

Childcare in the Netherlands

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Extended Abstract

Author Note

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Abstract

This paper describes how childcare behaviors vary across the population following the introduction of subsidized private childcare in the Netherlands. Existing research has identified a large socioeconomic gradient in childcare across Europe which is not wholly explained by cost and access. Scholars have speculated that this is due to an incomplete revolution, normative inertia, and the failure of lower-income households to adopt gender-equal behaviors and utilize private childcare (Esping-Andersen, 2009). These theories of value diffusion suggest that the use of formal childcare spread across networks (Aassve, Billari, and Pessin, 2016). Given that the use of formal childcare represents a complex behaviour with multiple facets and dependencies, this paper conceptualizes this diffusion process through a complex contagion process by which individuals only use formal childcare if a sufficient number and diversity of peers do so (Centola & Macy, 2007). Using detailed administrative data covering 10 years and 3.5 million children, this analysis uses multi-channel sequence analysis to illustrate that childcare strategies differ markedly between socio-economic groups and that this gradient has persisted over time despite overall increases in the use of formal childcare. Furthermore, using high-resolution administrative network data, the complex contagion hypothesis is tested. The results show that parents are more likely to opt for a specific childcare strategy when multiple, diverse peers in their network have already done so. The results suggest that social investment policies success are highly dependent on normative diffusion and that this process explains existing trends in policy uptake and concerns over a Matthew effect.

Keywords: childcare, Netherlands, sequence analysis, administrative data

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Introduction

Childcare policy has been portrayed as a panacea in social policy. It is purported to increase female employment (Akgunduz & Plantenga, 2018), increase gender quality in the home (Craig & Mullan, 2011; Kleven et al., 2020), reduce the child penalty for women (Kleven et al., 2019), increase the likelihood of parity progression (Wood & Neels, 2019), improve the life outcomes of children (Rosholm et al., 2021; Waldfogel, 2002), and reduce socio-economic inequalities (García et al., 2021). Despite this, the use of formal childcare services is still limited and displays a strong socioeconomic gradient, even in countries with universal and affordable childcare services such as Sweden (Van Lancker & Ghysels, 2016).

Policymakers are reluctant to invest significantly in further expansion as this is costly, seen to benefit middle and high-income households (Pavolini & Lancker, 2018), and existing evidence suggests that such expansions are only accompanied by mild policy impacts and limited uptake (Rabaté & Rellstab, 2021). This has led to the assertion that childcare behaviors are normatively grounded, resistant to change, and dependent on the trust of parents in institutional childcare provision (Aassve et al., 2016).

Existing evidence on the diffusion of childcare behaviors is limited to either the self-reporting of trust and normative value differences (Pavolini & Lancker, 2018), or to utilizing experimental methods and difference-in-difference approaches that look at aggregate outcomes across sub-populations (Havnes & Mogstad, 2011). However, to fully understand whether and how childcare behaviors are structured by normative diffusion, it is necessary to utilize high-

resolution data from a population scale network during a period of childcare expansion within a country (van der Laan et al., 2022).

Using administrative data from the Netherlands, this analysis examines the complex contagion of childcare between 2010-2020 amongst the parents of children aged 0-4. This paper contributes to our understanding of childcare behaviors in multiple ways. First, it takes a high-resolution, sequential perspective of childcare behaviors. This is preferable to current research, which tends to focus exclusively on the use or not of childcare at specific points in time. Instead, childcare behaviors are conceptualized based on the timing, intensity, and sequencing of childcare usage and how it relates to parental employment.

Secondly, it places these sequences within the context of parental employment by using a multichannel sequence analysis approach to classify the childcare strategies of parents. Existing research tends to view parental employment as a determinant of or determined by childcare usage. In this analysis, they are conceptualized as a joint distribution to reflect a couple's decision to work and use childcare as part of a singular 'strategy' to optimize family well-being.

Thirdly, the analysis uses a whole population network approach to ascertain whether formal, institutional connections between individuals help explain an individual's childcare strategy over and above shared membership of particular groups. In short, the analysis examines whether childcare behaviors in the Netherlands spread via complex contagions and whether this accounts for socioeconomic gradients in childcare usage.

The resulting analysis utilizes new data and methods to better understand the determinants of socioeconomic gradients in childcare behaviors and provides potential frameworks for new policy interventions looking to increase the use of formal childcare.

Background

The Socioeconomic gradient in Childcare

Childcare has been widely identified within developed economies as a major instrument of labor market and family policy. Childcare has been shown to improve the life outcomes of children and subsequently reduce inequalities in early life development. It has also been shown to marginally reduce gender inequality in household work and childcare responsibilities and support maternal employment. This has led to the widespread expansion of childcare services across OECD countries, with a particular emphasis on expanding access.

