

Innovation Crisis in Public Theater? A Longitudinal Study of Theaters in North Rhine-Westphalia, 1995-2018.

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English Version

Abstract: This paper examines cultural innovations in German public theaters using North Rhine-Westphalia (NRW) as the most populated region as an example. Though existing analyses, including social structure-centered audience research, have focused on the demand side, diagnosing a steady decline and aging of the cultural audience, our analysis addresses the supply side, especially the number of premieres and first performances and their adoption into the repertoire. The results show that recent efforts by public theaters to increase both the number of venues and the number of plays on the municipal or regional level have not been sufficient to stabilize the declining audience. Too few new plays are scheduled, even fewer of which make it into the repertoire. Our results suggest that theaters can retain their capability for renewal only by placing significantly more new plays and attracting new audience members. With regard to such renewal, decentralized competition as a characteristic of the NRW theater landscape seems a favorable institutional context.

Keywords: Theater, Premieres, Innovation, Cultural Organizations, Organizational Field

1. Introduction

This paper investigates innovation activity in the publicly funded theater sector. It is intended as a contribution to the empirical-analytical tradition of cultural-sociological research addressing cultural diversity and innovation. Two research paths can be distinguished. The first path goes back to DiMaggio and Stenberg (1985a, 1985b) and focuses on *nonconformity*. The other path includes authors who investigate *new plays*, such as Castañer and Campos (2002), Kremp (2010), or Gerlach-March (2011). This paper contributes to the second research path.

In the first research path, *nonconformity* is used synonymously with 'diversity'. However, it typically does not refer to the diversity of the creative artists in terms of ethnic or regional origin or sexual identity (e.g., Gerhards et al. 2020; Sharifi 2014), but the diversity of the collectively created cultural products within organizational fields (Dowd et al. 2002; Durand and Kremp 2016; Heilbrun 2001; Jensen and Kim 2014; Kim and Jensen 2011). In the second research path, cultural innovations are understood as the adoption of new authors (or composers) and their plays (Castañer 2014; Gerlach-March 2011; Kremp 2010). Both research paths are founded on a concept of culture that postulates an everyday understanding of culture and includes fields such as visual arts, classical music, and literature, along with theater and opera (Adloff et al. 2014; Reckwitz 2015).

The innovation activity of the theater sector in Germany has, with few exceptions (Gerlach-March 2011; Neligan 2006), been scarcely investigated, and quantitative longitudinal analyses have thus far been lacking. This is a gap in the research that we hope to partially close with this article. The focus of our study is on publicly funded theaters in North Rhine-Westphalia (NRW). We selected NRW because it is Germany's most populous federal state and has the highest spatial density of public theaters in the country. Although NRW comprises only one state in Germany, its 18 million inhabitants make it comparable to the Netherlands, a potentially interesting case for future comparisons. Furthermore, the depletion of public theatergoers during the observation period (1995-2018) was twice as high in NRW than in Germany as a whole, which can be interpreted as signaling a crisis (see section 2). Insights in this regard are provided by Reuband (2005, 2013, 2016), who showed with the help of audience surveys in Cologne and Düsseldorf, the two largest cities in NRW, that opera, theater, and concert audiences are growing older and not being replaced by younger cohorts.

Audience aging and subsequent long-term decline has been increasingly addressed in the arts sections of national newspapers since the 2000s (e.g., Schindhelm 2000; Schlaffer 2014; Sucher 2001). These pick up on an assessment of the situation that had already been articulated in the 1980s: "Theater will die when its audience dies off" (Henrichs 1984). Interestingly, the arts

pages also mention the aging of theater critics (e.g., Makowsky 2001), the reluctance to experiment with stage plays, and non-sold-out premieres (e.g., Rossmann 2006; Stadelmaier 2002). Together with the call for more new plays (e.g., Stephan 2003), a dual assessment is found in the arts pages; not only is the audience vanishing, but innovation in the theater industry is leaving much to be desired.

