Linköping Studies in Arts and Sciences No. 930
Institute for Analytical Sociology Dissertation Series No. 13

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Social Influence and Membership Dynamics in Religious Organizations

Elis Carlberg Larsson

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Linköping 2026

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Distributed by:
Department of Management and Engineering
Linköping University
SE-581 83 Linköping, Sweden

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Printed by LiU-Tryck, Linköping 2026

Edition 1:1

Cover art created with ChatGPT.

ISBN 978-91-8118-395-5 (print)
ISBN 978-91-8118-396-2 (PDF)
https://doi.org/10.3384/9789181183962
ISSN 0282-9800, 2004-268X
eISSN 2004-2698

ABSTRACT

In recent decades, most Western countries have experienced a religious decline, reflected in shrinking membership in religious organizations. Explanations of this decline have primarily emphasized individual-level predictors of joining or leaving religious organizations or broad macro-level processes such as modernization. Missing from this picture is the meso-level: the social context and networks in which individuals are embedded in. Attending to this level is crucial to understand not only how individuals make decisions in response to their social environment, but also how these interdependent behaviors aggregate into broader patterns of organizational growth and decline dynamics. To address this gap, this dissertation examines how joining and leaving a religious organization are shaped by the behavior of others, that is, by social influence, and how these micro-level processes generate organizational growth or decline. This is investigated in three essays, all using the Church of Sweden as the empirical case and analyzing full-population Swedish register data by combining conventional statistical approaches with machine-learning techniques and computational simulation methods.

Essay I, co-authored with Peter Hedström, analyzes how exposure to leavers shapes membership dynamics in the Church of Sweden. Using Swedish full-population register data from 2002 to 2023 and a dynamic matched-sample design, the analysis shows that exposure to leavers increases the likelihood of leaving the Church of Sweden. However, this effect is moderated by how deeply socially embedded an individual is in the Church, being particularly strong among individuals with few social ties to other members. To explore how these dynamics shape collective membership trajectories, an empirically calibrated agent-based simulation model is used. The simulation results suggest that social influence has amplified the overall decline in membership of the Church of Sweden, but also that the decline would have been even steeper in the absence of religious embeddedness. The essay demonstrates how, and under what conditions, social influence shapes individual decisions to leave and what implications this has for the broader organizational decline of the Church of Sweden.

Essay II analyzes how exposure to religious pluralism through social ties shapes parents' decisions to baptize their children in the Church of Sweden. Using Swedish full-population register data on all parents with children born between 2002 and 2022, network-based measures of religious pluralism are constructed, and an inverse probability weighting design is used to estimate the effect of exposure to religious pluralism. The results show that exposure to religious pluralism decreases the likelihood of baptism, with particularly strong effects under religious cross-pressure (when parents differ in religious affiliation) and especially when the father has another affiliation. The essays highlight how social networks shape the intergenerational transmission of religious behavior, providing a meso-level perspective on the link between religious pluralism and religious participation.

Essay III examines how individuals' social ties to other church members shape their susceptibility to the Church of Sweden's membership fee. Using full-population register data from 2001 to 2023, the analysis shows that higher fees increase the risk of leaving the Church of Sweden, but that this effect is weaker for individuals with many social ties to other church members. To explore how these micro-level dynamics shape collective membership trajectories, an empirically calibrated agent-based simulation model is used. The simulations show that while church fees contributed to membership decline, religious embeddedness dampens this effect overall while simultaneously reinforcing spatial differences in affiliation. Together, these findings demonstrate that social networks shape when and for whom costs affect religious participation, and that this micro-level heterogeneity has large consequences for the collective patterns of religious participation.

Together, the three essays show that social influence is crucial for understanding the membership dynamics of religious organizations. In doing so, the dissertation demonstrates how micro-level interactions and their social interdependencies aggregate into the collective patterns of religious decline and secularization.

Acknowledgments

Many people have contributed to me reaching—or at least approaching—the finish line of my doctoral studies. I am thankful for the generous help and support I have received throughout this journey, and I am sure that some who deserve to be mentioned will inevitably be left out. Nevertheless, I will try.

First of all, I am deeply grateful to my main supervisor, Peter Hedström. Thank you for giving me the opportunity to begin my doctoral studies and for your invaluable advice, comments, and guidance throughout these years. I still remember the first time you commented on one of my texts—I was somewhat terrified to see every page covered in notes. However, I quickly learned that this reflected the remarkable amount of time and attention you devote to each piece of work. Thank you for your dedication and for the high standards you set for me. It has been a true privilege to be your doctoral student. I have learned a great deal from you—about research, academic writing, and analytical sociology. And since this dissertation is, after all, about social interdependencies, which are known to be able to produce unexpected and unpredictable outcomes, it also feels fitting to credit you for founding the Institute for Analytical Sociology (IAS) in Norrköping. My time at IAS not only shaped me into the researcher I am today, but it also had the unexpected consequence of leading me to meet Elida, the mother of my child, Kai. I'm sure neither of us expected that outcome.

I am also very grateful to have had Måns Magnusson as my co-supervisor. Although our joint work did not end up being part of this dissertation, you have been crucial to my doctoral journey. Thank you for all the phone calls, check-ins, and for teaching me about the many extra-curricular aspects of and socialization into academia and the research process. Thank you also for always pushing me methodologically, often "strongly recommending" me to try more advanced (and often better-suited) methods. I have learned a lot from that. Last but not least, thank you for organizing the annual research retreats in the Stockholm archipelago; they were among the best parts of my doctoral studies. I apologize that this dissertation does not use more Bayesian statistics.

IAS has provided fertile ground (pun intended) for learning and research. I first came to IAS in 2018 to begin my master's studies, and after all these years, I have never regretted that decision. It is an environment that constantly pushed me to the next level; both my research and my development as a researcher have greatly benefited from it. It is also a place full of generous and inspiring people who make everyday work enjoyable. I could not imagine a better place to train as a researcher. I especially thank Marc Keuschnigg, Karl Wennberg, and Eduardo Tapia for their guidance and help before and during my doctoral studies. I want to give a special shout-out to Martin Arvidsson, Maria Brandén, Emanuel Wittberg, Eszter Vit, Pontus Strimling, Carl Nordlund, Jacob Habinek, Selcan Mutgan, Etienne Ollion, Benjamin Jarvis, Erik Rosenqvist, Sarah Valdez, and Károly Takács for their encouragement, discussions, and thoughtful feedback, which have inspired and sharpened my research. I also want to thank Madelene Töpfer, Åsa Arnoldson, and Elin Dahlström for always being there to help with anything administrative and for patiently guiding me through the peculiarities of academic bureaucracy. I also owe you an apology for all the times my mistakes or haste created extra work for you.

Our PhD group at IAS is something special—a mix of brilliance, humor, and constant support. I could not have asked for a better group of peers and friends. Thank you to Miriam Hurtado Bodell, Laura Fürsich, Rodrigo Martinez-Peña, Erik Liss, Anastasia Menshikova, Maël Lecoursonnais, Hendrik Erz, Cheng Lin, Alexandra Rottenkolber, Jesper Lindmarker, Axel Norgren, Kazuki Sakamoto, and Tangbin Chen for your camaraderie.

I should also mention scholars outside of IAS with whom I have had the pleasure to work during my doctoral journey. Namely, Vegard Skirbekk, Isabel Raabe, Niklas Bomark, Filip Olsson, Weiqian Xia, and Susanne Wallman-Lundåsen. Thank you for our collaborations and I look forward to more in the future.

I am very grateful to everyone who has read and commented on the drafts of the chapters in this dissertation. Thank you to David Voas, Martin Kolk, Marc Keuschnigg, and Benjamin Jarvis, who read my work as opponents during my doctoral seminars—your comments and suggestions improved the dissertation considerably. I also want to thank the members of my writing group, Laura Fürsich, Elida Izani, and Miriam Hurtado Bodell, for reading countless versions of these chapters and for their sharp comments and steady encouragement. Finally, thank you to Karl Wennberg, Axel Norgren, David Eagle, Jeremy Senn, Nan Dirk de Graaf, and Hendrik Erz for reading and providing valuable feedback on the essays in this dissertation.

Leaving the academic part of this acknowledgment, I want to thank my best friend, Axel Lundström, for all the walks and talks we have had over the past few years. You helped me to debrief, decompress, and think about other important things that are not related to this dissertation.

Many, many, many, many thanks to my family. Your encouragement and patience have made all the difference. To my parents and their respective spouses—thank you for your unwavering support and for always believing in me, even when no one else did. To my sisters, Amanda, Vendela, and Miriam—thank you for always putting me in my place and reminding me that there is more to life than work.

To Elida, who has read my work more times than anyone ever should—thank you for your never-ending patience and unrelenting support. Thank you for reading, commenting on, and improving nearly everything I have written, including these acknowledgments. You have been my constant sounding board, my calm in moments of stress, and my partner through every step of this journey. Thank you for always listening, even when it meant yet another conversation about work; for posing annoyingly critical yet entirely valid questions that led to more (but better) research; and for grounding me whenever I lost perspective. I know that talking research is a shared pastime, but your dedication to all the many non-research things you do has given me permission to indulge in frivolous but equally necessary things, like going to football games or making spreadsheets to model outcomes in competitive reality TV shows. These fun, mundane things we do together have given me great respite from the toll of writing a dissertation. So, thank you for insisting I take a break when I needed it most. And to Kai, my son, who had the pleasure (or perhaps misfortune) of spending my final PhD year with me: you made it all worthwhile.

And to Ciku: thank you for putting up with my habit of cutting walks short whenever I had to rush home to write down a new thought or try a new solution to a coding problem. Without you, I would have no reason to leave the house. You are the goodest of all good dogs.

Lastly, I dedicate this dissertation to my sister, Amanda, who saw me begin but never saw me finish.

Elis Carlberg Larsson
Stockholm, Sweden
December 2025

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I also gratefully acknowledge the funding that made my doctoral studies and the work conducted as part of this dissertation possible. My doctoral studies were funded by the Swedish Research Council (Grant No. 445-2013-768), with additional support through the Swedish Research Council's funded research environment (Grant No. 2024-01861). I have also benefited from conducting my doctoral studies within the Swedish Excellence Center for Computational Social Science (SweCSS), also funded by the Swedish Research Council (Grant No. 2022-06611).

List of Essays

This dissertation is based on the following essays, which are referred to in the text by their Roman numerals.

I. Carlberg Larsson, Elis, and Hedström, Peter. "The Rise and Decline of Churches: The Role of Social Influence in the Membership Decline of the Swedish Lutheran Church" *Unpublished Manuscript*.

II. Carlberg Larsson, Elis. "Religious Pluralism and Social Networks: How Exposure to Religious Pluralism through Social Ties Influences Baptism Decisions" *Unpublished Manuscript*.

III. Carlberg Larsson, Elis. "Bound by Ties? How Costs and Networks Shape Religious Participation Patterns" *Unpublished Manuscript*.

Contents

Introduction

Most Western countries have experienced a religious decline in recent decades (Bruce, 2002; Cragun & Smith, 2024; Inglehart & Inglehart, 2021; Kasselstrand et al., 2023; Norris & Inglehart, 2004; Stolz et al., 2025). This is reflected in the decline in the number of individuals who are religiously affiliated,[1] fewer attending religious services, and fewer who consider religion to be an important part of their lives (Hout & Fischer, 2014; Stolz et al., 2025; Twenge et al., 2015, 2016; Wood, 2020). Together, these trends highlight a larger process of secularization, which scholars often conceptualize as a long-term transition in religious decline (Stolz et al., 2025; Voas, 2008, 2009). Within the secularization process, the decline of religious organizations is a crucial dimension and is described as the final stage of secularization (Stolz et al., 2025), where residual or "fuzzy" forms of religious belief can no longer be sustained institutionally (Voas, 2008, 2009). As Durkheim (1912) emphasized, religion is fundamentally a collective phenomenon, sustained through shared rituals and institutionalized practices. Religious organizations are important as institutional carriers of religious faith, providing structures that enable collective action, reproduce traditions, and maintain the presence and

[1] While the overall tendency points toward the decline of religious groups, there are exceptions. Some religious groups continue to thrive and expand their membership (Berger et al., 2021), and evidence evidence for a revival of religious groups has been found in previously secularizing contexts, where common examples are the Pentecostal movement, the widespread resurgence of Islam in the 1970s, and the Orthodox resurgence in the aftermath of the Soviet Union's disintegration (Northmore-Ball & Evans, 2016; Pew Research Center, 2017; Stolz & Bastardi, 2023; Stolz et al., 2023). Thus, while overall secularization trends may dominate at the macro level, certain religious groups continue to grow and remain resilient in secularizing contexts.

power of religion within the social order. Their decline thus marks not only the last step in the secularization process, but also the erosion of religion as a collective force in societies.

To explain the decline in religious organizations, research focuses primarily on why individuals choose to join, leave, or remain in religious organizations. Here, the literature points to a mix of factors and processes at the individual and collective-level (Stolz, 2020; Voas, 2020). Previous research has examined individual-level factors associated with leaving or remaining a member of religious organizations, including sociodemographic factors (Berghammer et al., 2017; Need & Graaf, 1996; Stolz, 2020; Stolz et al., 2021; Thiessen & Wilkins-Laflamme, 2017; Ultee, 2004; Vargas, 2012) and organizational factors describing traits of religious organizations themselves (Berghammer et al., 2017; Chaves & Gorski, 2001; Finke & Stark, 1988; Stark & Bainbridge, 1987; Stark & Iannaccone, 1994). At the collective level, explanations for the decline in religious organizations often refer to general macro-processes of modernization and individualization (Beck & Beck-Gernsheim, 2001; Casanova, 1994; Hadden, 1987; Kasselstrand et al., 2023; Luckmann, 1967; Pollack et al., 2017; Stolz et al., 2016; Stolz & Tanner, 2019). Missing from this picture is the crucial middle ground: the social environments[2]. Much of social life unfolds within these structures, which shape patterns of social interactions and exposure and their effects often extend beyond direct dyadic relations (Granovetter, 1978; López-Pintado & Watts, 2008; Salganik et al., 2006; Schelling, 1971, 1978; Simmel, 1957). Understanding how individuals' religious decisions are shaped by such social influence is important, as it advances our understanding of religious decline more broadly, showing how individual-level behaviors are influenced by others and, in turn, how these interdependencies shape religious organizations' growth dynamics.

Although there is research investigating how social influence affects religious behavior, most have focused on specific ties rather than larger social networks. For example, previous research shows that parents transmit religious values intergenerationally (Berghammer et al., 2017; Iannaccone, 1990; Need & Graaf, 1996; Sherkat, 1991; Stolz, 2009; te Grotenhuis et al., 2015), that spouses influence religious decisions of each other (Need & Graaf, 1996; Stolz et al., 2021), and that friends, especially at certain formative ages, have long-lasting effects on the religiosity and religious behaviors of individuals (Te Grotenhuis & Scheepers, 2001). Some researchers have attempted to model broader social influence processes using spatial diffusion models (Land et al., 1991), or by suggesting that parental religious socialization op-

[2]The term 'social environment' is used here to describe other actors who can influence the focal actor in various ways, whether it is direct, for example when the focal actor observes a friend listening to a specific music artist and mimics it (Arvidsson et al., 2025), or indirect, such as when an unknown person leaves litter in the physical surroundings of the focal actor (Keizer et al., 2008; Keuschnigg & Wolbring, 2015) or when someone leaves their job, thus creating a vacancy for the focal actor (White, 1970).

erates both through direct value transmission and by steering children into certain social environments that expose them to peers who share the religious affiliation of their parents (Cornwall, 1989; White, 1968). A further step is Iannaccone and Makowsky (2007), who demonstrates how social influence together with identity processes generate persistent regional clustering of religiosity, highlighting the importance of connecting micro-level processes of social influence to macro-level outcomes. Yet, aside from these contributions, most approaches focus on egocentric ties and dyadic effects, neglecting the larger network structure and failing to link individual decisions with macro-outcomes. This has left us with an incomplete understanding of how individual choices to join, leave, or remain in religious organizations are shaped by the behaviors of others and how these interdependencies aggregate into membership dynamics.

Seeing this void in the literature, this dissertation asks how social influence shapes individuals' decisions to join, leave, or stay in religious organizations, and how these decisions aggregate into macro-level membership trajectories of religious organizations. To that end, this dissertation consists of three essays that examine how individual religious membership choices are shaped by exposure to religious behavior through social ties. Particular attention is given to how micro-level behaviors aggregate and influence the collective trajectory of religious organizations. Methodologically, the dissertation combines statistical techniques with recent advances in machine learning to estimate social-influence effects and uses empirically calibrated simulation models to capture the interdependencies between individual actions and organizational dynamics. All three essays use the Church of Sweden as an empirical case, drawing on rich administrative register data. As a historically dominant, but declining, religious organization in a highly secular society, the Church of Sweden provides an ideal setting for studying how social influence shapes religious affiliation behavior and organizational change.

Essay I, co-authored with Peter Hedström, analyses how exposure to leavers affects individuals' decisions to also leave and how religious embeddedness, the extent of social ties to other church members, moderates this effect. Using full-population register data covering individuals from 2002 to 2023 and a dynamic matched-sample design, the analyses show clear evidence of social influence: exposure to leavers increases the likelihood of leaving, particularly among individuals with weak religious embeddedness. Using these empirical estimates and the observed social network as the technical core, an agent-based simulation model demonstrates that social influence contributed substantially to the decline of the Church of Sweden, while religious embeddedness mitigated this effect. The essay shows how, and under what conditions, social influence shapes disaffiliation decisions and how these micro-level processes generate broader organizational decline.

Essay II investigates how exposure to religious pluralism through social ties affects parents' decisions to baptize their children in the Church of Sweden. Using full-population register data on all parents with children born between 2001 and 2022, I construct network-based measures of religious pluralism and apply a machine learning–based inverse probability weighting design to estimate its effect on baptizing one's child. The analyses show that exposure to religious pluralism reduces the likelihood of baptism, particularly under conditions of religious cross-pressure when only one parent belongs to the Church of Sweden. The essay highlights how social networks shape the intergenerational transmission of religion and provides a meso-level perspective on the link between religious pluralism and religious participation.