Despite this enthusiasm, the impact of expanded childcare policies has been limited by persistent socioeconomic gradients in childcare use (Van Lancker & Ghysels, 2016; Van Lancker & Pavolini, 2022). The costs and access to childcare do explain a proportion of this socioeconomic gradient, with many childcare policies specifically designed to ensure high uptake amongst higher-income households. Nevertheless, the gradients persist after controlling for such access and cost constraints with socioeconomic gradients still evident in many countries such as Sweden and Belgium where universality and good access are in place. Alongside such practical and financial constraints on the uptake, there has been a consistent identification of ‘childcare norms’ which restrict the uptake of formal childcare.

This is particularly evident amongst migrant populations where there is a considerable differential in uptake that closely aligns with values and norms from the origin countries. For example, Bartova and Karpinska found a substantially lower uptake of childcare amongst Polish migrants in the Netherlands even when considering access to childcare. Polish migrants instead reported greater emphasis on the need for children to be raised by their mother and skepticism over the quality of childcare. This immigrant gap in childcare use is pervasive in Europe and is

weakened only when individuals show structural signs of integration such as acquiring citizenship and changing the language spoken at home.

In their study of fertility progression, Aassve et al (2016) suggest that trust in social institutions is a key determinant of childcare use and subsequent parity progression and explains cross-national differences in Europe. Trust and familiarity with childcare arrangements are in this view a necessary pre-requisite for the uptake of childcare policies, irrespective of whether the policy itself is financially beneficial to individuals. Such a perspective is particularly discouraging for policymakers as it suggests that childcare usage and its positive spillovers in female employment, child outcomes, and gender equality may remain stubbornly low despite the design and deployment of comprehensive and high-quality childcare programs.

Despite this, whilst a great deal is known about the socioeconomic gradient in childcare and its association with structural and financial constraints, relatively little is known about the process by which childcare behaviors change and diffuse across a population. It is this gap in the literature that this paper seeks to address.

The diffusion of childcare behaviors

The persistent low uptake of childcare amongst marginalized socioeconomic groups is a problem well described by social network theory. In social network theory, it has long been recognized that undesirable macro-level outcomes can result from contradictory individual-level incentives. For example, in his seminal work, Schelling demonstrated that populations may self-sort into segregated societies even when the preference for living with people similar to oneself is only slight (Clark & Fossett, 2008; Schelling, 2006).

If childcare use is something that is based on trust and familiarity with the institutional arrangements, it should be expected that their use of childcare is dependent on the childcare

behaviors of those around them rather than simply as a pocketbook calculation of their own. That is to say, an individual's use of childcare is determined not only by the structural and practical constraints on childcare use that childcare policy seeks to alleviate but is also conditional on their exposure to the effective usage of childcare.

However, the large costs involved and complexity of the effective use of childcare suggest that the process of diffusion may not be simple. As detailed above, decisions on childcare use are exceptionally complex in the context of household decision-making. This can be demonstrated in several ways. First, childcare arrangements require coordinated action across multiple agents. Childcare arrangements frequently involve some agreement and contribution by both parents and often grandparents. This means that the specification of childcare use needs to be negotiated across several parties. Secondly, the selection of a childcare strategy has complex labor market and financial contingencies that are endogenous to the optimization process. This means that more childcare that is used likely increases income but may also affect the eligibility for various income-dependent components of childcare policy. This is the case in the Netherlands, making optimization a complex process, especially when taken across a couple. Third, the optimization of childcare arrangements changes over time and is dependent upon a large unknown factor (i.e. the child's well-being and development). Children develop differently and whilst a new parent may anticipate that their child will be 'ready' for childcare at age 6 months, they could feel very differently when that time approaches. They could feel that the child is ready sooner or later and this will affect their cost-benefit assessment of formal childcare usage. Finally, the selection of a childcare strategy has long-term financial consequences which are hard to incorporate into decision-making effectively. Reducing hours for working mothers has been shown to notably decrease labor market income in the short and long term in what is

referred to as the child penalty. This is subsequently reflected in the accumulation of pension and housing wealth of women. However, the precise nature of these penalties is not known in advance and is difficult to estimate.

When individuals are faced with such complex and potentially costly decisions they tend towards heuristics and existing research shows that parents tend to develop their views on childcare through discussions with friends, family, and colleagues. This effect is of course exacerbated by the need for coordination amongst multiple actors in the use of formal childcare arrangements. Even if a couple decides to use formal childcare themselves, it is likely dependent on some form of tacit agreement from family members and employers in making these arrangements practicable.