Cultural sociological research focused on social structure and lifestyle, particularly in the German-speaking world, has traditionally addressed the question of how social status and cultural taste are related and, in this context, has mainly dealt with the opposing theses of two key works by Bourdieu (1984) and Peterson (1992) (Gerhards et al. 2013; Kunißen et al. 2018; Rössel 2006; Rössel et al. 2017). In this regard, comprehensive population and audience surveys provide a rather different picture of current and potential audiences (e.g., Glogner-Pilz and Lutz 2011; Renz 2014; Reuband 2017b; Tauchnitz 2004). On the other hand, the question of the extent to which cultural practice can renew itself and access new audience strata has hardly been addressed in German cultural sociology. Instead of performing the same plays that generate less and less demand, theaters could renew their repertoire by staging new plays and tap into new audiences in the medium- and long-term. However, empirical findings on precisely this consideration are lacking. Therefore, this paper examines the extent to which new plays are staged and can establish themselves in the repertoire.

Before presenting the current state of research in Section 3 and using it to form hypotheses, Section 2 will outline the structure of the NRW theater sector compared to Germany as a whole. The data set and analytical methods used are described in Section 4, followed by a presentation of the empirical findings in Section 5. Section 6 discusses the findings and draws conclusions.

2. Structural data on the public theater sector in NRW

Public theaters are defined by the German Theater and Orchestra Association (Deutscher Bühnenverein, DBV) as “standing, [...] performing theaters and state theaters (traveling theaters) with their own ensembles, but not including touring theaters or amateur theaters (fairy tale theaters, home theaters), as well as variety theaters and cabarets (...) whose legal and/or economic sponsors are states, municipalities, associations of municipalities, regardless of the legal form under which they are operated” (DBV 2014a). Due to the large proportion of public theaters, the German theater sector has some special characteristics in terms of its organizational structure and the system of state support, including a decentralized geographical distribution, director-led management, multiple-branch theaters, and a large number of subscriptions. Moreover, compared to private theaters, public theaters tend to be larger and more hierarchical with artistic, as opposed to commercial, decision-makers playing a dominant

role (Gerlach-March 2011: 290-291; Neligan 2006: 1111). Accordingly, the model of theater funding in Germany is often described as *state-centered*. In Germany, both culture in general and theater in particular are primarily the responsibility of the regional states (Länder), with roughly half of public theater funding coming from the Länder and half from the municipalities (Abfalter 2010).

Table 1 presents key figures for all municipal and state-sponsored theaters in NRW since the 1995/96 season (for the justification of the analysis period, see Section 4). Multiple-branch theaters are also included. Looking at the key figures, it is evident that the number of theaters has remained fairly constant (Table 1). Furthermore, the number of performance venues in NRW increased from 91 (1995/96) to 128 (2017/18) (+41%), with a peak of 165 venues in the 2010/11 season. However, the number of seats available followed a reverse trend: the number per venue decreased from 484 (1995/96) to 320 (2017/18). Thus, the increase in the number of venues led to a reduction in the average number of available seats.

The trend across Germany was similar (Table A1). The average number of seats offered per venue decreased from 369 (1995/96) to 317 (2017/18). The figures show a trend toward many different venues per theater (in NRW from an average of 3.5 venues per theater in 1995/96 to 5.1 venues per theater in 2017/18) that have fewer seats available and are, therefore, easier to fill. As a result, theaters are able to stage more different plays at the same time. Because the seating capacities are comparatively small, it is easier to compensate for ‘failures’ (i.e., plays that attract a few spectators only).

Table 1 Figures for municipal and regional (Länder) theaters in NRW

	1995/ 1996	2000/ 2001	2005/ 2006	2010/ 2011	2015/ 2016	2017/ 2018
Number of theaters	26	26	25	26	26	25
Number of venues	91	108	134	165	135	128
Number of seats (in thousands)	44	43	46	49	41	41
On-site performances	8,963	9,532	9,342	9,910	9,784	9,784
Full-price/day tickets (in thousands)	1,034	1,100	1,024	1,131	1,200	1,077
Subscriptions (in thousands)	897	806	689	618	567	573
On-site audience size (in thousands)	3,617	3,415	3,190	3,107	3,016	2,864
Real operating revenue	62,734	54,895	54,301	56,680	55,802	54,612
Funding from private institutions	1,236	2,404	3,590	3,931	5,117	5,541
Real subsidies (federal + state)	366,671	341,801	325,334	324,618	323,505	343,351
Total revenue	436,266	402,727	389,258	400,563	392,289	410,754
Number of theaters ^a	22	21	22	22	22	22
Number of venues	85	108	131	165	131	131
Number of performances	5,797	5,917	5,665	5,979	6,107	5,123
Number of plays performed	361	364	473	508	514	454
Including first performances and premieres	42	49	38	69	63	58

Source: (DBV 1997-2019a, 1997-2019b) Financial data in thousands of euros, inflation-adjusted (base year: 1995). ^a The lower part of the table refers exclusively to the 22 theaters that are part of the analysis of repertoire decisions (Section 5.1).