Essay III examines how individuals' social ties to other church members shape their susceptibility to the Church of Sweden's membership fees. Using full-population register data from 2001 to 2023, the analyses show that higher fees increase the risk of disaffiliation but that this effect is weaker among individuals with many ties to other church members. To explore how these micro-level dynamics shape collective membership trajectories, an empirically calibrated agent-based simulation model is used. The simulations show that while increasing fees contributes to membership decline, embeddedness dampens this decline while reinforcing spatial differences in religious affiliation.

Together, the three studies reintroduce social influence into the study of religious organizations' membership dynamics, demonstrating how social interdependencies shape macro-level patterns of religious change. Previous research has lacked data capable of capturing these social interdependencies. This dissertation addresses this gap by leveraging full-population register data to construct the complete multiplex social network of Sweden. These administrative records allow me to identify likely social ties of individuals, thereby mapping the everyday social environments through which influence flows. In empirical analyses, this structure is translated into egocentric measures of social influence, while in simulation models, the full network is used to examine how local social influence aggregates into organizational change. By integrating these approaches, the dissertation moves beyond a focus on isolated ties or macro-level trends and places a population-wide network perspective at the center of the analysis. This helps explain why religious decline unfolds unevenly across groups and regions, and how micro-level interactions accumulate into large-scale organizational change. Together, the three essays demonstrate that taking social influence into account is crucial to understanding the membership dynamics of religious organizations. The dissertation shows how micro-level interactions drive the processes through which religious organizations lose members and secularization advances.

The remainder of this introductory chapter is organized as follows. The chapter begins by defining what I mean by a 'religious organization' and

provides an overview of empirical and theoretical research on religious disaffiliation. This is followed by a discussion of social influence and its importance for studying the growth dynamics of religious organizations. The analytical framework of the dissertation is then introduced, drawing on analytical sociology as a framework for linking micro-level processes of social influence with macro-level patterns of organizational change. A general description of the data and methods used in the studies follows. The empirical case of the Church of Sweden is then presented, including its historical background, the paradoxical relationship between religiosity and affiliation that it exemplifies, and a descriptive analysis of predictors of religious membership changes in Sweden. The chapter continues with a summary of the three empirical studies and concludes with a discussion of the contributions of the dissertation.

Social Influence and Religious Organizations' Growth Dynamics

Research on the membership dynamics of religious organizations has focused on individual characteristics, organizational traits, and broader contextual factors. This chapter reviews the state of the art, beginning with a definition of religious organizations, then examining explanations and predictors of religious membership change, and finally turning to the role of social influence and discussing its potential in shaping affiliation decisions and organizational membership dynamics. Together, these sections provide the conceptual and theoretical foundations of the dissertation.

Defining religious organizations

Religious organizations are the core macro-level entities and the main collective outcome focused on in this dissertation. To understand what the term 'religious organization' means in academic discourse, it is useful to begin by separating the two words, namely, 'religion' and 'organization', and then define them separately before considering them jointly.

Different academic disciplines, such as economics, sociology, psychology, and anthropology, offer different definitions of 'religion'. For example, the anthropologist Tylor (1871) defined religion as a "belief in spiritual things" (p. 424), the Enlightenment philosopher Kant (1781) defined religion as the "recognition of all our duties as divine commands" (p. 129), while the sociologist Yinger (1957) defined religion as "a system of beliefs and practices by means of which a group of individuals struggle with the ultimate problem of human life" (p. 7). As discussed by Cragun and Smith (2024), these varying definitions highlight different aspects of what religion is, and the core seem

to be related to beliefs, moral obligations, and collective practice. By combining these three elements, religion encompasses a belief system related to the individual's relationship to the cosmos or other supernatural objects in the world. In other words, religion provides a belief system that seeks to explain our existence and relationship to the universe. The supernatural dimension is crucial to religion. As argued by Stark and Bainbridge (1985), religion fulfills an inherent demand that humans seek existential answers and comfort in the face of mortality. This leads them to conclude that "a religion lacking supernatural assumptions is no religion at all" (p. 3). Importantly, these beliefs influence the actual behavior of individuals, mainly by establishing rules and norms for how to behave and what to strive for. This is close to Durkheim (1912) definition of religion, stating that "[religion is] a unified system of beliefs and practices relative to sacred things, that is, things set apart and forbidden—beliefs and practices that unite into a single moral community [...]" (p. 47), denoting religion as a belief system that provides a moral framework for understanding how to live with other individuals by regulating social interactions and collective behavior to meet the needs and desires of individuals. Durkheim's functionalist perspective, reflected in the quote, emphasizes the importance of religion in the coordination of social life. Synthesizing these different definitions and borrowing in part from Cragun and Smith (2024), the definition of religion used in this dissertation is that religion is a belief system that subscribes to supernaturalism, which influences the desires and opportunities of individuals by establishing rules and norms that influence the behavior of individuals.

An 'organization' can be defined as an institution that serves a function (Blau & Scott, 1962). Usually, the functions of an organization are to structure social action by coordinating the behavior of individuals to reach a common goal or build a tangible product. This structure is characterized by defined roles, responsibilities, and a hierarchy that facilitates coordinated social action and effort. Thus, a common trait of organizations is the division of labor, where different individuals within the organization specialize in increasing the return to the organization from their invested time, thus producing higher returns for both members and the organization as a whole (Blau & Scott, 1962). As argued by Weber (1968), this type of organizational bureaucracy enhances efficiency and increases predictability in achieving organizational goals. Organizations are usually framed by a formal membership that comes with a set of rules about what it takes to become and remain a member, describing the obligations and rights of the members (Blau & Scott, 1962; Stinchcombe, 1965). In summary, an organization is more than a mere collection of individuals; it is a structured entity with defined roles and hierarchies that function in a social system to achieve a goal.

Combining the definitions of 'religion' and 'organization' discussed above, this dissertation defines a religious organization as a social institution that coordinates individuals' behavior around a shared belief system

that subscribes to supernaturalism. Religious organizations institutionalize these beliefs by establishing roles, responsibilities, and membership boundaries through formal structures. Religious organizations facilitate collective action, regulate the conduct of members through norms and expectations, and provide structures to transmit religious beliefs and practices across generations

Explanations and predictors of religious (dis)affiliation

Since the growth and decline of religious organizations ultimately depend on the decisions of individuals to become, remain, or cease to be members, understanding organizational dynamics requires attention to the factors shaping such decisions. Before turning to social influence, the following section reviews the main predictors and theoretical explanations for why individuals choose to join, stay in, or leave religious organizations. These explanations can be grouped into three broader categories: (1) individual-level characteristics, (2) organizational factors, and (3) broader contextual factors.

Individual-level characteristics

The literature identifies several sociodemographic attributes that are associated with an increased probability of joining or leaving religious organizations and proposes various theoretical explanations for why this is the case. The most well-established patterns concern gender, age, residential location, and education (Berghammer et al., 2017; Need & Graaf, 1996; Thiessen & Wilkins-Laflamme, 2017; Ultee, 2004; Vargas, 2012). These empirical regularities have been consistently documented in Western countries since the 1950s. The following section describes these patterns in greater detail, together with the explanations that have been proposed for them.

Clear empirical evidence shows that individuals are more likely to leave a religious organization during adolescence and early adulthood.[3] This pattern has been documented in various contexts, such as the Netherlands (Need & Graaf, 1996; Te Grotenhuis & Scheepers, 2001; Ultee, 2004) and the United States (Roof, 1989; Sherkat, 1991; Sherkat & Ellison, 1999). The probability of disaffiliation peaks in the 20s and tends to decline thereafter. This trend is often attributed to life-cycle triggers, which denote specific life-course events that impact the likelihood of participating in religious organizations (Need & Graaf, 1996). Some common examples include leaving the home of the parents or receiving one's first income, which can also mean having to pay a church tax or fee (Stolz et al., 2020). These are all events that typically occur in one's 20s. However, as Stolz and colleagues (2021) point

[3]However, there are exceptions to this pattern. For instance, scholars have reported that leavers of the Austrian Catholic Church are evenly distributed across the life course (Berghammer et al., 2017; McClendon & Hackett, 2014; Potančoková & Berghammer, 2014).

out, certain life-cycle events can also increase the probability of joining or remaining affiliated with a religious organization. Examples of this include becoming a parent, getting married (especially with a religious partner), or the early death of a parent. Such events can interrupt the otherwise linear age effect. For example, Stolzenberg and colleagues (1995) argue that the increase in religious affiliation observed among individuals aged 22 to 32 years in the United States is largely explained by the birth of children during this age period. However, as Ultee (2004) cautioned, this increase may also reflect selection effects, as religious individuals tend to have more children and at an earlier age. Among older individuals, evidence suggests a duration effect: the longer a person remains affiliated with a religious organization, the less likely they are to disaffiliate.

Gender is another important predictor of religious affiliation behavior (Trzebiatowska & Bruce, 2012), often described as a near-universal law (Miller & Stark, 2002). Men are generally less religious, participate less frequently in religious activities, and are more likely to leave their religious organization (Miller & Hoffmann, 1995; Miller & Stark, 2002; Sherkat, 2002; Trzebiatowska & Bruce, 2012). These patterns are commonly explained with reference to differential gender socialization, whereby men are usually less exposed to religious norms and practices during their upbringing (Miller & Stark, 2002). Other explanations emphasize gender differences in risk preferences; disaffiliation or change of affiliation is viewed as a form of risk-taking, and men are often found to be more risk-prone than women (Miller & Hoffmann, 1995; Miller & Stark, 2002; Trzebiatowska & Bruce, 2012). In this framework, risk-averse individuals are more likely to remain affiliated, whereas more risk-seeking individuals are more likely to leave or switch religious organizations.

Another widely documented pattern is that higher levels of education are associated with a higher probability of leaving religious organizations (Roof, 1989; Stolz et al., 2020; Ultee, 2004; Wilson, 2003). Theoretical explanations usually point to the adoption of scientific and rational worldviews through education (Ultee, 2004; Wilson, 2003). These worldviews promote critical thinking and emphasize rational understanding of the world, thereby leaving less room for supernatural explanations. As such, education can reduce the likelihood of joining and increase the likelihood of leaving one's religious affiliation. Empirical evidence of this association is found in many contexts. For example, Roof (1989) finds that in the United States, highly educated individuals are more likely to leave their church. In the Netherlands, Need and Graaf (1996) report a similar pattern, but note that the positive effect of education on disaffiliation tends to level off after completing higher-level secondary education, suggesting a nonlinear association. More recently, several studies have attempted to estimate the causal effect of education using natural experiments. Studies of compulsory schooling reforms in Canada (Dilmaghani, 2019; Hungerman, 2014) and in European countries (Mocan &

Pogorelova, 2017) treat changes in school-leaving age as quasi-random variation in years of education and find that additional schooling negatively affects religious belonging, belief, and service attendance.

Lastly, the residential context predicts whether individuals join or leave a religious organization. Urban residents are consistently more likely to leave. An explanation for these patterns refers to sorting processes: urban populations tend to be younger and more educated, and both are related to higher probabilities of leaving religious organizations (Stolz et al., 2020; Te Grotenhuis & Scheepers, 2001). Other explanations focus on the role of religious pluralism in urban settings. Urban residents are more likely to encounter diverse religious worldviews, which can challenge the plausibility of any religious tradition. This is in line with Berger's (1969) argument that the plausibility of a religious worldview declines as competing worldviews increase, thereby reducing participation.[4]

Although individual-level characteristics provide valuable insight into empirical patterns of who are members of or decide to leave religious organizations, they fail to capture the social nature of religious behavior. Sociodemographic factors such as age, sex, education, and residential location may correlate with affiliation behavior, but do not identify the mechanisms that explain why individuals do what they do. In addition, explanations for why these associations exist often treat individuals as isolated actors making independent choices, overlooking how the behaviors of individuals are shaped by others.

Organization-level factors

Organizational factors refer to aspects of religious organizations that can influence an individual's decision to join, stay, or leave. This shifts the focus from individual-level to organizational-level causes. Two main explanations have been identified: (1) supply-side explanations and (2) the religious distance between the individual and the organization.

Supply-side explanations, or the economic model of religion, focus on the supply and quality of religious goods. In this framework, religious organizations are described as providers of religious goods in a market where organizations are competing for members. The more attractive a religious product is, the more likely individuals are to join and participate in their activities

[4]However, the effect of religious pluralism on religious participation is a topic that has been the subject of extensive debate. Berger's (1969) conclusion has been challenged by advocates of the supply-side strand of rational choice theory of religion who argue that religious pluralism is positively associated with religious participation. By stating that religious markets are similar to economic markets, increased competition among religious organizations should lead to improved quality of religious products, and, in turn, make them more attractive to potential adherents (Finke & Stark, 1988; Stark & Iannaccone, 1994). In other words, religious pluralism should lead to increased religious participation. However, Chaves' (2001) review of the literature on religious pluralism's effect on religious participation finds little empirical evidence for the supply-side's arguments.

(Finke & Stark, 1988; Stark & Bainbridge, 1987; Stark & Iannaccone, 1994). In a similar vein, advocates of this perspective argue that competition in the religious market improves the quality of religious products and, in turn, increases participation (Chaves & Gorski, 2001; Iannaccone, 1991). Thus, factors that facilitate or constrain the religious market are considered important. In other words, supply-side explanations emphasize organizational behavior and performance rather than religious attitudes of individuals when explaining (changing) affiliation patterns (Sherkat & Ellison, 1999; Stark & Iannaccone, 1994). However, this approach has been criticized for relying on unrealistic assumptions about rational maximization (Chaves, 1995).

Other explanations focusing on organizational factors concern the distance between an individual's religious beliefs and those of the religious organization. The degree of alignment between an individual's beliefs and the organization's doctrine is an important predictor for both those who choose to leave a religious organization. Berghammer and colleagues (2017) argue that differences in beliefs between individuals and religious organizations play a central role in explaining religious disaffiliation.

In sum, organizational explanations offer valuable insight into how religious organizations can attract or repel potential members, but they remain insufficient to explain individual decision-making processes. Supply-side theories that emphasize religious market dynamics and the provision of high-quality religious goods tend to assume rational actors with stable preferences who operate independently of social context. However, individuals rarely evaluate religious organizations in isolation, as both information and religious beliefs are shaped through social interaction. This highlights the need to move beyond organizational factors and examine the role of social influence in shaping religious membership behavior.

Other contextual factors

Contextual factors refer to societal events or structural conditions that influence individuals' decisions either to join or to disaffiliate from religious organizations. These factors can be grouped into three broad categories: (1) the religious establishment, (2) period and cohort effects, and (3) broader trends of modernization.

As indicated previously, the economic approach to religion argues that regulating the religious market negatively affects religious participation. Following this logic, religious establishment (i.e., the preferential state support for particular religious organizations (Chaves & Cann, 1992; Fox, 2011; Stolz & Chaves, 2018)) reduces overall religious vitality by limiting inter-organizational competition. In contrast, disestablishment (the withdrawal of the state's preferential treatment of specific religious organizations) is expected to increase vitality by fostering competition between religious organizations (Iannaccone, 1991; Stolz & Chaves, 2018; Stolz et al., 2020, 2021).

Two main processes are proposed to explain this. First, religious organizations benefiting from state support tend to put less effort into recruitment and have weaker incentives to improve the quality of their religious product. Second, religious organizations that are disadvantaged by state favoritism are left with fewer resources and limited capacity to compete in the religious market, thus reducing the quality of the religious goods provided. Together, these dynamics reduce the supply of religious options and weaken competition, which, according to rational choice theorists, leads to lower-quality religious goods and, subsequently, declining participation (Chaves & Gorski, 2001; Iannaccone, 1991; Stolz & Chaves, 2018).[5] However, this interpretation remains controversial within the sociology of religion. Critics argue that changes in religious affiliation cannot be fully explained by changes in legal frameworks alone (Stolz & Chaves, 2018; Stolz et al., 2020). Advocates of rational choice theory respond by pointing to institutional inertia, arguing that it can take "generations for the situation to approach that of a perfectly competitive market" (Iannaccone, 1991, p. 163).

In addition to legal changes related to the religious market, broader contextual characteristics can influence individuals' propensity to affiliate with, disaffiliate from, or remain affiliated with religious organizations. Two types of contextual effects are usually distinguished depending on what they represent: *period* effects or *cohort* effects (Crockett & Voas, 2006; Need & Graaf, 1996; Norris & Inglehart, 2004; Voas & Chaves, 2016; Voas & Doebler, 2011). Period effects refer to the influence of prevailing norms, values, or events at a specific point in time that affect all age and cohort groups, for example, the cultural upheavals of the 1960s in Western Europe or the Georgian religious revival following the societal and economic crises of the late 1980s after the collapse of the Soviet Union (Stolz & Bastardi, 2023; Stolz et al., 2023). By contrast, cohort effects capture the formative influence of exposure to religious or secular norms during childhood and adolescence, a life stage that shapes enduring values and long-term religiosity (Need & Graaf, 1996; Voas, 2020; Voas & Chaves, 2016). These early-life socialization processes generate persistent differences in religiosity between cohorts, producing generational replacement as more recent, less religious cohorts gradually replace older, more religious ones (Molteni & Biolcati, 2023; Voas & Chaves, 2016).

Other explanations tie religious decline to larger processes of modernization (Casanova, 1994; Hadden, 1987; Kasselstrand et al., 2023; Luckmann,

[5]The Swedish case is an interesting example often cited by supply-side theorists. The dominating church in Sweden, the Church of Sweden, has long benefited from preferential treatment by the Swedish state and historically operated as a legally sanctioned monopoly. Despite this, Sweden maintained high levels of religious affiliation for much of the 20th century. In line with the supply-side explanation of religion, the eventual decline in membership in the Church of Sweden has been linked to the process of disestablishment, which increased competition on the religious market. As new religious organizations entered the market or gained visibility, the Church of Sweden failed to offer a comparably attractive religious product, leading to large-scale disaffiliation (Hamberg & Pettersson, 1994).

