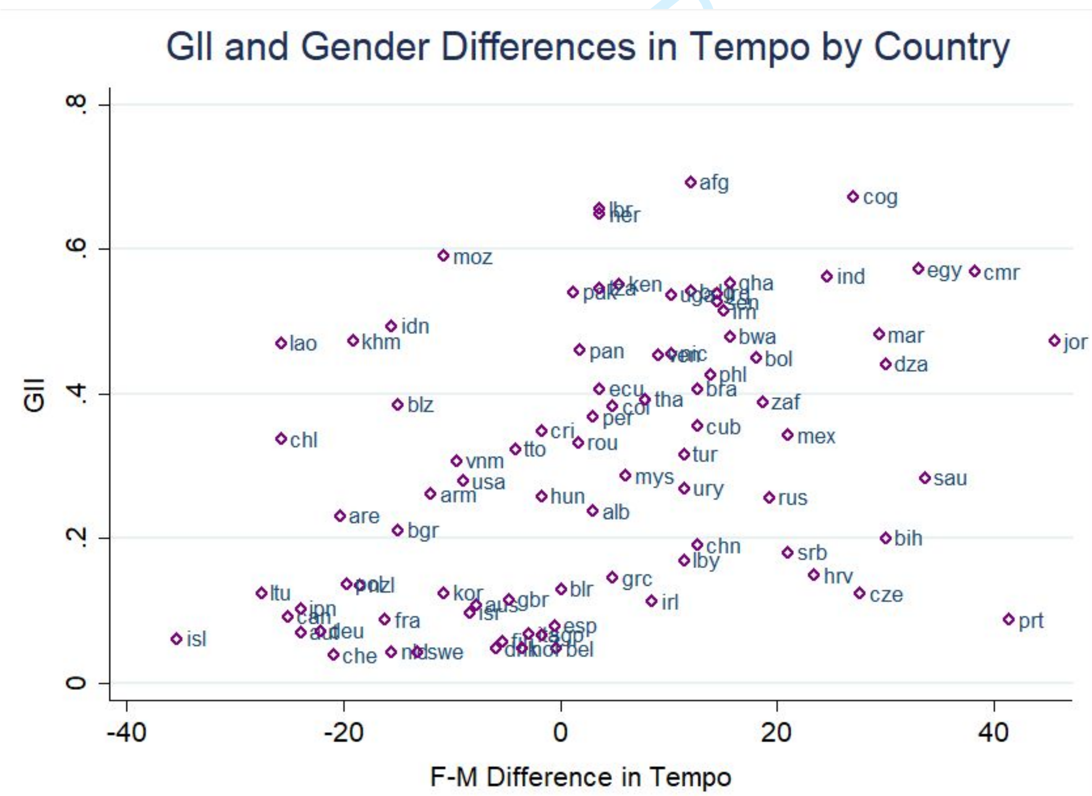
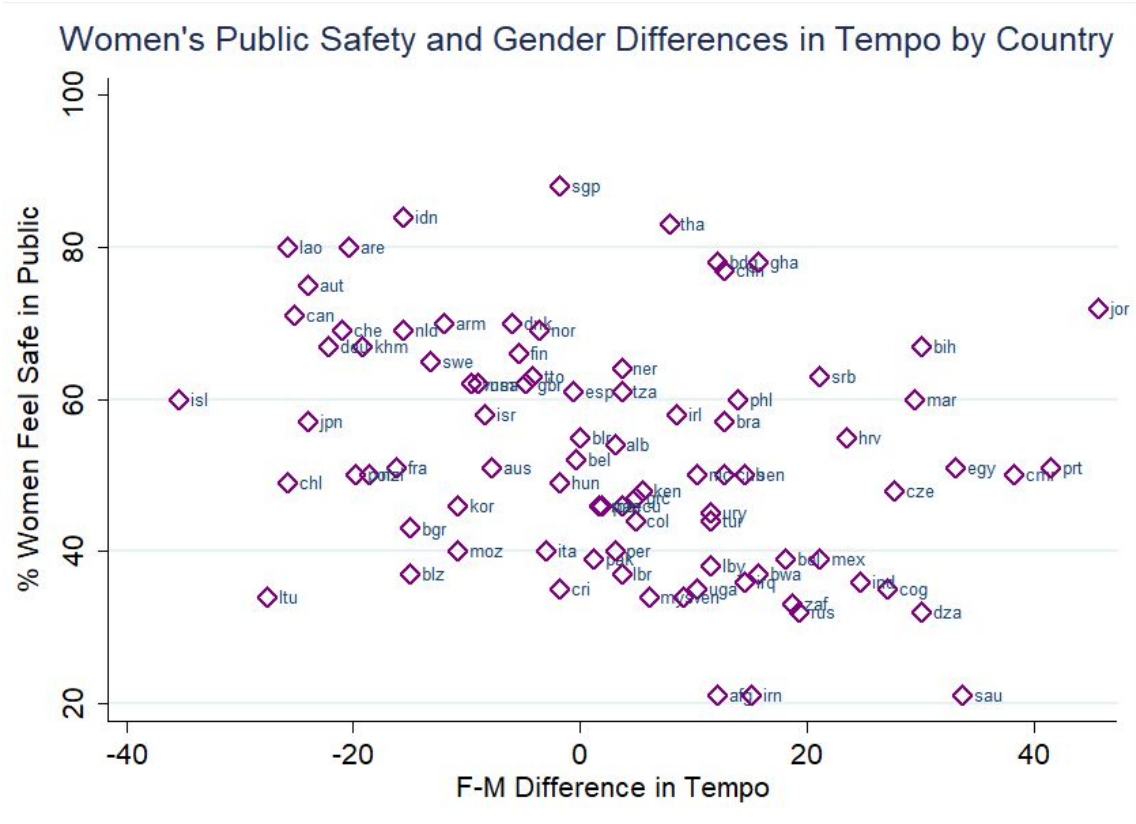


Figure 4A.