In social network theory, the diffusion of childcare behaviors appears to be more akin to a complex than a simple contagion. In a simple contagion, an idea is adopted simply through a single unsustained exposure. This is broadly comparable to how a cold or flu is contracted. This is observed in the contagion of ideas when the idea is simple and easily communicated like a 'meme'. More complex or high-risk ideas require a complex contagion process. This requires multiple, sustained exposures for an idea to take hold and be adopted.

The difference between simple and complex contagions is critical for the potential macro-level results of diffusion. In simple contagions across real-world networks, diffusion eventually results in saturation with the whole population exposed to the idea in a relatively short period of time. In complex contagions, however, diffusion is much more sensitive to an individual's network structure. For simple contagions, weak ties that stretch between communities rapidly enable the spread of an idea and ensure that the whole population is captured. In complex

contagions, this is less apparent as weak ties are, by definition, insufficient for such a transfer to take place.

However, for such a diffusion process to shed light on the socioeconomic gradient in childcare use, it is necessary to consider differences in network structure for varying socioeconomic groups. Bokanyi et al (2022) use population scale network data from the Netherlands to identify a higher degree of ‘excess closure’ amongst low-income households. Excess closure is a concept applicable to multilayered networks and reflects the degree to which people within an individual's network know each other in differing walks of life (i.e. work, neighbors, family). For example, if your neighbor works with your cousin, this represents excess closure. This differs from traditional clustering coefficients which focus exclusively on a single layer and ignore different types of connections. The process identified by Bokanyi et al is sociologically well founded in so much that economic mobility tends to expose individuals to new ties. Going to university and working in a higher-paying sector tend to mean that individuals form links with people who are different from them. This has been observed regularly in marriage market research for example. Social mobility generally differentiates work, family, neighborhood, and classmate networks and consequently makes those experiencing social mobility instigators for broader social change.

In the context of the complex contagion of childcare, one might assume that individuals need to observe childcare use amongst members of their family or neighborhood, and in the context of work or education. However, given the potential need to cross-validate, this behavior individuals may also require that this be observed in differing individuals in those contexts. For lower-income households in the Netherlands, excess closure amongst these groups means that

this is a far harder criterion to satisfy than it is for higher-income individuals and makes the diffusion of complex and high-risk behaviors less common.

This paper sets out to test this proposition. Firstly, it demonstrates that a network with high excess closure leads to stalled diffusion of a complex contagion requiring multi-layer, cross-validation whereas low excess closure leads to broader diffusion. Secondly, it uses administrative data to estimate whether the use of formal childcare in the Netherlands in the period 2010-2020 is determined by exposure to formal childcare use in an individual network and specifically whether multi-layer, validation is a pre-requisite for utilizing formal childcare.

Methods

Data

The data used for this analysis is from the Statistics Netherlands Microdata catalogue. This catalogue contains the Dutch administrative data and linked administrative files and is accessible only via a secure remote access environment at Statistics Netherlands (project number 9314) (access conditions are available via <https://www.cbs.nl/en-gb/onze-diensten/customised-services-microdata/microdata-conducting-your-own-research>).

The unit of analysis is the individual child, though the majority of data is derived from their parent's records. The GBAPERSONJJJTABVV (doi:10.5072/FK2/RI3ANH) file contains a record of all individuals registered in the Netherlands, their sex, their date of birth, and their ethnic background. This file was used to create the baseline of observations which includes a person-month observation file of all children aged 0-4 in the years 2010-2019. This resulted in a file of 3,500,000 individuals and 120,000,000 observations. To these baseline observations were added the persistent identifiers for the legally recorded parents of the child using the

KINDOUDERJJJTABVV (doi:10.5072/FK2/TOKXP0) data file. The identification of parents is not conditional on coresidence and this variable is measured via a separate process. This enabled parents' monthly employment hours to be added via the POLISJJJBUSVV datafile (doi:10.5072/FK2/FAHJJN). This data file is constructed by Statistics Netherlands from tax records and includes reliable information on employment hours for individuals as well as the use of sickness and child-related leaves.

To measure childcare usage, data was added from the KINDEROPVANG file which reports on the usage of formal childcare facilities in the Netherlands. These reports are collected as part of the application for childcare subsidies (Kinderopvangtoeslag). It is possible to use private childcare providers without applying for the subsidy but such instances are limited given the size and universal nature of the subsidy. The values for hours in childcare are expressed on an annual basis in the file and are allocated to months based on the parental distribution of hours of employment over the period. This allocation was then validated against self-reported hours of childcare usage that were reported in the LISS Panel. This data can be linked at the individual level with the administrative data and the redistribution of hours is shown to be a more accurate fit to expressed values than an aggregate distribution over months. See figure 1.