1967; Pollack et al., 2017; Stolz & Tanner, 2019; Wallis, 1995). Modernization encompasses several transformations—rationalization, differentiation, increased existential security, individualization, pluralism, and globalization, to mention a few—each of which can undermine the plausibility or social role of religion (Bruce, 2011). In brief, rationalization refers to the expansion of scientific knowledge and technological solutions that reduce the reliance on supernatural explanations. For example, today individuals seeking to conceive typically consult medical professionals rather than praying for fertility, whereas historically the opposite pattern was more common (Kasselstrand et al., 2023). Differentiation highlights how religion is gradually pushed out of domains such as education, politics, or welfare, becoming relegated to a more limited religious sphere and religion being regarded as a "private matter" (Casanova, 1994; Kasselstrand et al., 2023). According to *existential security theory* (Molteni, 2025; Norris & Inglehart, 2004), improvements in welfare, education, and economic stability reduce the dependence of individuals on religion for comfort and existential reassurance. Individualization gives children greater autonomy, weakens parental religious socialization, and contributes to generational replacement (Kasselstrand et al., 2023). Finally, globalization and pluralism expose individuals to multiple worldviews, undermining the taken-for-granted truth of any single religious belief (Berger, 1969). Together, these theoretical processes illustrate how modernization could contribute to religious decline, even if the precise micro-level pathways linking them to individual behavior are often specified only in vague terms.

In sum, contextual explanations offer important frameworks but also have serious limitations. Legal changes and the dynamics of the religious market cannot account for individual variation within the same institutional setting. Cohort replacement captures an important mechanism of secularization, but does not in itself explain why cohorts differ in religiosity. Macro-level secularization theories identify broad drivers, such as modernization and pluralism, but often remain vague about the micro-level pathways through which these forces shape individual decisions about leaving or remaining in their religious organization. As Stolz and colleagues (2016) argue, secularization should not be understood as a non-linear process of decline, but as a dynamic field of competition between religious and secular worldviews, sustained through social interaction and institutional differentiation. This highlights the need to examine the role of social influence in shaping the behavior of religious affiliation in more depth.

Social influence

Social influence constitutes a core concept of this dissertation when trying to explain why individuals choose to join or leave religious organizations. Since the sizes of religious organizations ultimately depend on individual-

level decisions, understanding how the social embeddedness of individuals influences their behavior is central to explaining organizational dynamics. Even if the initial affiliation of the individuals is initially driven by one of the factors or explanations discussed previously, their religious behavior might affect the behavior of other individuals in their social proximity, thus initiating a potential behavioral cascade. In what follows, the concept of social influence is defined, and important aspects that affect how second-order effects of social influence unfold are highlighted. Special attention is paid to heterogeneity in susceptibility to social influence and to how social structure shapes how the influence diffuses. Understanding these aspects is crucial to identifying when and how social influence affects the growth dynamics of religious organizations.

Sociological theory has long recognized that individual behavior is shaped not only by individuals' own characteristics and traits, such as values, beliefs, and resources, but also by the behavior of others. This idea has deep roots in sociology, with notable examples including Tarde's (1903) *laws of imitation* and Weber's (1968) concept of *social action*. This reflects the idea of social influence that individual behavior is partly a function of the observed, perceived, or anticipated behavior of others within their social environment (Cialdini, 2001). Social influence has been extensively studied in numerous domains, showing effects on educational choices (Raabe et al., 2019), voting (Lazarsfeld et al., 1944), residential decisions (Fürsich & Jarvis, 2025; Schelling, 1971, 1978), cultural consumption (Arvidsson et al., 2025; Rossman, 2012; Salganik et al., 2006), and many more social domains (for a review, see Veenstra and colleagues (2013)).

This dissertation adopts a broad definition of social influence, understood as the effect of social interactions on individual behavior (or belief). Social influence can occur through both direct and indirect interactions.[6] Direct influence occurs when individuals affect each other's behavior through immediate interaction. For example, observing a friend reading a book may increase the likelihood of reading the same book. Indirect influence, by contrast, unfolds through sequences of events that create ripple effects, where the behavior of one individual ultimately affects others without direct interactions (Arvidsson, 2022; Keizer et al., 2008; Keuschnigg & Wolbring, 2015). An example is vacancy chains, where someone leaving a role or position creates opportunities that subsequently affect others (White, 1970). For instance, in the housing market, when a household moves out of an apartment, it opens a vacancy that someone else fills, which then creates another

[6]Social influence may also arise from interactions with social aggregates rather than from direct or indirect interactions with individuals. In such cases, macro-level properties affect individual behavior directly. To illustrate this, Schelling (1998) uses the example of drivers adjusting their speed to the average speed on a highway: they do not respond to any particular car, but to the aggregate pattern formed by all cars together. This is an influence exerted by a collective property rather than by individual actors.

vacancy, and so on. Another example of indirect interaction is the *Broken windows theory* (Keizer et al., 2008; Keuschnigg & Wolbring, 2015): when an unknown person, for example, litters in a local environment, the initial act of littering alters the local environment in ways that shape the behavior of others. Observing signs of disorder, such as litter, graffiti, or rule-breaking, signals neglect or low social control, increasing the likelihood that others will also violate norms. This chain of norm violations unfolds without direct interactions, as individuals respond to cues left by others. Thus, both direct and indirect interactions can produce social influence, and recognizing their distinctiveness is crucial for understanding the role of social influence across different social phenomena.

The impact of social influence on the behavior of a focal actor varies. Commonly, social influence is assumed to lead to assimilation, where interactions increase the probability that individuals become more similar to those they interact with (Asch, 1951; Flache et al., 2017). However, research also shows evidence of a differentiation effect, in which individuals actively seek to distinguish themselves from those with whom they interact (Hovland et al., 1957), as well as cases in which both assimilation and differentiation occur simultaneously (Simmel, 1957). The specific conditions that determine whether social influence results in assimilation or differentiation remain unclear and are a subject of ongoing research (Takács et al., 2016). Whether social influence leads to assimilation, differentiation, or both, it remains an effect of social interaction. However, the specific form social influence takes has important implications for how it shapes individual behavior.

What, then, is the impact of social influence on macro-level outcomes? A well-established observation in sociology is that aggregated patterns in social systems often cannot be directly inferred from the individual actions that produce them (Arvidsson et al., 2025; Durkheim, 1895; Granovetter, 1978; Salganik et al., 2006; Simmel, 1957). Macro-level outcomes are often unexpected or even contradictory in relation to the micro-level behaviors that generate them. This is because individuals do not act in a vacuum; rather, their behavior is shaped by and, in turn, shapes the behavior of others, producing complex processes of social interdependencies (Anderson, 1972). Thus, in order to explain how collective outcomes emerge, scholars have emphasized the importance of taking into account social influence (Granovetter, 1978; López-Pintado & Watts, 2008; Merton, 1968; Simmel, 1957; Tarde, 1903). Social interdependencies arising from social influence can lead to cascading effects that extend far beyond dyadic relationships, producing path dependence and unforeseen collective consequences (López-Pintado & Watts, 2008). As Schelling (1971, 1978) famously demonstrated, social influence can cause aggregate outcomes to become decoupled from individual preferences. Empirical examples of this include the unpredictability of success in cultural markets (Salganik et al., 2006), the tipping of neighborhoods from integration to segregation (Schelling, 1971, 1978), and mobility dynamics in labor

markets that switch from reinforcing segregation to a desegregating dynamic (Arvidsson et al., 2021). In sum, social influence is central not only to understanding individual behavior, but also to explaining the emergent dynamics of collective outcomes

Sources of social influence and heterogeneity in susceptibility

As discussed above, social influence posits that individuals exert interpersonal influence on one another, thereby shaping future behavior. Much attention has been paid to exploring the sources or mechanisms of this influence (i.e., how and why social influence arises at an intra-personal level), which can be grouped into three broad categories. First, social influence can flow through norms, peer pressure, and authority effects, where individuals adjust their behavior to align with group expectations or comply with authority figures, as shown in classic studies of conformity (Asch, 1951; Sherif, 1935), group identification (Festinger, 1950), distinction (Simmel, 1957), and obedience to authority (Milgram, 1974). Second, interactions can provide information that directly influences behavior, as individuals update their beliefs by drawing on the (perceived) knowledge of others, often referred to as rational imitation or herding behavior (Bikhchandani et al., 1992; Dilmaghani, 2019; Hedström, 1998), or processes of social learning (Bandura, 1977). Third, social influence can also occur through simple contact or diffusion processes, where exposure alone affects behavior, as often conceptualized in epidemiological frameworks (Kermack & McKendrick, 1927; Rogers, 1965). Together, these categories describe different processes through which social interactions shape individual behavior and capture the action-formation mechanisms (Hedström & Swedberg, 1998) of social influence at the micro level.

An important follow-up question is whether the source of social influence shapes how contagion unfolds. While the specific source of influence is often secondary for understanding the broader social dynamics it generates, different sources can nonetheless produce distinct micro-level dynamics that matter for the collective outcome and therefore need to be taken into account. For instance, some mechanisms may generate behavioral change after a single exposure, whereas others, particularly those involving high-cost, high-risk, or uncertain situations, require reinforcement from multiple interactions (Centola, 2018; Centola & Macy, 2007). When adoption depends on such reinforcement, which Centola (2018) terms *complex contagion*, the resulting macro-level patterns differ substantially from those produced by *simple contagion* (Centola & Macy, 2007). Distinguishing between simple and complex contagion is, therefore, essential for understanding how social influence aggregates into collective outcomes.

In addition to sources of social influence, individuals can vary in their susceptibility to social influence. Research has argued that individuals are particularly susceptible to the influence of others in situations of uncertainty

(Granovetter, 1978; Hedström, 1998). In such situations, when individuals lack crucial information or face greater risks, the behavior of others can provide guidance and reassurance about why and how to act (Rogers, 1965; Rossman, 2012). The behavior of others can thus provide credibility or legitimacy, helping individuals overcome uncertainty related to a behavior. This underscores that the characteristics of the receiver of influence matter. The characteristics of the sender of influence are likewise important determinants of susceptibility. First, different types of ties can exert different levels of influence on an individual. Granovetter's (1978) distinction between weak and strong ties is well known: tie strength depends on the time invested, the emotional intensity, and the reciprocal nature of the relationship.[7] Although strong ties often exert greater influence, Granovetter argued that weak ties also matter because they expose individuals to information they would otherwise not encounter. Another source of varying susceptibility is homophily—the similarity between the sender and receiver of an exposure. Influence from similar peers tends to be stronger because individuals trust and rely more on those who are similar themselves (Centola, 2018; McAdam & Paulsen, 1993). McAdam and Paulsen (1993) showed that shared identities increase the probability that a social tie influences behavioral adoption. Similarly, Centola (2018) argues that individuals are more likely to trust, and therefore to be influenced by, the behavior of similar others. The shared characteristics that matter most likely depend on the behavior in question.

Variation in susceptibility can have a substantial impact on collective outcomes. This is exemplified by Granovetter (1978) who showed that if individuals differ in how many others must adopt a behavior before they do, it has major implications for how diffusion unfolds. He introduced the notion of a "threshold" to describe this individual-level heterogeneity and showed that even small differences in threshold distributions can lead to vastly different aggregate results, even when the groups are otherwise identical. Thus, heterogeneity, arising from the sender, the receiver, or their combination, can strongly influence aggregation dynamics.

Social structures facilitating social influence

To fully understand social influence and its dynamics, it is important to distinguish between the effects of social interaction and the structures that facilitate it (Arvidsson, 2022; Hedström, 2021). These interaction structures can be represented as social networks or, more broadly, as social environments that determine the likelihood of interaction. Such structures are crucial for how social-influence effects unfold, as they determine who interacts with whom in a population.

[7] As discussed by Granovetter (1973), it is important to distinguish between *strong ties* and *multiplex ties*—multiple contact with a social tie in different social context—as ties may be strong even if they only occur once. However, in many circumstances, they are highly correlated.

Accordingly, collective dynamics result from both the presence of social influence and the structure of social ties. For example, when individual networks are highly clustered along social categories (reflecting strong social divisions), diffusion may unfold sequentially: behaviors first spread within clusters before reaching adjacent ones (Centola, 2015; Hedström, 2005; Watts, 2002). Similarly, transitivity, the tendency for connected individuals to share mutual ties (person A has social ties to person B, and person B has social ties to person C, then person A is also likely to have social ties to person C), is an important structural feature shaping how social influence unfolds beyond the direct dyadic effect. Transitivity gives rise to closed triads, which are particularly important in diffusion processes where adoption depends on repeated exposure. High transitivity increases the likelihood that individuals are embedded in dense local networks, where behaviors, norms, or beliefs can be reinforced through multiple overlapping ties (Centola, 2010; Centola & Macy, 2007; Granovetter, 1973). This becomes especially important in cases of complex contagion, where individuals need exposure from multiple sources before being affected (Centola, 2010). In such cases, transitive ties, through the existence of closed triads, create the conditions necessary for repeated and reinforcing exposures. By contrast, simple contagion processes, such as the spread of information or certain diseases, often require only a single contact and can spread effectively through long bridging ties. However, for both simple and complex diffusion, high transitivity can also constrain diffusion by limiting the spread across clusters.

In addition to clustering and transitivity, other structural features of networks are also important for how the influence unfolds. One such feature is variation in the number of ties individuals have, often referred to as degree heterogeneity. In most real-world networks, some individuals have many more social ties than others. These highly connected individuals can act as social hubs, playing a crucial role in spreading behavior or information across networks (Barabási & Albert, 1999). Another important feature is assortativity, the tendency for individuals to have and to form ties with others who are similar to themselves, which can further shape diffusion dynamics. Although homophily can strengthen social influence within groups by reinforcing shared behaviors, it can also limit diffusion across group boundaries, producing behavioral pockets or echo chambers (McPherson et al., 2001; Rogers, 1965). Lastly, many networks exhibit small-world properties, combining a high degree of local clustering with short average path lengths between nodes. This structure arises when a few long-range ties link together otherwise distant parts of the network. Such structures are especially important for diffusion, enabling rapid spread while still supporting local reinforcement (Watts & Strogatz, 1998).

Together, these structural features of social networks determine how social influence diffuses through a social network, who is most likely to be affected, and how collective behavioral patterns emerge over time. In other

words, the structure of social relationships determines how interactions occur and, consequently, what collective outcomes emerge. It also highlights that individual behaviors are shaped not only by immediate ties but also indirectly by more socially distant others—such as alters' alters or even alters-of-alters-of-alters.

Social influence in joining and leaving religious organizations

Following the general discussion above, this section examines the role of social influence in shaping religious behavior, particularly the decisions of individuals to join, remain in, or leave religious organizations. The influence of social relationships on religious participation has been examined previously, though not always explicitly labeled as social influence, and mainly through studying the influence of specific ties, thus focusing on dyadic rather than higher-order network effects. The following section reviews prior research on social influence and religious behavior and discusses why it is necessary to move beyond a dyadic, egocentric network approach.

Previous research finds that individuals' decisions to join or leave religious organizations are often influenced by the choices of others within their immediate social environment. For example, Berghammer and colleagues (2017), using interviews with current and former members of the Catholic Church in Austria, found that many individuals postponed leaving the Church in respect of their parents' wishes. They also show that a spouse's decision to leave is highly predictive of its own. This aligns with other studies that emphasize the importance of spousal religiosity for the individual's own religious behavior. Spousal religiosity and practice appear to have a bidirectional effect: individuals influence and are influenced by their partners, leading to convergence in religious practices and beliefs (Need & Graaf, 1996; Stolz et al., 2020). Research also documents the social influence of other specific ties. Te Grotenhuis and Scheepers (2001), for example, find that the religiosity of friends during adolescence has long-lasting effects on an individual's own religious behavior. However, this effect seems to disappear when controlling for parents' socioeconomic background, suggesting that socioeconomic factors may override peer effects, or that parents with a certain socioeconomic background may channel their children into particular religious contexts.

These empirical findings are not surprising, as theories in the sociology of religion have long emphasized the importance of social ties for religious behavior. For instance, White (1968) proposed an "interaction model of religion", arguing that members of a religious organization enforce norms, beliefs, and behaviors through mutual interaction. According to this model, frequent and strong interactions with members of the religious in-group reinforce and maintain individual religiosity, whereas weak interactions make individuals more prone to discontinue their commitment. There are also

clear, albeit implicit, references to social influence in the dominant theories of the field. Berger (1969) argued that interactions with religious members in and out of the group have important implications for individual religious commitment. He argued that taken-for-granted religious beliefs are sustained through ongoing interaction with others. When interactions consistently confirm a shared worldview, the plausibility of belief is reinforced. Conversely, exposure to a differing or contradictory religious belief, through interaction with religious out-group members, can erode the taken-for-granted status of those beliefs. Similarly, the religious economy model highlights the importance of social ties in shaping religious behavior. Social ties serve as channels through which individuals receive information and reassurance about the value of religious participation. These interactions help reduce uncertainty and perceived risk, offering clues about the potential benefits or costs associated with religious participation (Iannaccone, 1995; Sherkat & Ellison, 1999). Within this framework, individuals are more likely to consider and commit to the religious options to which they have been exposed through their immediate social environment. Consequently, social interactions constrain the set of possible choices and shape their perceived utility.