As with the number of available seats, the number of events offered by theaters also decreased despite the increasing number of venues (Table 1). In NRW, the average number of performances per venue declined linearly from 98 (1995/96) to 77 (2017/18). This means that, despite the increased number of venues in 2017/18 (+37), one-fourth fewer events on average were staged there than in 1995/96 (−22). The trend for Germany as a whole was similar but less pronounced (Table A1). Overall, the average number of performances per venue across Germany decreased from 95 (1995/96) to 79 (2017/18). A decline in the frequency with which plays are performed was also observed. In the 22 theaters for which reliable data on works are available, the average number of performances per play decreased from 16 to 11 during the observation period (Table 1, bottom).

Audience size followed the decline in the number of theater events. In NRW, audience size decreased from 3.61 million (1995/96) to 2.86 million (2017/18), a drop of 20.8%. The decline

in seat rentals was especially dramatic, falling by 36%. This development was not offset by sales of full-price and day tickets, as this measure only increased by 4%. The figures show a slight shift from subscriptions to one-way ticket sales and that the decline in patrons is mainly due to the decline in subscriptions. This means that the regular audience base declined over the study period. It is possible that patrons no longer want to commit themselves to a subscription but want to spontaneously buy individual tickets for specific performances in which they are interested.

Audience surveys identified another reason for the declining number of patrons. It is mainly elderly people who buy subscriptions (Reuband 2017a, 2017b), but these people gradually die off and are not replaced to the same extent by younger patrons. Audience numbers nationwide also exhibited a downward trend. The number of theatergoers fell 9.8% from 20.55 million in 1995/96 to 18.53 million in 2017/18 (Table A1). In contrast to the number of patrons, the number of different plays performed (+38.1%) and the number of premieres (+25.8%) increased from 361 and 42 (1995/96) to 454 and 58 (2017/18), respectively. This may give the impression of a connection between the decreasing number of patrons in NRW and the increasing number of premieres and first performances or plays overall. However, this is not the case, as no significant correlations ($p < 0.05$) were found.

The decline in the number of theatergoers in NRW is also reflected in the total inflation-adjusted revenues of the municipal and regional (Länder) theaters. These decreased by 5.8% over the study period, with a greater decrease in operating revenue (-13%) than subsidies (-6.4%). In contrast to NRW, no financial decline was seen nationwide; the level of total inflation-adjusted theater revenue essentially remained constant. The clearest difference from NRW was the substantial increase in operating revenue (+20%), whereas subsidies only declined slightly (-2%) and funding from private institutions made up a proportion of the total revenue (1.2%), similar to NRW.

Summarizing these structural findings for NRW, and Germany as a whole, it is possible to identify a crisis of demand: despite the increasing number of plays, audience numbers fell. This finding is consistent with that of Haselbach et al. (2012) of a "cultural expansion" since the late 1970s, which resulted in an increase in supply. However, this does not answer the question of whether the cultural expansion of the theater sector is also accompanied by a renewal of the theater program in terms of premieres and first performances, or whether this expansion is sufficient to attract new audiences. The answers to these two questions are closely linked to cultural policies that must legitimize the financing of theaters from tax revenues vis-à-vis the public (Zimmer and Mandel 2021). Theaters are embedded in an institutional environment that comprises not only the economic, legal, and political framework, but also supply and demand

on the leisure, media, and entertainment markets (cinemas, television, streaming, games), with the corresponding competitive pressure to attract and retain audiences (Glogner-Pilz and Föhl 2011; Wagner 2005). Before examining this question empirically in Section 5, we present a theoretical overview and description of our hypotheses.