The resulting data provides the three sequences to be utilized in the multichannel sequence analysis. To create an analytical sample for this, several requirements were placed on observations. Firstly, to ease the comparison of sequences only complete sequences were included and all left and right censoring were removed. This has the effect of restricting the analysis to all those children born between 2010 and 2016 and who were resident in the Netherlands for the entire time they were aged 0-4. Secondly, we restricted the analysis to all those children for whom both legal parents were identified. This is the case for 97.6% of children

in the Dutch Population Register. The 2.4% of children for whom both parents are not identified are primarily composed of single mothers for whom the identity of the father is not known and for the children of migrants for whom one or both of the parents are not registered within the Dutch Population Registers and therefore are not identified in the file. These restrictions result in an analytical sample of 2.2 million children and 110,000,000 person-month observations.

In addition to the data used to construct the sequences, a number of additional covariates were integrated from across the data at Statistics Netherlands. Firstly, parental residential status was derived from the GBAPERSONJJJTABVV (doi:10.5072/FK2/RI3ANH) tab file, and a variable constructed identifying whether children lived with both parents, only one female parent, only one male parent, or neither parent. This variable was constructed for all children at the month of birth and then a separate variable expressing the modal status over the 48 months of observations. A further indicator was created to identify the children of same-sex couples. Paternal and Maternal age at birth was derived from the GBAPERSONJJJTABVV (doi:10.5072/FK2/RI3ANH) file and linked using the KINDOUDERJJJTABVV (doi:10.5072/FK2/TOKXP0). For same-sex couples, parents were randomly allocated to 'maternal' and 'paternal' values.

To identify the socioeconomic gradient in childcare strategies, the highest educational status of the mother was created using the HDIPLOMAREGJJJTABVV file (doi:10.57934/0b01e410801fef57). This records the highest level of maternal education. This is treated as a time-constant measure in the analysis with the status at the first observation (birth of the child) used. For same-sex couples, one parent was selected at random and their educational status used. The educational status was coded as low (0, 1, 2, 3), medium (4, 5), and high (6, 7), aligning with ISCED 2011 codings in brackets.

Finally, to identify ‘links’ between each individual in the Dutch population, we used the whole population network file developed by Statistics Netherlands. This links all classmates, neighbors, colleagues, housemates, and family members in the Netherlands with one another over the 10-year period under study (van der Laan et al., 2022).

The analytical code for all the analysis, including data construction and curation, is available through the following repository (<https://github.com/temery86/childcarestrategies>). For those wishing to replicate the study, they can contact Statistics Netherlands and cite the project number (9314) in order to reconstruct the analytical environment for replication.

Multichannel Sequence Analysis

Using the data, three sequences of 48 months were constructed for all 2.2 million children in the analytical sample. The first sequence represents maternal employment and is drawn from employment records with the mother's status recorded for each month, specifically, whether she was self-employed, working part-time, working full-time, unemployed, on leave, or not in employment. This categorization is in line with the employment coding utilized by Eurostat. The second sequence uses the same coding but for the father's status. It should be noted that same-sex parents were excluded from this analysis but would be an excellent subject of further study.

The third sequence is that of childcare usage. In this sequence, each month was coded with whether a child used formal childcare in that month and if so what type. Specifically, for each month it was first recorded as to how much childcare a child used with the usage segmented into six groups; 0 hours, 1-10 hours, 11-20 hours, 21- 30 hours, 31-40 hours, and 41-50 hours. These categories were then further delineated based on whether Kinderdagverblijf (Childcare Center) or Gastouder (Child Minder) was the predominant form of childcare provider. Taken together, this results in seven states for paternal and maternal employment trajectories and eleven

states for the childcare trajectory. These sequences are then clustered using multi-channel sequence analysis (Gauthier et al, 2010) to produce identifiable clusters of childcare strategies.

Network Analysis

Once the clusters of childcare strategies were identified in the data for all 2.2 million children in the analytical sample, cluster membership was predicted using a multinomial logistic regression model with the following predictors: mother's year of birth, father's year of birth, number of siblings, number of siblings under four at time of birth, year of birth, mothers educational level, household income at time of birth, fathers educational level, municipality at birth, mothers place of birth, and fathers place of birth. In addition to this, predictors were included, which measured the prevalence of specific strategies in their local network. Specifically, for each cluster, it was identified how many of the child's parents' direct contacts had used that strategy in the past three years, how many of the child's parents' secondary contacts (i.e., 2 degrees of separation) had used that strategy in the past three years, and how many of the parents' network layers the strategy was observable in.

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