Another social-influence process frequently discussed in the literature is *intergenerational transmission* of religion (i.e., religious socialization processes), typically focusing on the relationship between parental religiosity and the religious behavior of children (Berghammer et al., 2017; Iannaccone, 1990; Kelley & De Graaf, 1997; Need & Graaf, 1996; Sherkat, 1991; Stolz, 2009; te Grotenhuis et al., 2015; Voas & Storm, 2021). These ideas draw on the broader sociological literature on socialization, which describes how individuals internalize the norms, values, and behaviors of their society. This literature emphasizes that socialization occurs primarily within the family during childhood and increasingly through peer interaction during adolescence (Erikson, 1963; Grusec, 2011; Himmelfarb, 1979; Laursen & Veenstra, 2021). Parents also indirectly socialize their children by channeling them toward particular social environments where they are more likely to form ties that reinforce the norms and behaviors learned at home (Himmelfarb, 1979). In line with this, Cornwall (1989) argues that parent often embeds their children in certain (homogeneous) social environments, where both similarity and ongoing interaction reinforce religious behavior and beliefs. Through these processes, children and adolescents internalize their families' (religious) norms, values, and behaviors, with significant implications for later life outcomes (Boudon, 1974; Breen & Goldthorpe, 1997). In other words, interactions within the family and, to some extent, with peers during childhood are expected to shape an individual's future religiosity and religious behavior. In a similar vein, the economic model of religion also conceptualizes religious socialization as an intergenerational process. Iannaccone (1990) describes it as a transfer of *religious capital*, which increases the subjective re-

wards of religious participation. Given the denomination-specific nature of religious capital, it generates inertia in the religious market: individuals are more likely to remain within the congregation in which they were raised, while those lacking inherited religious capital are more prone to disengage altogether. This makes factors such as religious homogamy among parents, whether both belong to the same religious group, important predictors of religious affiliation behavior, since homogamous households tend to provide more consistent religious socialization (Need & Graaf, 1996; Voas, 2003).

There are also a few general network-based explanations for religious participation grounded in theories of conformity and social control. Early work argued that congregational friendships and denominational affiliation were stronger predictors of religious commitment than sociodemographic characteristics or doctrinal assent, attributing this to interpersonal influence and informal social control (Roberts & Davidson, 1984; Welch, 1981; White, 1968). These dynamics are reinforced by processes where religious identity is strengthened by one's social ties (Nepstad, 2004), and where deviation from group norms risks jeopardizing important relationships (Everton, 2018). In line with this, Bergahammer and colleagues (2017) find that some individuals delay disaffiliation until after the death of their parents to avoid relational conflict, evidence that aligns with broader theories of social conformity and control (Coleman, 1986). In contrast, other work emphasizes not the costs of deviation but the rewards of embeddedness. Stroope (2012) shows that a higher share of friends within one's congregation predicts stronger belief and practice, while small groups and close friendships provide solidarity rewards that reinforce commitment (Dougherty & Whitehead, 2011; Lim & Putnam, 2010). Together, these perspectives show that religious ties sustain commitment both by constraining disaffiliation and by offering positive incentives for continued participation.

A smaller set of studies has sought to capture the broader role of social influence on church membership patterns. A notable contribution linking social influence with collective outcomes is the work of Land and colleagues (1991), who developed a spatial diffusion model to examine how social influence operates in geographic space. By relating county-level church membership rates to distance-weighted exposure to adherence in neighboring counties, their model explains a substantial share of the spatial variation in US church adherence in 1910, 1920, and 1930. Extending this line of inquiry, Iannaccone and Makowsky (2007) constructed a stylized agent-based simulation model to assess whether social influence can account for the persistence of religious regionalism in the United States. They argue that previous explanations fail to capture the link between micro-level behavior and macro-level religious patterns because they reduce social influence to regional averages, ignoring the local structure of ties. Their simulations demonstrate how stable regional differences can persist despite high levels of migration, provided that individual identity and social conformity interact in particular

ways. More broadly, and consistent with the arguments made in this dissertation, they conclude that social influence is crucial for understanding how micro-level interactions scale into macro-level religious outcomes.

Together, this suggests that individuals' decision to join, remain, or leave a religious organization is not merely an (intra-)individual phenomenon, but religious decisions are shaped through interaction with others. While previous research has emphasized the importance of social influence on individual religious behavior, most studies have focused on specific social ties rather than the larger social networks in which individuals are embedded in. This has led to a neglect of the crucial meso-level, the networks and social contexts in which individuals are embedded in. Another limitation of previous research, also highlighted by Iannaccone and Makowsky (2007), is its predominant focus on how social influence affects micro-level behavior, without linking these behaviors to macro-level outcomes. As a result, much of the literature remains confined to the micro-level, unable to assess how dynamics generated by social influence shape the aggregate growth trajectories of religious organizations. To fully understand the role of social influence in these dynamics, we must empirically examine how local interactions produce collective outcomes. This is particularly important in light of Schelling's (1971, 1978) insights, which demonstrate that social influence can decouple collective outcomes from individual preferences and behavior. Social influence may help explain paradoxical patterns in religious organizational patterns, such as why countries with highly secular individual values, like the Nordic countries, maintain high levels of religious affiliation. As discussed previously, fully unpacking social influence requires examining its sources, the varying susceptibility of senders and receivers, and the social structures that shape their interactions. The crucial task then is to investigate how these factors jointly produce the organizational dynamics under study.

Reintroducing social influence in explanations of religious organizations' membership dynamics

This dissertation argues that fully understanding and explaining membership dynamics in religious organizations requires integrating social influence into existing explanatory frameworks. In doing so, it brings the social back into explanations of religious organizational dynamics. A crucial step in this integration is the empirical assessment of how social influence operates dynamically; how it arises, unfolds, and diffuses through networks. As outlined earlier, the source of influence, the susceptibility of both influencers and those they influence, and the social structures within which interactions occur are all central to understanding the role of social influence in shaping membership dynamics. Therefore, it is essential to examine how these aspects intersect and under what conditions they affect the growth and decline of religious organizations.

To incorporate social influence in explanations of the dynamics of religious organizations, it is necessary to identify the effect of social influence. This involves assessing how social interactions or exposures alter the behavior of a focal actor, including whether repeated or reinforced interactions are required for the influence to take effect or shape its magnitude. The susceptibility of the receiver and the characteristics of the sender, as well as their interaction, must also be considered. While accounting for these factors adds analytical complexity, they have critical implications for how micro-level behaviors evolve and, consequently, how membership dynamics aggregate at the collective level. It is also important to distinguish between explaining why social influence arises at an intra-individual level and the social dynamics it gives rise to. In many cases, the data needed to identify where social influence originates, such as how an interaction caused an individual to leave, is not available. In such instances, it is preferable to avoid imputing unobservable internal processes and instead focus on empirically observable social dynamics, drawing conclusions accordingly (Hedström, 2021, 2025, forthcoming). This approach can still accommodate complexity by examining the varying susceptibility and testing whether reinforced exposure amplifies social influence. Thus, analytical attention should be directed toward observable social-influence dynamics and the social dynamics they generate. From an explanatory point of view, this strategy is both sufficient and preferable to constructing speculative accounts of individuals' mental states or intentions.

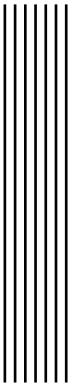
More concretely, social influence should be understood as a stimulus that affects individual behavior. Conceptualizing it in this way aligns with the notion of the *influence-response function* (López-Pintado & Watts, 2008). The advantage of this stripped-down conceptualization is that it enhances generalizability and avoids relying on interpretability or understandability as criteria for assessing a theory's validity[8]. This perspective highlights the dynamics of collective behavior that emerges from social influence. Attention should focus on identifying different forms of social influence, the individual and network-level structures that moderate its effects, and their roles in the aggregation process.

Applied to the study of religious organizations, this approach enables a more precise analysis of how individual-level religious membership decisions are shaped by social exposures and interactions, and how these, in turn, generate macro-level patterns of organizational growth and decline. By

[8]This refers to Watts's (2014) critique of intentional explanations of social action in sociology (i.e., Weber's (1968) notion of *Verstehen*). Watts criticizes the effort to rationalize actions, where rationalization refers to creating an empathic understanding (i.e., understanding action by placing ourselves in their shoes) by imputing the intentions behind the actions, since this often implies attempting to imagine the mental states of individuals to understand their motivation and intention behind their actions. Watts argues that this is prone to produce explanations filled with human biases, as well as striving for theories that make sense rather than achieve high scientific and explanatory value.

treating social influence as a measurable stimulus, explanations of membership dynamics can move beyond anecdotal or purely interpretive accounts, allowing researchers to model how religious behaviors diffuse through networks and trigger cascades of membership behavior.

It is important to note that social influence does not, and should not, replace established theories of religious decline or secularization, but complements them. Social influence can function as a force that prevents, dampens, or reinforces ongoing secularization processes. In some contexts, social influence can slow religious decline by sustaining religious practices through exposure and reinforcement, even as individual beliefs become more secular. This dynamic may help explain the phase of "fuzzy fidelity" in Voas' (2009) model of secular transition, which describes individuals who occupy an intermediate status, neither religiously committed nor wholly secular. Such individuals may retain residual belief, attend occasionally, or identify nominally depending on cultural context. When social environments remain highly affiliated, individuals may remain affiliated not out of conviction but due to continued exposure and normative expectations from peers. In contrast, the same processes can also accelerate disaffiliation. Observing others leave religious organizations can prompt additional exits. For instance, when an individual disaffiliates after completing higher education, that act, independent of its original cause, may trigger a cascade of disaffiliations as others within the network observe and respond. Individuals with weak religious commitment are particularly susceptible, as exposure to disaffiliation can make their nominal membership feel inconsistent with their weak beliefs. Moreover, as demonstrated by Iannaccone and Makowsky (2007), social influence can generate persistent regional differences in religiosity despite high levels of migration, thus counteracting or strengthening broader secularization forces. In this way, religious behaviors can become mutually reinforcing, setting off cascades of affiliation or disaffiliation that would not otherwise occur. Accounting for social influence thus provides a more nuanced understanding of the variation in the growth and decline of religious organizations, as well as the broader processes of religiosity and secularization.



Analytical Sociology and Mechanism-Based Explanations

In this dissertation, the role of social influence on the membership dynamics of religious organizations is examined through the lens of analytical sociology (AS). AS seeks to explain[9] social phenomena by decomposing them into their constituent parts to better understand how individual actions and interactions give rise to collective outcomes. This framework is particularly well-suited to studying the role of social influence for membership dynamics in religious organizations, as it enables systematic analysis of how micro-level interactions generate macro-level patterns. By emphasizing the interdependent nature of social actions, where the behavior of an individual influences others, AS is a useful framework for understanding the processes by which social influence can accelerate or in other ways alter religious organizations' membership dynamics. It also highlights the importance of identifying the specific conditions under which different forms of social influence occur. Finally, AS's emphasis on theoretical precision and clarity, together with empirical rigor, makes it useful for advancing the understanding of social influence and its role in shaping the membership dynamics of religious organizations.

AS emerged as a critique of general-law (Hempel, 1970) and statistical-association modes of explanation (Abbott, 1998; Goldthorpe, 2001). Explanations of this kind attempt to subsume the explanandum under general

[9] In sociology, to *explain* a phenomenon means to provide a causal account of why and how a social outcome occurred when and where it did. This contrasts with descriptions, typologies, taxonomies, and simple correlations, which address other questions—such as how a social outcome is constituted as well as how this varies across time and space, how it can be classified or labeled, or how various factors are associated with each other. For a more full discussion, see Hedström (2005, forthcoming) and Zetterberg (1965).

laws by specifying the conditions under which these laws apply (Hedström, 2005). As noted by Hedström (2005) and Ylikoski (2017), this approach directs attention toward aggregated regularities—quantifying relationships between variables, and, in the best cases, causal ones—rather than toward the underlying processes that generate the observed association. Such explanations neither account for nor empirically test the mechanisms that bring about the observed relationships. Instead, they often rely on plausible theoretical narratives to explain why an association exists, assuming its validity without empirically assessing the processes behind it. In a related, and more recent, critique, AS has also questioned the imputation of unobservable mental states or the motives behind social action (Hedström, 2021, 2025, forthcoming). As Hedström (2021, 2025, forthcoming) argued, rather than simply assuming the mental states of individuals driving their actions (e.g., intentions, motivations, and reasons), AS emphasizes the study of empirically observable social dynamics, how actions and interactions unfold over time and generate collective outcomes.[10] The emergence and development of AS can therefore be understood as a critique of storytelling in sociological explanation: rather than telling compelling theoretical stories, the focus should be on empirically grounded descriptions of the social processes linking micro-level behavior to social outcomes.

AS emphasizes that in explaining a social outcome, it is crucial to identify the underlying social mechanisms that are responsible for bringing it about (Hedström, 2005; Hedström & Ylikoski, 2010). A social mechanism refers to a constellation of actors whose actions and interactions are organized in ways that generate the phenomenon of interest. More precisely, a mechanism needs to specify the entities involved, their relevant properties, the activities in which they engage in, and the social structure that organizes these activities. Doing so shows how these entities and their behavior jointly bring about the outcome to be explained. Accordingly, AS maintains that the explanations of social phenomena should specify, with sufficient *precision* and *clar-*

[10]This recent development stands in stark contrast to many of the ideas that characterized the early years of analytical sociology, something Hedström (2025, forthcoming) describe as the first and second generations of analytical sociology. The first generation emphasized explaining action by referring to intra-personal processes (i.e., how configurations of beliefs, desires, emotions, values, and cognitive states produce individual behavior, which then aggregates to collective outcomes). Hedström's seminal book *Dissecting the Social* (2005) is representative of this approach. Later development in AS, however, shifts the focus away from intra-personal explanations toward inter-individual processes (Hedström, 2021, 2025, forthcoming). This second-generation perspective emphasizes how individuals interact and how these interactions generate social processes responsible for the collective outcome. Two considerations motivate this shift: (1) reliable information on individuals' mental states is rarely available, and even when it is, identifying which specific mental states produced a given action is extremely difficult; and (2) that it falls outside the scope of sociology. The primary focus of sociology is on social dynamics, processes, and patterns, whereas theorizing about mental states falls within the domain of psychology and cognitive science. Consequently, analytical sociology should concentrate, both theoretically and empirically, on how the social environments in which individuals are embedded influence their behavior.

ity, how the behavior of individuals generates the observed outcome (Elster, 1989; Hedström, 2005, 2021; Manzo, 2014), leaving no ambiguity about the process through which the outcome is produced. Thus, to develop a mechanistic explanation of any social phenomenon, AS calls for identifying the relevant actors, their interactions and behaviors, and describing how these unfold over time to generate the social outcome under scrutiny.

AS rests on a fundamental distinction between the micro- and macro-levels of a social system, while recognizing their interdependence (Coleman, 1986; Hedström, 2005, forthcoming; Hedström & Ylikoski, 2010). The macro level refers to supra-individual entities (that is, groups or collectives whose properties cannot be defined for any single member alone (Hedström, forthcoming)).[11] These macro-level entities can have various properties, such as varying degrees of inequality, network density, segregation, and population patterns, or, as in this dissertation, the membership trajectories of religious organizations. In analytical sociology, such supra-individual properties usually constitute the macro-level outcomes that are to be explained. The micro-level consists of the actors within the system and their actions and interactions. Although actors are typically individuals, they can also include social groups such as families or organizations. To explain the macro-level outcome, AS emphasizes directing explanatory focus to these actors and to how their actions and interactions generate the macro-level outcomes. This focus is crucial because only social actors are capable of social actions, whereas categories, variables, or events cannot. The emphasis on actor-level processes aligns AS with the tradition of methodological individualism (Udehn, 2002). Crucially, the micro- and macro-levels are mutually interdependent. Macro-level properties shape actors' behavior by altering the social environment and the structure of social interactions, thereby influencing their opportunities, expectations, and exposure patterns.[12] Conversely, micro-level actions produce macro-level patterns that, in turn, reshape the context in which subsequent actions unfold. Social systems are therefore characterized by a continuous micro–macro dynamic in which individual actions and aggregate outcomes co-evolve. These are the dynamics that AS seeks to identify and explain in terms of social mechanisms.

The striving for empirically plausible mechanistic explanations has important epistemological implications (Hedström, 2005; Hedström & Ylikoski, 2010). Rather than pursuing a grand, unified social theory, AS conceives of theory as a toolbox of social mechanisms (Hedström, 2005, 2021). This view

[11] Such supra-individual entities can vary widely in size and scope, ranging from entire social systems to more restricted subsystems or small friendship groups.

[12] Although macro-level properties do not exert influence as independent causal agents, they matter because they structure the social situations in which actors act. At the same time, as Schelling (1998) notes, individuals often respond directly to aggregate conditions—such as the average speed on a highway—rather than to any single actor. In this sense, macro-level properties and conditions can influence behavior by shaping the social context within which individual actions unfold (Hedström, forthcoming).

is consistent with Merton's (1968) notion of middle-range theories, which emphasizes that theories should be precise, clear, and simple, highlighting the most important explanatory factors. Crucially, middle-range theories can be generalized across a range of social phenomena without claiming to explain everything within the social system. To clarify this orientation, Ylikoski's (2017) distinction between *causal scenarios* and *causal mechanism schemes* is particularly instructive. Causal scenarios refer to mechanisms that explain specific social outcomes, whereas causal mechanism schemes are abstract representations of mechanisms that can produce effects of a given kind. In Ylikoski's words: "causal scenarios are (selective) representations of particular causal processes responsible for some concrete event or phenomenon. Thus, a causal mechanism refers to a causal narrative that describes the process responsible for the explanandum. [...] [causal scenarios] describe the crucial elements in the relevant causal chain" (p. 409). Causal mechanism schemes thus function as building blocks for explaining particular causal scenarios.[13] They are precisely the kinds of mechanisms that belong in the analytical toolbox and exemplify how the theoretical development of sociology proceeds (Ylikoski, 2017). This distinction highlights the relationship between explaining specific events and formulating abstract theoretical processes that can inform explanations of other disparate outcomes. The toolbox approach, therefore, envisions theoretical progress not as the construction of ever more comprehensive theories but as the continual refinement and expansion of this collection of mechanism schemes that can be applied across diverse empirical contexts.