3. Theoretical overview and hypotheses

As mentioned in Section 1, two research paths exist in the cultural sociology literature that conceptualize the products of cultural institutions, such as theaters, concert halls, opera houses, and museums, in different ways. The first path harkens back to DiMaggio and Stenberg (1985a, 1985b) and focuses on the *nonconformity* of the repertoire. On the other path are authors, such as Castañer and Campos (2002), Kremp (2010), and Gerlach-March (2011), who analyze *new plays* in the repertoire (i.e., the adoption of new authors or composers and their works).

DiMaggio and Stenberg (1985a, 1985b) assume that innovativeness in theaters cannot be measured directly because there is no consensus on what is innovative, as concrete plays, authors, or theaters are difficult to place on an ordinal scale. Therefore, the authors analyze the degree of deviation of the repertoire of a given theater from the repertoire of all other theaters. The more the repertoire of a theater conforms to that of the other theaters, the more 'conformist' it is. Conversely, the more the repertoire of the focal theater differs from that of the other theaters, the more 'non-conformist' the performance practice is. Thus, conformity is operationalized as the deviation of a cultural organization from its organizational field. This deviation finds expression in DiMaggio and Stenberg's (1985a, 1985b) conformity index, which has been used either directly (Jensen and Kim 2014; Kim and Jensen 2011; Neligan 2006; O'Hagan and Neligan 2005; Tamburri et al. 2015) or in a modified form (Dowd et al. 2002; Durand and Kremp 2016; Pompe et al. 2011) in follow-up studies.

The results of the aforementioned studies show that repertoire conformity increases with increased dependence on the market and available seats, whereas access to potential audiences with high cultural capital reduces conformity (DiMaggio and Stenberg 1985b; Neligan 2006; O'Hagan and Neligan 2005; Tamburri et al. 2015). In contrast, heterogeneous audiences with different preferences are more likely to lead to a balance between conventional and unconventional plays in a theater's programming (Jensen and Kim 2014).

The conformity index has been criticized in the literature for assuming that a *nonconformist* performance practice is inherently innovative. Nonconformity, according to the critics, should by no means be equated with the performance of new, hitherto unknown composers or authors and their plays (Castañer and Campos 2002). In contrast to the definition based on DiMaggio

and Stenberg (1985a, 1985b), Castañer and Campos (2002) suggest using the concept of innovation common in science and technology studies and creativity research, which focuses on the play and dissemination of new knowledge and new artifacts. For example, this conceptualization is adopted by Kremp (2010), who focuses his analysis on performances of works by new composers in the field of symphony orchestras.

Furthermore, Gerlach-March (2011) distinguishes four types of "innovativeness" in theatrical plays on an ordinal scale: new interpretations of a repertoire piece (i.e., new staging); interpretations and reworkings for a theater play of texts or materials from a different medium, such as books or films (i.e., adaptations); translations and adaptations of a play from another language (i.e., first performances); and original new plays (i.e., premieres). She views premieres and first performances as most innovative (Gerlach-March 2011). However, diversity (opposite: conformity) and innovativeness (opposite: canon) cannot be directly equated, though diversity and innovativeness are relevant concepts from cultural sociological research. With our dataset, we analyze *new plays* (or *novelties*, in the form of original and first performances) and their success in the organizational field (i.e., *innovations*), but we do not make any statements about *conformity*.

The tradition established by DiMaggio and Stenberg (1985a, 1985b) has strongly influenced empirical research on cultural innovation over the last three decades (Otte 2017). However, the reflections of Castañer and Campos (2002) and the empirical investigations of Kremp (2010) and Gerlach-March (2011) suggest another interesting research path that meaningfully complements the previous empirical results in the tradition of DiMaggio and Stenberg (1985a, 1985b) and connects them to other fields of social science research, such as science and technology studies, as well as creativity research (Castañer 2014).

We now set out to formulate hypotheses on the basis of earlier studies from both research paths, which have so far been empirically tested for different cultural organizations, especially theaters, opera houses, and concert halls outside Germany, primarily in the United States and United Kingdom (Castañer 2014). Corresponding relationships will be examined for the public theaters in NRW for the period 1995-2018, and we take a pragmatic approach in our hypothesis testing, guided by the available data, most of which comes from the DBV (see Section 4).