Women's Public Safety and Gender Differences in Tempo by Country
% Women Feel Safe in Public
F-M Difference in Tempo
100
80
60
40
20
-40
-20
0
20
40
sgp
idn
tha
lao
are
gha
aut
jor
can
che
nld
arm
nor
bih
fin
khm
swe
ner
srb
tto
gbr
esp
tza
isl
phl
mar
jpn
isr
irl
bra
hrv
alb
bel
egy
prt
chl
fra
aus
hun
ken
cze
kor
ury
col
tur
bgr
moz
ita
per
mex
lby
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uga
irq
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zaf
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sau
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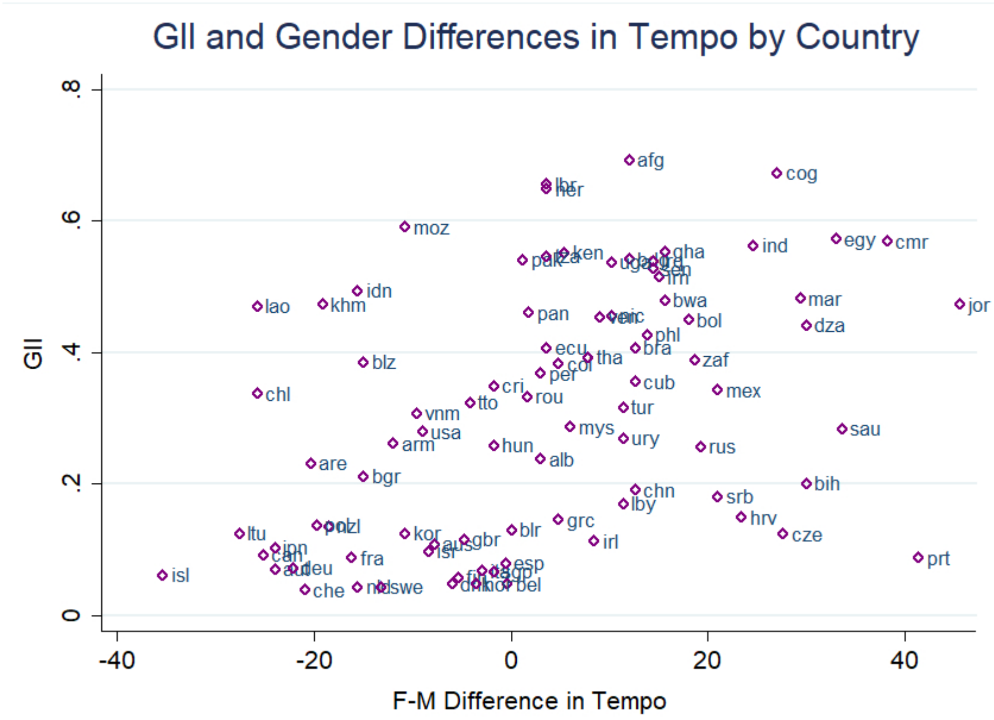
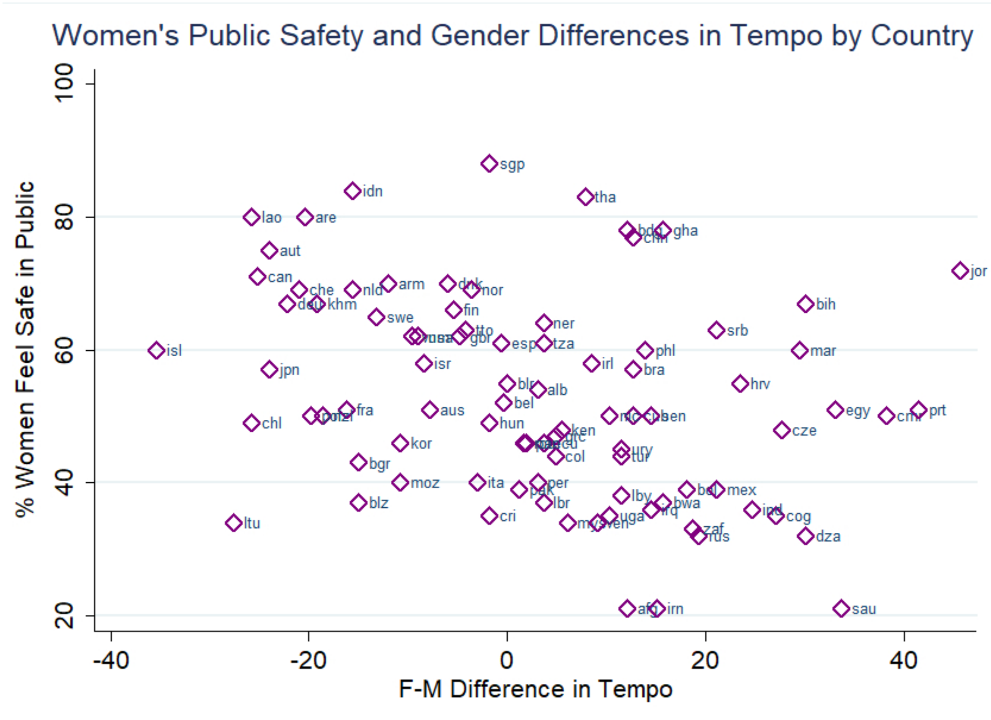
Figure 4B.



GII and gender differences in tempo by country

296x215mm (72 x 72 DPI)



Women's public safety and gender differences in tempo by country

296x215mm (72 x 72 DPI)