In this dissertation, the causal scenario under investigation is the membership trajectory of religious organizations. To explain this outcome, the analysis draws on causal mechanism schemes, general social mechanisms that describe how different processes of social influence unfold to produce macro-level patterns. The study of religion can, in this sense, draw inspiration from existing schemes describing diffusion, reinforcement dynamics, and threshold effects. These frameworks clarify how individual-level exposures and interactions generate aggregate patterns of religious organizations' membership trajectories. At the same time, the empirical case of the membership dynamics of a religious organization provides a useful context for testing, refining, and extending these causal mechanism schemes, thus expanding the analytical toolbox. By modeling how micro-level interactions give rise to collective outcomes, this dissertation contributes to two fields simultaneously: it deepens our understanding of the variation in the growth and decline of religious organizations, and it advances the broader analytical-

[13]Similar distinctions between levels of abstraction and concreteness in explanation have been made by several scholars, including Hedström's (2005, forthcoming) contrast between *concrete* and *abstract* tokens, Hayek's (1952) distinction between *ordinary* and *theoretical* explanations, Popper's 1959 discussion of scientific models, and Weber's (1949) treatment of *ideal types*.

sociological project of developing mechanism-based explanations of social phenomena.

Empirical Framework

The empirical framework of this dissertation builds on the approach proposed by Arvidsson and colleagues (2024), who outline a three-step procedure for empirically examining interdependent processes within the AS tradition. First, the structure of interdependencies in the social system must be specified; that is, which actors interact with whom. This can be achieved, for instance, by identifying the social networks or other parts of the social environment in which actors are embedded in. Second, these interactions must be examined in relation to their impact on the dynamics of the social process. In other words, one must identify how the behavior of one actor influences others, the effect of social influence. Third, the analysis should detail how the effects identified in step two combine to produce the collective outcome under investigation, with particular attention to the second-order dynamics that emerge from these interactions. This framework provides the empirical foundation for the essays included in this dissertation.

This framework is applied to the case of religious organizations' membership dynamics. Social-influence processes are analyzed using full-population data, while both micro-level effects and macro-level dynamics are examined through a combination of statistical modeling and computational techniques. The rise of computational social science has introduced methods that make it possible to empirically investigate interdependent social processes at multiple analytical levels (Arvidsson et al., 2024; Arvidsson & Keuschnigg, 2025), a development often referred to as the computational turn in sociology.

The following section outlines what this computational turn entails and explains how Arvidsson and colleagues' (2024) framework is implemented here by integrating statistical and computational methods. This is followed by an overview of the data used in the essays, and the section concludes with a discussion of the ethical considerations associated with the work conducted as part of this dissertation.

The computational turn in sociology

Until recently, quantitative sociology has largely relied on conventional methods of data collection and well-established statistical methods, which assume statistical independence (Jarvis et al., 2021). These approaches have been highly effective in predicting individual-level outcomes as a function of sociodemographic attributes and individuals' values and beliefs (Coleman, 1986). However, they suffer from two central limitations when the aim is to analyze interdependent social processes. First, the available data have been insufficient. As Hedström (2005) notes, survey data and similar sources remove important parts of the social from the analysis, as individuals are "uprooted from their social environment" (p. 109). Random sampling typically strips away information about individuals' social embeddedness—their networks and social environments—providing rich data on attributes but limited possibility to analyze social interdependencies.[14] Such data remain useful for micro-level prediction and the estimation of macro-level correlations, but are insufficient for studying social influence dynamics. Second, traditional statistical models have been insufficient for empirically studying the theoretically proposed processes. Standard statistical models describe how factor X influences outcome Y but rarely illuminate or empirically test the mechanisms through which interdependent processes unfold. They struggle to capture feedback loops, contagion processes, and how social interactions aggregate into macro-level dynamics.

Together, these limitations have produced a persistent gap between empirical research and social theory: sociological explanations are often proposed but seldom tested empirically (Goldthorpe, 2001; Jarvis et al., 2021). Fully explaining social phenomena requires longitudinal data that capture the structure of interactions between all individuals in a social system, together with methods capable of isolating social influence from confounding factors and studying the social interdependencies that arise from it. This enables empirical tests of the proposed theoretical mechanisms. Recent advances in computational methods and access to new data sources now open the possibility to bridge this gap and bring empirical research closer to AS's theoretical ambitions (Arvidsson et al., 2024; Arvidsson & Keuschnigg, 2025; Jarvis et al., 2021).

[14] A critique similar to that raised by qualitative researchers, who note that interviews fail to capture social interactions (Lamont & Swidler, 2014).

As outlined by Arvidsson and colleagues (2024), the first step of the framework introduced earlier concerns the identification of suitable data sources that contain information on individual behaviors and social relationships among actors. New data sources that have been made available to research, such as digital trace data and administrative records, now provide detailed information on individuals' actions and their social embeddedness. The crucial task is to determine, on theoretical grounds, which structures of interaction are most likely to constitute the arenas of influence for the specific outcome of interest. Ideally, such analyses require data that capture a complete or closed social system; without this coverage, analyses risk being limited to egocentric or dyadic fragments that obscure the broader interdependencies through which social influence operates.

In the second step, conventional statistical techniques and causal-inference designs can be combined with computational approaches to estimate social influence while isolating it from effects arising from selection or sorting processes. This distinction is essential to establish that the influence of others caused the focal individual to act in a particular way. Put differently, one must be confident that actor A behaved as they did because of interaction with actor B, rather than because both share attributes associated with a similar propensity to act in a certain way. For example, a group of friends may behave similarly because they influence each other and align their behaviors over time. However, an equally plausible explanation is that they became friends due to pre-existing similarities in behavior or traits, i.e., a process of homophily (McPherson et al., 2001).[15] In the context of this dissertation, religious individuals may be more likely to form ties with other religious individuals, while secular individuals tend to form ties with others who are also secular. In such cases, it could be religiosity itself, rather than exposure through social ties, that drives the behavior. To accurately assess the role of social influence, it is therefore necessary to ensure that the observed associations reflect a genuine social influence effect rather than homophily, although both can produce similar data patterns (i.e., correlated behaviors or beliefs among interconnected individuals). This distinction matters because the underlying dynamics differ substantially and have far-reaching implications for aggregate outcomes (Aral et al., 2009; Lyons, 2011; Steglich et al., 2010).[16]

[15] As discussed before, the relationship between social influence and homophily is rather complicated, where it can also have a moderating effect on social influence (Centola, 2018; McAdam & Paulsen, 1993).

[16] Both the dynamics and the macro-level outcome differ substantially depending on whether they are produced by social influence or by homophilic tie formation (Aral et al., 2009; Lyons, 2011; Steglich et al., 2010). Under social influence, interdependent processes are primarily shaped by the structure of individuals' relationships and interactions. In contrast, if diffusion is driven by certain attributes, the distribution of these attributes in the population governs the adoption pattern. These two processes also yield different macro-dynamics: social influence typically produces an *S*-shaped growth curve, with adoption accelerating through social ties

Recent advances in computational social science have introduced promising methods for disentangling social-influence effects from those arising from selection and sorting processes (Arvidsson & Keuschnigg, 2025).[17] Because tie formation is typically homophilic, an individual's network position, reflecting their structural location in the network, contains information about latent traits that shape both their relationships and behavior. By adjusting for network position, it becomes possible to account for otherwise unobserved heterogeneity and thereby obtain more purified estimates of social influence.[18] More specifically, machine-learning techniques can be used to infer latent network positions of individuals, for example, through node embeddings (Arvidsson & Keuschnigg, 2025; Cristali & Veitch, 2022; Grover & Leskovec, 2016; McFowland III & Shalizi, 2023; Sridhar et al., 2022; Veitch et al., 2019). This approach enables researchers to isolate genuine social influence from homophily and other confounding factors, allowing for more accurate estimation of pure social-influence effects.

Regarding the third step, agent-based models (ABMs) can be used to simulate real-world populations and examine how different interventions influence macro-level outcomes (Arvidsson et al., 2024; Bruch & Atwell, 2015; Hedström, 2005, forthcoming; Macy & Willer, 2002; Manzo, 2022).[19] ABMs are computational simulations in which the micro-level behavior of agents is specified. Agents then act and interact, and their interactions collectively generate macro-level patterns. The value of ABMs increases substantially when they are empirically calibrated, as calibration enhances realism,

and slowing at saturation, whereas attribute-driven growth is constrained by population composition and capped by the number of individuals possessing the relevant attribute. Thus, although micro-level behavior may look similar, the diffusion process and the eventual collective outcome differ markedly.

[17]The potential of computational methods extends well beyond estimating social-influence effects. For instance, natural language processing techniques have been used to analyze meaning-making process in large-scale text corpus (see Erz (2025), Hurtado Bodell (2024), and Menshikova (2025) for a few examples of this), to improve prediction of social outcomes using machine learning models (see, for instance, Daoud and Dubhashi (2020) and Lundberg et al. (2022)), to simulate emergent dynamics with agent-based simulation models (e.g., Centola et al. (2005), DellaPosta et al. (2015), Goldberg and Stein (2018), and Mutgan et al. (2025)), conduct large-scale macro experiments (Hedström, 2006; Keuschnigg et al., 2016), and to enhance qualitative research (Izani Ibrahim & Voyer, 2025).

[18]Because all, or almost all, homophily is removed, the estimated social-influence effect should be interpreted as conservative. As discussed previously, and shown by prior research (Arvidsson et al., 2025; Centola, 2018; McAdam & Paulsen, 1993), partial similarity between connected individuals can be a necessary requirement for social influence to operate. Eliminating all similarity therefore removes not only selection but also components of social influence itself, yielding a lower-bound estimate of the social-influence effect.

[19]This use of ABMs aligns with Woodward's (2003) interventionist view of causal explanation, often summarized as asking *"what would have happened had things been different?"*. In this framework, a putative mechanism X is a genuine cause of outcome Y if interventions that change X would, under suitable conditions, produce corresponding changes in Y. ABMs make such counterfactual assessments feasible and possible by allowing us to manipulate the mechanism within a simulated population and observe how the macro-level outcome changes. This provides a way to assess the causal plausibility of the proposed mechanism.

allows the construction of plausible counterfactual scenarios, and enables researchers to focus on theorized mechanisms while letting parameters be informed by data (Bruch & Atwell, 2015). Empirical calibration also mitigates the problem of generative sufficiency, the fact that multiple micro-level mechanisms can, in principle, produce the same macro-level outcome (Hedström, 2005; León-Medina, 2017; Squazzoni & Boero, 2005). By calibrating models with empirically estimated parameters and observed social structures, ABMs narrow the range of plausible generative processes and thereby strengthen explanatory credibility. When empirically grounded, ABMs enable the exploration of counterfactual scenarios—showing, for instance, how the collective outcome would change if a social-influence effect were removed or if structural features of the system were altered. Such simulations allow researchers to manipulate behavioral and structural parameters that could not be modified in the real world for practical or ethical reasons (Macy & Willer, 2002). In this sense, ABMs function as social laboratories, enabling the systematic examination of how social influence contributes to collective outcomes and of the relative importance of different social-influence mechanisms for the membership dynamics of religious organizations.

Together, these three steps constitute a coherent empirical framework that links theoretical mechanisms of social interdependencies to observable data, enabling a systematic and rigorous examination of how social-influence processes aggregate into religious organizations' membership dynamics.

Data

The essays in this dissertation use data from Swedish administrative records (hereafter referred to as Swedish register data). These data contain detailed information from multiple government agencies. For instance, the Swedish Tax Agency provides records on individuals' economic and religious affiliation, while the Swedish National Agency for Education provides data on educational attainment, academic performance, and school attendance. The register data also covers the entire population, providing information for all individuals residing in Sweden.

Keeping population records has a long tradition in Sweden and the Nordic countries in general. The origins of what are now known as Swedish register data can be traced to parish records established by the Church of Sweden in 1686, which systematically documented births, deaths, occupations, and migrations (Statistics Sweden (SCB), 2022). Following centuries of local recordkeeping by the Church of Sweden, responsibility for maintaining population statistics was centralized in 1960 under Statistics Sweden (SCB). This early and comprehensive administrative system made Sweden one of the first countries to develop a unified population register, later expanded to encompass multiple domains—including residence, education, employment, income, and civil status, and much more—through the national

personal identification number (PIN) introduced in 1947 (Statistics Sweden (SCB), 2022). The PIN also enables exact data-linkage to external data sources or records, such as company, survey, or organizational data, provided that these sources also record the PIN.

A particular advantage for this dissertation of using Swedish register data is the way religious affiliation is measured. Unlike many other countries (e.g., the US or the UK), where affiliation is typically self-reported in surveys, a subjective, reversible, and cost-free category, affiliation in Sweden is formally defined and recorded in administrative registers. This institutional arrangement is based on the long history of the Church of Sweden as a state church with administrative responsibilities. Although the Church and state were formally separated in the year 2000, members pay a church fee collected through the tax system. This makes membership directly observable in the registers and provides complete population coverage. Consequently, the affiliation of the Church of Sweden is consistently measured. Other religious affiliations are also included in the registers, but these data are voluntary, less comprehensive, and not tied to comparable institutional or financial obligations. In addition, the register data also, and crucial for this dissertation, includes information that allows the identification of the likely social ties of all individuals residing in Sweden. Together, Swedish register data provide highly granular information on sociodemographic characteristics, labor and housing market positions, religious affiliation, and inferred social ties, making it a unique case to analyze the role of social influence for religious organizations' membership dynamics.

However, register data also has limitations. Certain events or attributes may remain unobserved if individuals fail to update their official records, for example, residential changes that are not reported to the Tax Agency. The register data also excludes individuals who reside in Sweden without formal registration, such as short-term labor migrants or undocumented residents. Finally, and especially relevant to this dissertation, register data rarely have information on dimensions related to (religious and other) attitudes or beliefs, making it necessary to infer such aspects indirectly through behavioral indicators. Despite these limitations, Swedish register data remains one of the most comprehensive sources of population-level data worldwide, offering a uniquely detailed foundation for the study of religious affiliation and social influence.

Inferring social ties

An important task in this dissertation has been to identify the structure of social interactions, that is, the social ties observed in the data that indicate when two individuals are more likely to interact. Social ties are inferred by exploiting the information in the register data on shared institutional affiliations, following recent efforts in several European countries to construct

full-population networks from administrative data (Cremers et al., 2025; Panayiotou et al., 2025; van der Laan et al., 2023). For the analyses in this dissertation, three categories of likely social ties are identified: (1) kinship ties, (2) workplace ties, and (3) neighborhood ties. Together, these ties form a multiplex network that defines the set of individuals with whom a focal individual is likely to interact (see Figure 1 for an illustrative example). It is important to recognize that these ties do not capture direct social relationships or interactions; instead, they represent institutional or structural links—reflecting shared social contexts—between individuals (van der Laan et al., 2023). For example, two individuals working in the same organization are linked as "colleagues", even if they never interact. The ties, therefore, serve as indicators of potential interactions and opportunities for exposure, not as direct measures of social relationships. Following this rationale, they can be interpreted as delineating an individual's social environment or a network of potential exposure.

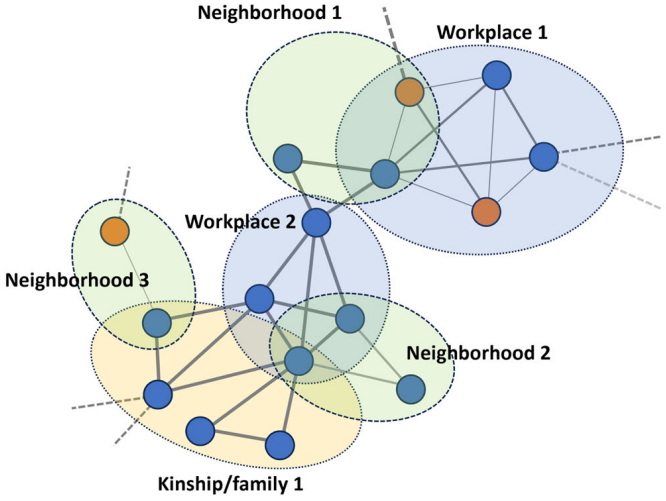


Figure 1: Illustrative example of a multiplex social network. Illustrates how kinship, workplace, and neighborhood affiliations overlap to form an individual's social environment. Each ellipse represents a social domain (e.g., workplace, neighborhood, or kinship/family), and individuals are connected by structural ties that indicate potential opportunities for interaction. Individuals who share ties across multiple domains (e.g., both neighbors and colleagues) are more likely to interact than those who share a single tie. Figure courtesy of Carl Nordlund.

The decision to focus on kinship, workplace, and neighborhood ties rests on their well-documented role as channels of social influence. These three social domains constitute the primary social environments in which individuals are embedded. Most people spend the majority of their time with

their family, at work, and in their local residential neighborhood (Gershuny & Fisher, 2023), and within these contexts, a large share of meaningful social ties are formed (Fischer, 1982; McPherson et al., 2001; Verbrugge, 1979). Each type of tie also has a different function and role (Wellman & Wortley, 1990).

Kinship ties provide strong, durable, and emotionally intense relationships that often can overcome spatial distances. Previous research highlights their importance for the intergenerational transmission of values, including religious beliefs (Litwak & Szelenyi, 1969; Wellman & Wortley, 1990). Workplace ties, on the contrary, are typically less intimate but offer frequent and sustained opportunities for interaction. Workplaces have been shown to be crucial arenas for the diffusion of norms, behaviors, and information, especially by facilitating exposure that individuals would otherwise be unlikely to encounter (Granovetter, 1973; Hedström et al., 2008). Finally, neighborhood ties represent the local community context in which individuals meet peers, neighbors, and acquaintances. A large body of research demonstrates how residential proximity structures provide opportunities for exposure, contextual influence, and network closure (Hedström, 1994; Hedström et al., 2000; Hägerstrand, 1967; Sampson et al., 1999). By combining kinship, workplace, and neighborhood ties, the network measure used in this dissertation captures a more comprehensive and realistic representation of the social environments in which individuals are embedded and exposed to the behaviors of others.

Furthermore, the register data make it possible to infer additional information about the strength[20] or importance of the extrapolated ties. The multiplex nature of the network captures individuals who are connected in several social domains, suggesting a higher probability of interaction than if they were linked in a single domain (Gluckman, 1973; Verbrugge, 1979). For example, if two individuals both work in the same organization and live in the same neighborhood, they are more likely to interact than those who share only one of these affiliations. Temporal information further enriches this inference. Individuals who maintain shared affiliations over a long period can be assumed to have stronger or more enduring connections than those linked for only a single year.[21] In addition, theoretical distinctions from social network research help interpret the qualitative importance of different ties. Granovetter's (1973) classic distinction between weak and strong ties emphasizes that tie strength depends on factors such as time investment, emotional intensity, and reciprocity.[22] For example, immediate kinship ties

[20] *Strength* here refers to a higher likelihood of interaction, rather than a binary indicator of an interaction or tie existence.

[21] This temporal dimension only applies to time-variant ties, such as neighborhood, workplace, and school ties, since kinship ties in the data are time-invariant.

[22] As discussed by Granovetter (1973), there is an important distinction between *strong ties* and *multiplex ties*. Strong ties can exist even if they occur in only one domain, and ties can span several domains (i.e., be multiplex) without being strong ties. However, in many circumstances, however, they are highly correlated.

are typically strong ties, whereas workplace ties tend to be weak. Together, these strategies provide a theoretically grounded and empirically informed approach to identifying the social environments in which individuals are embedded, a crucial step in analyzing the role of social influence in the membership dynamics of religious organizations.

Ethical considerations

The research presented in this dissertation raises several ethical considerations, encompassing both well-established concerns regarding the processing of sensitive data and newer issues emerging with the rise of big data and computational social science, such as the ethics of inferring individual-level information, as well as ongoing debates surrounding open science and research transparency. To ensure ethical integrity and protect the individuals in the data, the research conducted as a part of this dissertation has been approved by the Swedish Ethical Review Authority (Ref. 2013/850-31 and amendment Ref. 2018/934-32). The following section outlines some of the general ethical concerns encountered in the course of this dissertation.

The study of social influence, one of the central themes of this dissertation, does not itself involve the processing of sensitive information. However, the register data used in the analyses contains sensitive information, most notably regarding religious behavior and membership. This has required strict adherence to ethical regulations and legal requirements, as well as careful consideration of how results are presented. All findings are therefore reported in a manner that prevents identification of individuals or small groups. No information is presented at the individual level; results are shown solely as aggregate statistics or model-based point estimates with associated uncertainty metrics. In addition, all analyses have been conducted using pseudo-anonymized data, meaning that I cannot directly identify individuals, which further safeguards the integrity and privacy of all individuals in the data.

Another ethical consideration concerns the generation of new information about individuals from existing data. This issue has received increasing attention, particularly regarding the ethics of inferring information about individuals (Mittelstadt et al., 2016; Richards & King, 2014; Salganik, 2017). In this dissertation, such inferences primarily concern social ties and certain religious behaviors, such as baptism, inferred from family relations or the timing of events. Although this information is not directly reported by individuals nor derived from their own behavioral data, an ethical question remains: does inferred information still belong to the person it concerns, and if so, should individuals retain some control over what is assumed or inferred about them? Moreover, this type of data generation can reproduce or amplify biases, contributing to statistical discrimination. In this dissertation, inferences are made solely for analytical purposes and have no direct im-

plications for the individuals concerned. To mitigate ethical risks, as noted above, all results are reported in aggregated form, ensuring that no individual or small group can be identified, and interpretations are made with these inferences explicitly stated. Together, these practices minimize the ethical concerns associated with inferring individual-level information.

Lastly, the nature of register data raises important issues of transparency and replication. For legal reasons, the data cannot be shared, which limits the possibility of replication. Moreover, because register data are organic in nature, continuously updated and revised, the data retrieved at one point in time may differ from data retrieved later, even under identical extraction parameters. This creates additional challenges for replicability and transparency, as future studies may be unable to access identical datasets and thus cannot reproduce results exactly. To mitigate these limitations, programming code and detailed documentation of both the data processing and analytical procedures will be made available at the time of publication of each essay, allowing others to clearly follow the analytical steps even if the underlying data cannot be shared.

In summary, the research presented in this dissertation is based on a broad ethical foundation that takes the issues of privacy, data protection, and scientific transparency. Ethical considerations have guided not only the design and execution of the studies but also the communication of their findings, with the aim of minimizing potential harm while upholding a high scientific integrity.

The Empirical Case of the Lutheran Church of Sweden

This dissertation takes the Lutheran Church of Sweden as its empirical case. The Church of Sweden provides a particularly suitable case for studying the role of social influence in the membership dynamics of religious organizations. Despite Sweden's reputation as one of the most secular countries in the world, the majority of the population has historically remained (and still is) members of the Church of Sweden, although membership has declined dramatically in recent decades. This pronounced decline, combined with the Nordic context of widespread secularization, makes the Church of Sweden an especially compelling setting to examine the processes of membership decline of religious organizations. In addition, the availability of high-quality register data, covering the entire population and including detailed information on religious membership, sociodemographic characteristics, and proxies for social ties, offers exceptional opportunities to analyze social-influence processes and their role in the decline of the Church. The following section provides background on Sweden and the Church of Sweden. It begins with an overview of the Church, followed by a discussion of religiosity in Sweden and the role of the Church of Sweden in Swedish society, and concludes with an analysis of the predictors of changes in religious membership in the Swedish context.

Background

Most Western countries have experienced a religious decline in the past century. This is evident in the decline of membership rates in religious organizations, the decrease in participation in religious practices, and the shrinking

share of people who consider religion an important part of their lives (Bruce, 2002; Norris & Inglehart, 2004; Stolz et al., 2025; Voas & Doebler, 2011). Sweden is not an exception. Church attendance has declined steadily since the 1950s (Granberg & Persson, 2013), and today Sweden is among the most secular countries in the world in terms of individual-level attitudes (de Hart et al., 2013; Delhey & Newton, 2005; Furseth et al., 2018; Hagevi, 2012, 2017; Willander, 2019). Given the diminishing role of religion in Swedish society, it is described as paradoxical that an overwhelming majority of Swedes have historically been, and a majority still are, members of the former Lutheran state church. However, in recent decades, the Church has experienced a pronounced decline in membership, where the membership having decreased steadily for several decades, with the pace of decline accelerating during the 1990s and 2000s. As shown in Figure 2, in 1972, approximately 95.2% of the Swedish population were members of the Church of Sweden, compared to only 52.1% in 2023. Although increased immigration of people practicing other religions has contributed to this proportional decline, a numerical drop is also observed: the Church has lost nearly 2.3 million members over the same period.

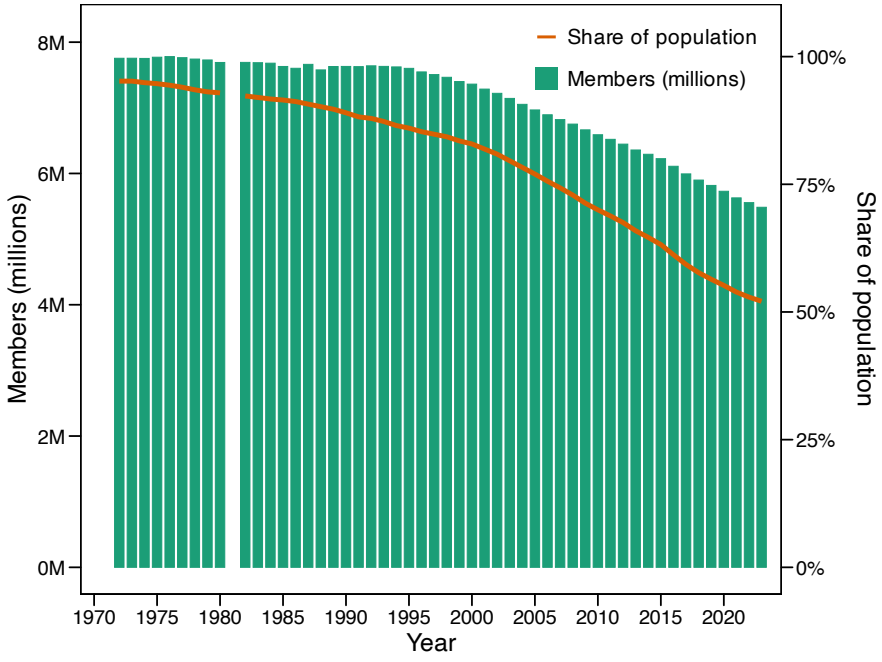


Figure 2: Church of Sweden membership, 1972–2023. Green bars (left y-axis) show the absolute number of members (millions). The orange line with points (right y-axis) shows members as a share of the Swedish population. Data for 1981 are missing. Data from the Church of Sweden (Svenska kyrkan, 2025c).

Historically, the Church of Sweden enjoyed preferential treatment from the Swedish state, which effectively granted it a near-monopoly on the religious market. Like other Nordic countries, Sweden established a Lutheran state church during the Reformation.[23] Until 1951, Swedes were prohibited by law from leaving the Church unless they joined another state-approved denomination (Hamberg & Pettersson, 1994). Even after this restriction was lifted, individuals remained subject to a parish tax obligation until the year 2000. In practice, this meant that a church tax was automatically deducted from all residents' income. Additionally, children were automatically enrolled in the Church at birth if at least one parent was a member, making membership in the Church of Sweden the default status, while nonmembership typically reflected an active decision by individuals or their parents to disaffiliate. As a result, almost all citizens were members of the Church of Sweden (see Figure 2, Bäckström et al. (2004) and Furseth et al. (2018)).

However, constitutional reforms introduced in 1975 redefined the principle of religious freedom in Sweden, rendering automatic inclusion in the Church of Sweden incompatible with the new Swedish constitution. As a result, new membership rules were implemented in 1996, requiring parents to actively enroll their children in the Church of Sweden through baptism. Additional reforms promoting the disestablishment—that is, the withdrawal of formal ties, privileges, and administrative functions of the state from the Church (Chaves & Cann, 1992; Fox, 2011; Stolz & Chaves, 2018)—of the Church of Sweden followed during the latter half of the twentieth century, culminating in the formal separation of the Church of Sweden and the Swedish state in the year 2000, ending a nearly 500-year union. Despite these legal changes, the Church of Sweden continues to occupy a privileged position in certain respects. For example, the Church of Sweden still has the responsibility for all burials in Sweden,[24] and the Swedish Tax Agency still collects what is now referred to as a "church fee" (Straarup, 2015).

Since the gradual loosening of ties between the Swedish state and the Church of Sweden, the Church has experienced a steady decline in members. After the formal separation in 2000, this decline accelerated markedly (see Figure 2 and (Bäckström et al., 2004). This membership decline is driven by both reduced inflows of new members and increased outflows of exist-

[23] At the time, Finland belonged to the Swedish realm, and a unified Lutheran state church for both Sweden and Finland was founded during the Reformation. The Church of Finland became formally separated from the Church of Sweden after Russia gained control over Finnish territories in 1809 (Encyclopaedia Britannica, 2025a, 2025c). Denmark–Norway (then a union under Danish rule) introduced a unified Lutheran state church during the same time, and Iceland, under Norwegian and later Danish rule, was incorporated into the same Lutheran state-church structure. Separate national churches emerged only after the dissolution of these unions in the nineteenth century (Encyclopaedia Britannica, 2025b, 2025d, 2025e).

[24] This is the case for all but two municipalities in Sweden: Stockholm and Tranås, where the municipalities themselves handle burials, a practice that has been in place since the early 1800s (Riksrevisionen, 2006).

ing members (see Figure 3). The Lexis diagram in Figure 3A illustrates how the change in membership arises from the interplay of age, period, and cohort dynamics. Cohort patterns are particularly evident: older birth cohorts display consistently higher levels of affiliation across ages, whereas later cohorts affiliate at substantially lower rates. These differences appear as diagonal gradients that reveal a generational erosion of the Church's membership base. However, these gradients do not reflect cohort differences in joining or disaffiliation alone.

As shown in Figure 3B, the reduced inflow of new members reflects mainly fewer children being enrolled through baptism. In contrast, the tendency for older children or adults to join has remained relatively stable at around 6,000–14,000 individuals per year, with some indications of an upward trend. This modest increase largely reflects children who were not automatically enrolled at birth after the 1996 legal reform, later choosing to join, for instance, in connection with confirmation. It should therefore not necessarily be interpreted as evidence of a broader religious revival among adults, but rather as an artifact of institutional change. Figure 3A also reveals a pronounced age structure of entry: most new members join within their first years of life, followed by a second, smaller peak during early adolescence, likely related to confirmation. From around 2012 onward, this "confirmation peak" became more distinct, a shift plausibly driven by the 1996 reform, which delayed many children's entry from birth to adolescence rather than indicating renewed adult religiosity. After adolescence, joining remains consistently low across ages and periods, with only occasional spikes, some coinciding with Church elections[25] (e.g., 2007 and 2017), suggesting temporary inflows triggered by increased institutional visibility.

Moreover, as shown in Figure 3C, membership outflows arise both from active disaffiliation and from the steady attrition caused by the deaths of members. Active disaffiliation is strongly age-structured, increasing sharply between ages 18 and 30 (see Figure 3A), a pattern consistent with Stolz and colleagues (2020) argument that the transition into working life, and with it the obligation to pay the church fee, often prompts individuals to reconsider their affiliation. After early adulthood, disaffiliation rates stabilize and gradually decline, reflecting a duration effect: those who remain affiliated longer become increasingly unlikely to leave. Vertical spikes in certain years (2005, 2010, 2014, 2018, 2022) indicate additional period effects. In contrast, exit through death constitutes the most stable component of membership decline. Mortality rises predictably with age, producing clear horizontal gradients in

[25]Church elections (in Swedish: *kyrkoval*) are the democratic elections through which members of the Church of Sweden choose representatives to the church's three levels of governance: the parish assembly, the diocesan council, and the General Synod. These elected bodies make decisions on matters such as worship, teaching, social and diaconal work, environmental initiatives, property, and finances. All eligible church members 16 years or older have the right to vote, and the election is conducted using a proportional system with ballots submitted either in person or by advance voting methods authorized by the church (Svenska kyrkan, 2025a).

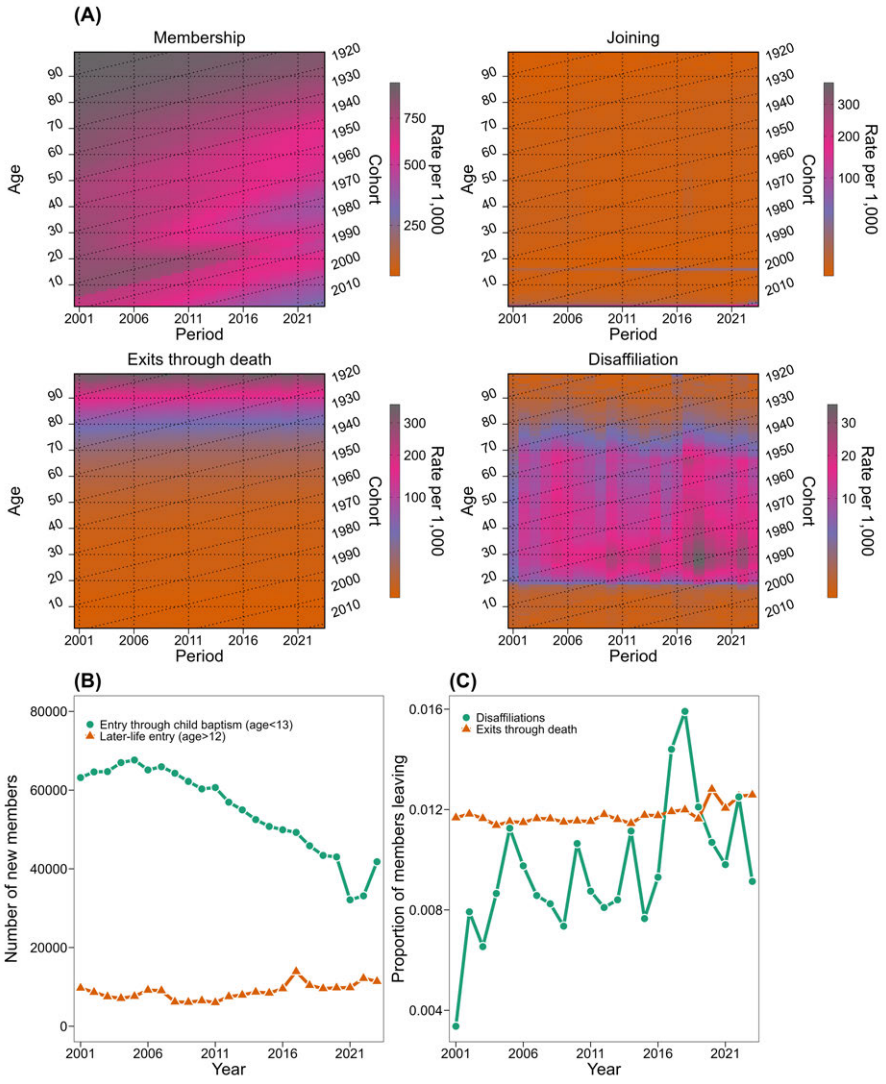


Figure 3: Inflow and outflow dynamics in the Church of Sweden, 2000–2023. (A) Lexis surface plots of membership, joining, and disaffiliation. Shading represents rates per 1,000 at risk, with darker colors indicating higher intensities. Membership and joining rates are calculated relative to the total population, whereas death and disaffiliation rates are calculated relative to members. Diagonal dotted lines mark birth decades (cohort effects), horizontal dotted lines indicate age groups (age effects), and vertical dotted lines indicate calendar years (period effects). Age is capped at 99 due to data sparsity. (B) Annual number of new members, separated into child baptisms (ages<13) and older joiners (ages>12). (C) Annual proportions of members leaving, distinguishing active disaffiliations from exits due to death. Data from Swedish administrative registers.

Lexis surfaces, while subtle diagonal shifts reflect gradual improvements in longevity since 2001. Unlike joining or leaving, deaths do not show any pronounced period effects, but instead provide a steady demographic baseline of decline that compounds the effects of reduced entry and concentrated exits.

Together, these patterns suggest that the decline of the Church of Sweden reflects the combined impact of reduced entry through baptism and increased exit through active leave, compounded by an aging membership base. Deaths steadily decrease overall membership, while younger cohorts are less likely to join and more likely to leave if they do. These processes of reduced inflow and increased outflow jointly accelerate the decline of the Church. In short, the decline in Church of Sweden membership mirrors broader secularization trends while also reflecting institutional and demographic changes specific to the Swedish context. The transition from automatic to voluntary affiliation, the rising rates of active disaffiliation, and an aging membership base have together produced a sustained and accelerating the decline of the Church of Sweden's membership.

Religiosity and the Church of Sweden

The apparent contradiction between Sweden's historically high rates of church affiliation and its status as one of the world's most secular countries has been widely discussed in the academic literature. Survey data consistently document low and declining levels of individual-level religiosity, as well as infrequent participation in religious practices (see Figure 4; Bäckström et al. (2004), Kasselstrand (2015), and Zuckerman (2008)). As shown in Figure 4, members of the Church of Sweden report lower levels of religiosity and attend religious services less frequently than individuals affiliated with other religious organizations, although they remain more religiously active than the non-affiliated population. Both religiosity and attendance show a consistent, albeit modest, decline between 2008 and 2022 among all affiliation groups. In particular, self-reported high religiosity is more prevalent than regular attendance, highlighting that personal belief does not necessarily translate into religious practice.[26]

Despite the low and declining levels of individual religiosity and religious practice, participation in Christian rituals performed by the Church of Sweden remains comparatively common. Approximately 25% of marriages in Sweden are conducted as church weddings, approximately 60% of funerals have religious ceremonies organized by the Church, approximately 35% of newborns are baptized, and around 30% of adolescents undergo the

[26]However, as Stolz with colleagues (2025) and Voas (2008, 2009) show, this difference between belief and behavior is not anomalous, but rather an expected part of the secularization practice, where religious practice typically erodes before personal belief and followed lastly by affiliation.

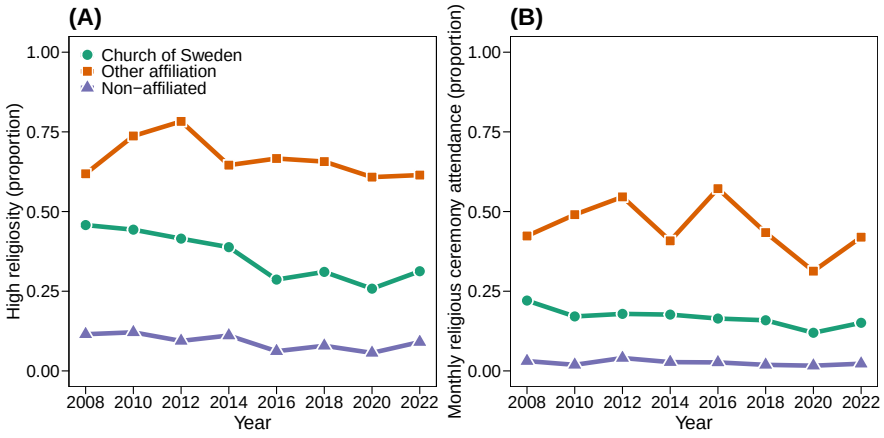


Figure 4: Religiosity among members of the Church of Sweden, 2008–2022. Proportions are estimated with weights recommended by the European Social Survey. (A) Proportion of respondents who report a strong religious belief, by religious affiliation. (B) Proportion of respondents who attend services at least monthly, by religious affiliation. Data from European Social Survey (2023), n = 13,572.

Church's confirmation, though all of these practices have decreased steadily over time (Straarup, 2015; Svenska kyrkan, 2025b). Compared to other highly secularized countries, these figures remain strikingly high. This discrepancy highlights that affiliation and ritual participation may persist for cultural or social reasons, even in the absence of strong personal belief.

This paradoxical situation is often referred to as the "Nordic paradox" (Bruce, 2002) and is explained as a form of "fuzzy fidelity" (Voas, 2009), referring to individuals who maintain a casual and largely nominal attachment to religion: neither fully committed believers nor entirely secular, they retain some loyalty to religious traditions despite religion playing only a minor role in their lives. In other words, individuals can "belong without believing" (Demerath, 2000; Storm, 2009; Voas & Crockett, 2005), suggesting that non-religious attitudes can still maintain religious affiliation

Taken together, these patterns indicate that the declining membership of the Church of Sweden cannot be explained by individual belief or religious practice alone, as both have long remained at comparatively low levels. Instead, the paradox suggests that personal religiosity is only weakly linked to collective membership trends and that social interdependencies, shaped by processes of social influence, can play a crucial role. This makes the Church of Sweden an ideal case for investigating how social influence drives individuals' decisions to join, leave, or remain a member of a religious organization.

Predictive factors of religious membership changes in Sweden

To further contextualize the empirical case, analyses of changes in religious membership in Sweden were conducted. These analyses focused on identifying different types of affiliation behavior and the sociodemographic factors that predict them. An inductive data-driven approach was employed to uncover clusters of affiliation patterns in the data and to examine individual-level characteristics associated with each cluster.

More precisely, a sequence analysis approach was used. Sequence analysis is a longitudinal method that identifies the states individuals occupy over time and the transitions between those states. It enables a dynamic understanding of affiliation patterns by analyzing sequences over time rather than isolated events (Abbott, 1995; Aisenbrey & Fasang, 2010). In this analysis, religious membership is observed longitudinally, capturing whether individuals remain in the same state or move between different religious organizations. The analysis uses Swedish register data covering the entire population, restricted to those present in 2001 and followed through 2023, yielding a total sample of 8,951,429 individuals.

As shown in Figure 5, individuals can occupy one of four states: (1) affiliated with the Church of Sweden, (2) affiliated with another religious organization, (3) non-affiliated, or (4) deceased or emigrated[27]. Figure 5A reveals a clear pattern: membership in the Church of Sweden has declined steadily, while both non-affiliation and affiliation with other religious organizations have increased. A considerable share of this decline reflects attrition through death or emigration. Figure 5B further shows that religious memberships in Sweden are highly stable, with annual transition rates below 5% for all groups. Among members of the Church of Sweden, the most common transition is death or emigration (1.38%), followed by disaffiliation (1.04%), and lastly, direct switches to other religious organizations are rare (0.02%). Non-affiliated individuals are the most stable group (98.17% remain non-affiliated), with death or emigration accounting for 1.10% of exits, followed by joining the Church of Sweden (0.42%) or another organization (0.31%). Those affiliated with other religious organizations exhibit the highest mobility: 3.16% become non-affiliated annually, with most other exits due to death or emigration. Overall, religious affiliation in Sweden is characterized by high stability but unequal mobility, individuals in other religious organizations move most often, followed by members of the Church of Sweden, while the non-affiliated are least likely to change status.

The sequence analysis generated individual-level affiliation trajectories for 2001–2023, capturing transitions between religious affiliation states. In total, 46,320 unique sequences were identified. To group these trajectories

[27] The categories *deceased* and *emigrated* are combined due to the relatively small number of emigrants, and both indicate individuals who leave the population for demographic rather than behavioral reasons.

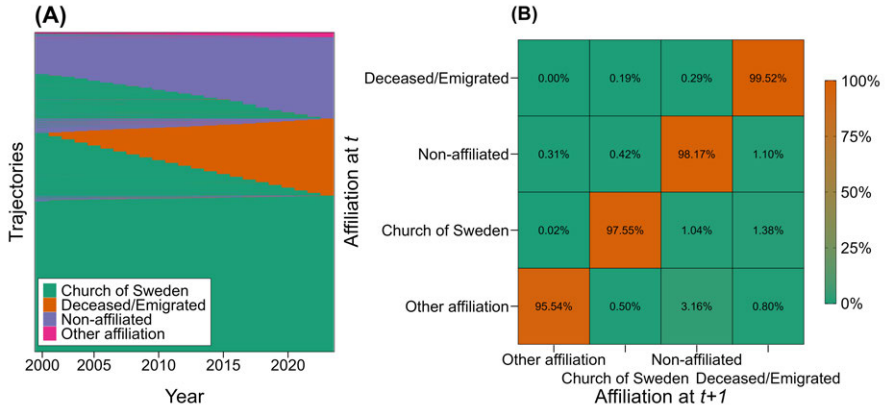


Figure 5: Religious affiliation dynamics in Sweden, 2001–2023. (A) Affiliation trajectories. (B) Transition rates across religious affiliation states. The data include all individuals who resided in Sweden in 2001. Data from Swedish administrative records.

into broader patterns, a clustering technique was applied, specifically, Partitioning Around Medoids (PAM) (Abbott & Tsay, 2000). The optimal number of clusters, determined by standard cluster quality indices, was four. These four clusters represent distinct affiliation trajectories throughout the study period. For interpretative clarity, clusters were manually labeled based on their characteristic transition patterns.

The first cluster consists of individuals who began as members of the Church of Sweden but left through death or emigration rather than active disaffiliation, representing 15.3% of the population. The second cluster contained 7.8% of the population, capturing those who actively left the Church and became non-affiliated during the observation period. The third and largest cluster (58.5%) includes individuals who remained members of the Church of Sweden throughout the time period. Finally, the fourth cluster captured those who entered the period as non-affiliated or affiliated with another religious group and remained so, accounting for 18.4% of the population. Figure 6 visualizes these trajectories, with each panel showing how members of each cluster transitioned between affiliation states over time.

To estimate the predictors of cluster membership, the four affiliation clusters were used as an outcome in a multinomial logistic regression model. Because the trajectories span more than two decades, during which many individual characteristics may vary, predictors were limited to variables that were either time-invariant or could be meaningfully summarized across the full time period. Three sets of predictors were distinguished. First, time-invariant characteristics included gender, birth year (centered on 2000 and divided by ten for comparability and interpretability reasons), country of birth, and parental country of birth. Second, socioeconomic status and social

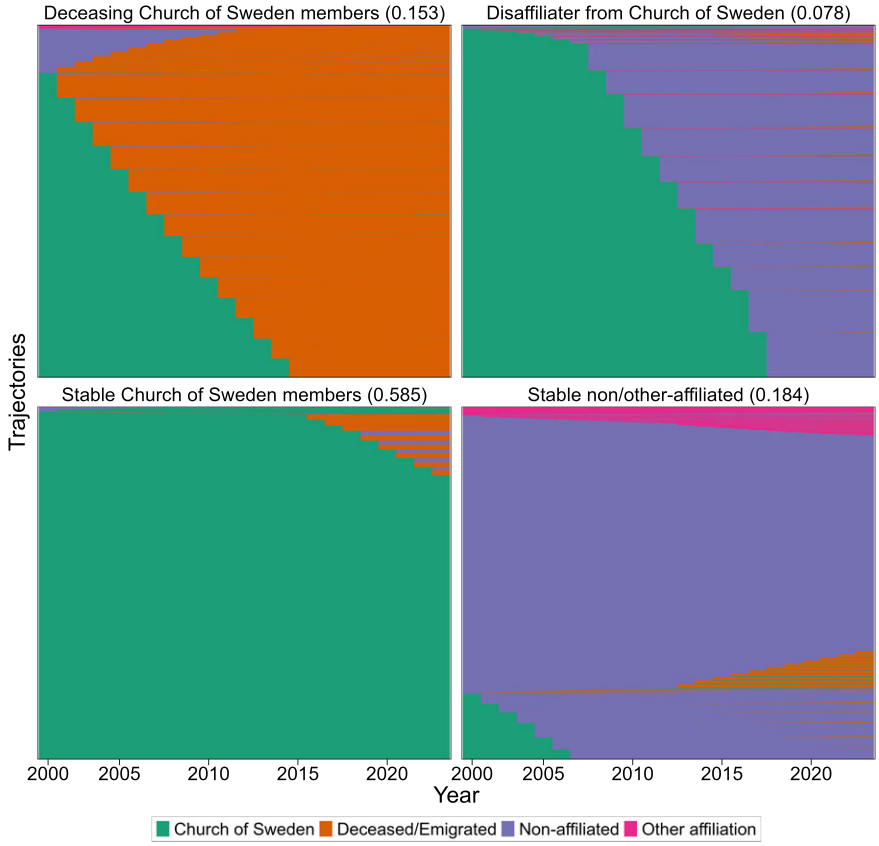


Figure 6: PAM clusters of religious affiliation behavior, Sweden 2001–2023. Affiliation trajectories over time within each cluster. Panel titles display the author-assigned cluster label and the cluster size (as a proportion). The data include all individuals who resided in Sweden in 2001. Data from Swedish administrative records.

instability were proxied by several variables, including the highest education attained by 2023, the median annual income decile position and its variability (standard deviation), the average proportion of days unemployed per year, the average annual frequency of housing changes, and the proportion of years spent residing in urban areas. Third, family-formation indicators included parity and marital status in 2001, as well as binary indicators for whether these statuses changed during the period. Together, these predictors capture a broad set of sociodemographic and life-course factors known to be associated with religious behavior.

Figure 7 presents the results of the multinomial logistic regression model, which show which characteristics are most strongly associated with particular cluster affiliation trajectories. Migration background emerges as one of

the most salient predictors: individuals born abroad, or with foreign-born parents, are more likely to belong to the stable non-affiliated cluster and less likely to remain in the stable members cluster. For the other two clusters, those who disaffiliate and those who leave through mortality, both the country of birth of an individual and his parents are less predictive. In summary, both stable membership and active disaffiliation are predominant patterns among Swedish-born individuals with Swedish-born parents.

Although migration background stands out as the strongest predictor, other characteristics also play an important role. Proxies for socioeconomic status further differentiate affiliation trajectories: individuals with higher education and stable, higher incomes are more likely to remain in the Church of Sweden, whereas those experiencing frequent unemployment, greater income instability, or high residential mobility are overrepresented in the disaffiliated and stable non-affiliated clusters. Importantly, not all socioeconomic indicators matter; urban residence shows no clear predictive power once other factors are accounted for. Family-formation indicators also shape trajectories. Individuals who were married in 2001 and remained so are more likely to stay Church of Sweden members, while those who divorced, never married, or remained childless are more likely to be in the disaffiliated and stable non-affiliated clusters. Taken together, these results indicate that long-term affiliation trajectories are structured not only by migration background but also by broader dimensions of socioeconomic stability and family-formation behavior.

Taken together, these results show that the likelihood of remaining in the Church of Sweden is predicted by several sociodemographic factors, with the country of birth (both the individual and the parents), higher education, economic stability, and a stable family life emerging as the strongest predictors. In contrast, disaffiliation and stable non-affiliation share overlapping determinants, particularly migration background and indicators of socioeconomic or family instability, but differ in emphasis: migration is more decisive for stable non-affiliation, whereas social instability more strongly predicts active disaffiliation. In general, these analyses demonstrate that long-term religious affiliation trajectories are predicted by sociodemographic characteristics.

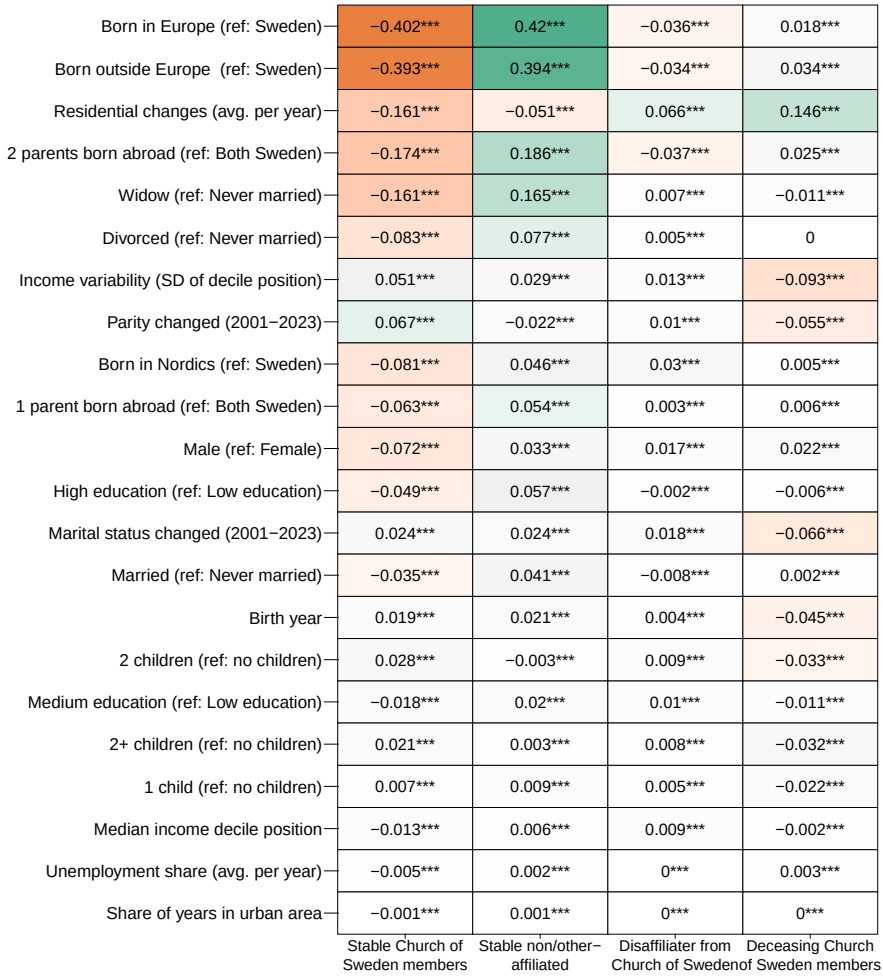


Figure 7: Predictors of PAM clusters of religious affiliation behavior, Sweden 2001–2023. Results from a multinomial logistic regression are shown as predicted probabilities of cluster membership. Green values indicate higher probabilities of cluster membership, and orange values indicate lower probabilities, with color intensity reflecting effect size. White indicates effects close to zero. Cell labels report predicted probabilities. Asterisks denote statistical significance (*p<0.05, **p<0.01, ***p<0.001). The data include all individuals who resided in Sweden in 2001. Data from Swedish administrative records.

Appended Essays

Essay I. The Rise and Decline of Churches: The Role of Social Influence in the Membership Decline of the Swedish Lutheran Church

Co-authored with Peter Hedström

This essay investigates how social influence contributes to the decline in church membership, with particular attention paid to heterogeneity in susceptibility arising from religious embeddedness. Previous research has primarily focused on predictors that describe the individual themselves, such as age, education, and urban residence, while largely neglecting the role of social influence. However, the dynamics of church membership are not only shaped by the individual's own traits, but also by their exposure to the behavior of others in their social environments. Against this backdrop, this essay examines whether exposure to individuals leaving the Church of Sweden increases one's own likelihood of leaving, and how these micro-level behaviors aggregate into macro-level organizational decline.

To investigate this, Swedish full-population register data covering individuals from 2002 to 2023 are used, together with a dynamic matched-sampling design to estimate the causal effect of exposure to others leaving the Church of Sweden. Matching is performed on a wide set of sociodemographic and network-related variables, including inferred network positions to capture unobserved heterogeneity. Religious embeddedness is introduced as a moderator, capturing the normative pressure of belonging, and thereby conditioning how strongly exposure translates into disaffilia-

tion. These micro-level estimates are then used as the technical core in an agent-based simulation model that explores how varying the strength of social influence affects the trajectory of the Church's membership. The simulations include counterfactual scenarios in which social influence is blocked or amplified, as well as scenarios in which the moderating role of religious embeddedness is either blocked or amplified.

The findings show a clear dose–response relationship: individuals are increasingly likely to leave the Church as more of their social ties do so. This effect is especially pronounced among those with weak religious embeddedness, the extent to which individuals have social ties to other church members, highlighting their moderating role in shaping susceptibility to social influence. Heterogeneity in tie types is also observed, with kinship exerting the strongest influence, followed by colleagues and, lastly, neighbors. The simulation results indicate that social influence has had a substantial impact on the decline of the Church: when social influence is blocked, the decline is slower, while amplifying the social-influence effect produces a steeper decline in membership. However, the results also show that religious embeddedness slowed the rate of decline. The essay thus demonstrates that social influence, conditioned by religious embeddedness, not only shapes individual decisions but also plays a central role in religious decline in the aggregate.

Essay II. Religious Pluralism and Social Networks: How Exposure to Religious Pluralism through Social Ties Influences Baptism Decisions

This essay continues the body of research in sociology on the relationship between religious pluralism and religious participation. While some theories propose that pluralism leads to decreased participation, others argue that it increases participation. Empirical evidence remains sparse and inconclusive, and previous research has been criticized for assuming that societal-level pluralism directly influences individual behavior. Adopting a social network perspective, the analysis presented here emphasizes that individuals are more likely to be influenced by the religious pluralism to which they are exposed through their social ties than by pluralism at the societal level.

To empirically investigate this, the essay examines how the decision of parents to baptize their child in the Church of Sweden is affected by the religious pluralism to which they are exposed through their social ties. Data from the Swedish full-population register covering all parents with children born between 2002 and 2022 are used. A machine learning–based dynamic inverse probability weighting design is implemented, with weights estimated using Bayesian Additive Regression Trees (BART) to adjust for observed confounders. Furthermore, the moderating role of religious cross-pressure, conceptualized as an intra-individual form of religious uncertainty

arising when parents do not share the same religious affiliation, is also investigated.

The findings show that higher levels of network exposure to religious pluralism are associated with a lower probability of baptizing a child, providing evidence of a negative effect of religious pluralism on religious participation. This negative effect is amplified when individuals are exposed to religious cross-pressure, i.e., when the parents do not share a religious affiliation. The analyses also show that the religious affiliation of the mother has a stronger direct influence on the decision about baptism compared to the father's. However, the moderating effect of religious cross-pressure is somewhat stronger when the father has a different religious affiliation than the Church of Sweden. These findings contribute to the literature by demonstrating that religious pluralism operates through social ties and that susceptibility to religious pluralism is heightened when intra-individual religious uncertainty is present. In doing so, the essay expands existing theories of religious pluralism by integrating network-based exposure and highlighting heterogeneity in its effects.

Essay III. Bound by Ties? How Costs and Networks Shape Religious Participation Patterns

This essay investigates why individuals continue to participate in costly religious practices despite limited apparent benefits. Although rational choice theories predict that higher costs should deter participation, empirical evidence shows that many remain committed nonetheless. The concept of religious embeddedness—the extent to which individuals have social ties to others bearing the same cost—is introduced to explain this puzzle. Religious embeddedness is proposed to buffer individuals against the deterrent effect of costs, making those who are highly religiously embedded to tolerant higher costs.

The analysis uses full-population Swedish register data for the years 2001 to 2023, focusing on the Church of Sweden, where members pay an income-based church fee. To adjust for unobserved confounding factors, such as underlying religiosity, node embeddings derived from the observed network are incorporated into the models to adjust for network assortativity. Logistic regression models show that higher fees increase the probability of disaffiliation but that this effect is substantially weaker among individuals with higher levels of religious embeddedness, measured through kinship, work, and neighborhood ties.

To assess the aggregate implications, an agent-based simulation model is calibrated with empirical estimates and observed network structure. The simulations reveal two dynamics. First, religious embeddedness dampens membership decline: without it, the church membership decline would be considerably steeper. Second, embeddedness contributes to increasing spa-

tial differences in religious participation, as strong local networks sustain high religious embeddedness in some areas, while decline accelerates in others. Taken together, these findings show that embeddedness dampens religious decline while simultaneously amplifying spatial differences in religious participation.

This essay contributes to research on religion, social networks, and organizational membership dynamics by showing how reactions to costly practices are conditioned by social ties between individuals. It also demonstrates how combining statistical modeling with empirically grounded simulations can be used to identify mechanisms linking individual behavior to collective outcomes.

Discussion and Conclusions

From the perspective of analytical sociology, this dissertation has examined the role of social influence in shaping the membership dynamics of religious organizations. This dissertation demonstrates how individuals' decisions to join, leave, or remain members of religious organizations are conditioned by the behavior of their social ties and how these micro-level interactions aggregate into the collective membership trajectories of religious organizations. Exposure through social networks can both dampen and accelerate organizational decline, though the effects vary between individuals and social contexts. By linking religious behavior to the structure of social networks, the dissertation illustrates how social interdependencies among individuals generate membership dynamics that, in turn, shape patterns of organizational growth and decline.

Together, the dissertation contributes to the sociology of religion in at least three ways. First, it advances the understanding of how social influence shapes the membership dynamics of religious organizations and, more broadly, processes of secularization. Whereas much existing research explains religious decline in terms of individual-level traits or macro-level processes of modernization, the essays in this dissertation demonstrate that religious organizational growth and decline must also be understood through meso-level networks and social environments. Essay I shows that church disaffiliation is predicted not only by sociodemographic factors but also by exposure to others leaving the Church of Sweden. Essay II extends this logic to religious pluralism, demonstrating that pluralism operates through social ties and that both relational and receiver characteristics condition its

effects. Essay III illustrates how religious embeddedness shapes responses to costly religious practices: while mitigating religious decline, it simultaneously increases spatial differences in religious affiliation. Thus, the dissertation demonstrates that the membership dynamics of religious organizations cannot be fully understood without accounting for how social influence shapes religious behavior at the micro level.

Second, this dissertation demonstrates the importance of taking into account the complete social network structure when analyzing religion. In all essays, the analysis goes beyond the traditional focus on isolated dyads or egocentric exposure to examine how social influence operates across multiplex networks spanning kinship, neighborhood, and workplace ties. In the empirical analyses, these networks are often translated into egocentric measures of social influence to enable individual-level analysis, whereas in the simulations, the full network structure is utilized to model how interdependencies unfold and shape macro-level membership dynamics. This approach directly addresses the critique raised by Iannaccone and Makowsky (2007), who argued that reducing social influence to egocentric exposure neglects the broader network structure of ties and the aggregation of micro-level behaviors into macro-level religious patterns. Their theoretical model demonstrated how persistent regional clustering of religiosity can emerge from simple local rules of conformity and identity, even under high levels of migration. By using register data to construct population-wide networks, this dissertation provides an empirical counterpart to such theoretical models, directly linking individual religious behavior to collective organizational change and placing the network perspective at the center of the analysis.

Third, this dissertation demonstrates that secularization is shaped not only by individual belief change or institutional and societal transformations, but also by the dynamics of social influence. The findings suggest that social influence interacts with ongoing processes of religious change; sometimes sustaining weak religiosity by keeping individuals nominally affiliated despite low personal conviction, and at times accelerating exit when disaffiliation spreads through social networks. Thus, depending on the network-specific exposure, social influence can slow the overall decline by reinforcing affiliation, yet the same social influence can also accelerate it when cascades of exit diffuse through the network. These results highlight that secularization is neither uniform nor linear, but contingent on the configuration of social ties and the interdependencies they generate. In this way, the dissertation advances a more relational and dynamic account of secularization, showing how micro-level processes of social influence can both sustain and destabilize collective religious commitment.

This dissertation also contributes to theories of social influence by demonstrating how micro-level interdependencies scale into macro-level dynamics, reinforcing a foundational sociological insight: macro-level patterns cannot be inferred directly from individual behavior alone (Durkheim, 1912;

Granovetter, 1978; Merton, 1948; Simmel, 1957; Tarde, 1903). Aggregate outcomes emerge from social interdependencies rather than additive individual choices, underscoring the importance of incorporating social influence and network structures into analyses of collective dynamics (Anderson, 1972; Salganik et al., 2006). Beyond the sociology of religion, these findings also have a broader relevance to understanding secular collective action and membership-based organizations. As illustrated in Essay III, in-group embeddedness can similarly moderate cost-induced disengagement in, for instance, civic, political, and voluntary domains, as well as in digital communities, unions, and professional associations. In doing so, the dissertation contributes to a broader understanding of how micro-level interdependencies shape collective action and organizational growth dynamics across different social domains.

Finally, this dissertation contributes methodologically to sociology and computational social science by demonstrating how conventional statistical models and machine-learning techniques can be integrated with simulation-based approaches to study social influence. It shows how empirically calibrated agent-based models (ABMs) can be used to connect micro-level behavior with macro-level outcomes. In Essays I and III, ABMs are used to assess how variations in the strength of social influence or in the moderating role of embeddedness would have altered the Church of Sweden's membership trajectories. Across all three essays, computational social science methods are applied to exploit large-scale register data: node embeddings are used to capture structural information in Essays I and III, while Bayesian Additive Regression Trees (BART) weighting is applied in Essay II to estimate the causal effects of exposure to pluralism. Taken together, these approaches illustrate how statistical modeling and simulation can be fruitfully combined to evaluate how micro-level behavior and interdependencies scale into macro-level dynamics, providing a methodological template applicable far beyond the sociology of religion.

The findings and conclusions of this dissertation suggest several avenues for future research. One promising direction is to examine the timing of social influence from a life-course perspective. Previous research has shown that adolescence and early adulthood constitute critical periods for peer effects and the formation of long-term religious trajectories (Myers, 1996; Stolzenberg et al., 1995; Te Grotenhuis & Scheepers, 2001; Voas & Crockett, 2005). Assessing when influence occurs throughout the life course and how its effects persist over time is an important next step. Another promising line of inquiry concerns the repetition and duration of exposure. Repeated exposures to religiously affiliated peers, or, conversely, with individuals who left their religious organization, may exert stronger cumulative effects than isolated instances of exposure.

Second, while this dissertation has focused primarily on religious belonging and formal organizational membership, future research could extend the

analysis to religious practices and beliefs. Recent work by Stolz and colleagues (2025) suggests that secularization unfolds in three stages: first, a decline in religious participation; second, a decline in the perceived importance of religion; and finally, a decline in belonging and formal affiliation.[28] In this sense, this dissertation primarily captures the final stage of secularization, one that is comparatively less demanding and less costly for individuals to sustain. Future research could therefore investigate how social influence operates in the earlier stages of this secularization process, when practices and the salience of belief remain central, as these may involve stronger commitments and distinct social influence dynamics. Such work would provide a more comprehensive understanding of how social influence shapes the full trajectory of secularization.

Third, the Swedish context and the case of the Church of Sweden raise important questions about generalizability. As discussed, Sweden is often described as a "Nordic paradox", combining high levels of formal religious affiliation with very low levels of practice and belief (Bruce, 2002). In addition, the historical status of the Church of Sweden as a state church, along with the continued collection of membership fees through the tax system, makes the affiliation relatively low-cost and low-effort. In this setting, where membership is often a default opt-out choice and carries symbolic cultural meaning rather than religious significance, social influence may primarily operate through salience or reminder mechanisms, for instance, when individuals are prompted to reconsider their membership after observing peers disaffiliate. However, in other contexts, where religious commitment entails higher costs or stronger obligations, the dynamics of social influence are likely to differ. In such cases, social influence can act through belief change or through costly disaffiliation decisions, requiring repeated reinforcement, authority-based influence, or normative sanctions, and producing social-influence dynamics distinct from those observed in Sweden. Future research should therefore apply the network approach developed here in different institutional and cultural contexts to assess both the scope conditions and the generalizability of these findings.

Fourth, while this dissertation constructs multiplex networks for the entire Swedish population based on shared kinship, workplace, and neighborhood attributes, often these ties should not be equated with actual social ties.[29] What is observed are shared affiliations that increase the likelihood of interaction. For instance, two individuals working in the same organization are linked as colleagues even if they never interact personally. In this

[28] This is in line with earlier work by Voas (2008, 2009), suggesting a transitional phase of secularization where nominal affiliation is the last religious dimension individuals shed.

[29] While workplace and neighborhood ties represent potential opportunities for interaction rather than direct social relationships, kinship ties can generally be considered actual social ties, as they denote formally recognized family relationships that typically involve social interactions.

sense, the social networks analyzed here should be understood as arenas of potential exposure rather than direct records of social influence. This approach offers a valuable baseline for identifying the structural contexts in which social influence may occur, but future research should use data that more directly capture actual social ties and interaction, such as surveys or digital trace data, or integrate such data with register data to improve our understanding of how and when social influence is transmitted.

Fifth, the agent-based simulation models used in this dissertation necessarily simplify the social systems and processes under study. Although the models are empirically calibrated, they are calibrated only to the parameters and exposures of interest, leaving out potentially important heterogeneity in individuals' susceptibility to social influence. This is both a strength and a limitation. The parsimony of ABMs makes it possible to isolate social mechanisms and to explore counterfactual scenarios that would otherwise be impossible to assess, yet it also means that certain complexities remain unmodeled. Future work could develop more complex models that incorporate heterogeneous behavioral rules to refine our understanding of how micro-level influence scales into macro-level outcomes. However, such added complexity must be balanced against the need for explanatory clarity, ensuring that model complexity enhances rather than obscures the mechanisms under examination.

Notwithstanding these caveats, this dissertation demonstrates the value of integrating computational approaches with the perspective of analytical sociology in the study of religion. By combining a social network perspective, statistical modeling, machine-learning techniques, and empirically calibrated simulation models, this dissertation shows how religious change can be understood as a phenomenon emerging from social interdependencies among individuals embedded in social networks. Rooted in the tradition of analytical sociology, this approach emphasizes mechanism-based explanations and the micro–macro link. In addition, it demonstrates how the tools of computational social science can be harnessed to advance the sociological study of religion, secularization, and organizational dynamics. Grounding these tools in analytical sociology makes it possible to subject theoretical mechanisms to empirical scrutiny while maintaining the distinction between individual-level behavior, meso-level networks, and macro-level outcomes. In this way, computational methods become not merely cutting-edge techniques, but powerful instruments for advancing sociological theory and deepening our understanding of religion, secularization, and collective social dynamics more broadly.

In summary, this dissertation has sought to deepen the understanding of how religious organizations grow and decline, emphasizing social influence as a central factor. Using full-population register data and computational social science methods, it has been possible to study religious change as a collective phenomenon while also taking into account the individual-

level dynamics and interdependencies that underlie organizational trajectories. Empirical analyses document several important findings: how social influence shapes religious membership behavior, how religious pluralism is transmitted through networks, and how embeddedness conditions responses to costs, combining advanced statistical techniques with empirically calibrated simulation models. Importantly, this dissertation should be viewed as a point of departure for future research on how interdependent behaviors scale into collective outcomes. Several potential directions for such work have been outlined, including the extension of the analysis of social influence to secular organizations and the application of computational methods to other social systems. Developing more powerful tools for explaining the dynamics that generate religious growth and decline will equip social scientists with a more powerful framework to understand not only religious organizations but also broader processes of religiosity, secularization, and organizational change.

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Essays

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https://doi.org/10.3384/9789181183962

ESSAY I

Carlberg Larsson, Elis and Hedström, Peter. The Rise and Decline of Churches: The Role of Social Influence in the Membership Decline of the Swedish Lutheran Church. *Unpublished Manuscript*.

ESSAY II

Carlberg Larsson, Elis. Religious Pluralism and Social Networks: How Exposure to Religious Pluralism through Social Ties Influences Baptism Decisions. *Unpublished Manuscript*.

ESSAY III

Carlberg Larsson, Elis. Bound by Ties? How Costs and Networks Shape Religious Participation Patterns. *Unpublished Manuscript*.

FACULTY OF ARTS AND SCIENCES

Linköping Studies in Arts and Sciences No. 930 (2026)
Institute for Analytical Sociology Dissertation Series No. 13
Department of Management and Engineering

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