The literature of the two aforementioned approaches in empirical cultural research usually includes two levels of analysis, which can be traced back to neo-institutionalist organization theory (DiMaggio and Powell 1983; Meyer and Rowan 1977; Powell and DiMaggio 1991): the organizational level (focal theater) and the level of the organizational field (all theaters studied) in which the focal theater is embedded. We also apply these two levels of analysis. Hereafter,

the term 'program' is used to describe the plays performed by a theater in 1 year (season), and the term 'repertoire' refers to plays performed by all of the studied theaters in the time span of the study.

We will test four hypotheses related to *new plays* and one hypothesis regarding *innovations*. The main focus is on *new plays* (premieres and first performances), as these precede *innovations*; only if a new play is taken up by at least one other theater and can establish itself in the repertoire is it an *innovation*.

The first hypothesis (H1) is based on the notion that the *performance capability* of theaters has a positive effect on the number of new works performed by them. In this regard, Dowd et al. (2002) present the empirical finding that the more US orchestras there are and the more concerts they give (i.e., performance capability), the higher the number of new composers in the repertoire. This finding at the field level can also, according to Kremp (2010), be observed at the organizational level; as the number of concerts increases, the number of new composers in the programs of specific orchestras increases. This correlation between performance capability and innovative activity, which was investigated for symphony orchestras, is to be applied here to theaters (H1).

H1: The greater the number of performances a theater has, the larger the number of new plays in its program.

We will also formulate hypotheses regarding theaters' *resource situation*. Staging new plays increases a theater's risk of failure (Pierce 2000; Sgourev 2012). The more theaters depend on their own operating income, the more they have to rely on established plays in order to not lose even more patrons. This suggests that dependence on operating revenue may decrease the willingness to experiment. Therefore, we will examine whether the amount of operating revenue in the form of subscriptions reduces the innovative activity of a theater. The assumption is supported by Voss et al. (2006), who found that the number of subscribers above a certain point has a negative effect on innovation. Therefore, we also suspect that the more the theater audience is used to booking season tickets, the less innovative the program is likely to be (H2). Conversely, government subsidies can be seen as buffers against commercial failure, reducing a theater's dependence on its own operating revenue. This means that the level of government subsidies should increase a theater's willingness to experiment (DiMaggio and Stenberg 1985b; O'Hagan and Neligan 2005). Thus, the size of government subsidies is expected to increase a theater's innovative activity (H3).

H2: The greater the number of subscriptions, the fewer new plays are found in a theater's program.

H3: The greater a theater's state subsidies, the more new plays are found in its program.

Alongside the organizational level, we also formulated hypotheses about the *organizational field* in which the theaters are embedded. According to the relevant literature, the innovativeness of the program is influenced by *competition*. Jensen and Kim (2014) found that opera companies are most effective in adapting their programming to different audience tastes when they are exposed to little competitive pressure. They measured competitive pressure using an index that links the number of different plays in a theater's schedule to the spatial density of theaters in the surrounding area. It is easier for a theater to attract and retain an audience if there are few other theaters in the area. At the same time, the conventionality of a theater's repertoire increases with increasing competitive pressure (H4). We follow up on this finding and investigate whether it can be applied to the theater sector in NRW and to the number of *new plays*. As an additional variable to measure competitive pressure, we have included the number of *private theaters* in the respective city in our analysis.

H4: The higher the competitive pressure, the fewer new plays are taken up into the theater's program.

In addition to the first dependent variable (DV1), which captures *new plays* (premieres and first performances), we examine whether these *new plays* become established over time. Following Kremp (2010), the binary variable *innovations* (DV2) was calculated to analyze whether a new play was performed again in at least one other NRW theater in the following 10 years (see Section 4). Our hypothesis states that the number of new plays in the entire field of NRW theaters promotes the emergence of innovations in the respective focal theater (H5). In this regard, Kremp (2010) found that the success of a new composer is positively associated with the density of new composers. The density of new composers stands for openness and resources for new music at the field level, through which the establishment of new pieces in specific orchestras is promoted. This argument is rooted in population ecology (Woywode and Beck 2014), an organizational field with high absorptive capacity for new plays that will provide a suitable context for the adoption of such novelties into the programs of other theaters.

H5: The greater the number of new plays in all theaters, the higher the number of innovations in the program of a focal theater.

4. Data and methods

The data used for the present study were taken from the annual theater reports from the DBV (1995/96 to 2017/18). Reports covering staged plays are available in disaggregated form (organizational level) as of 1995/96, so analyses at this level are only possible from that season onward. These reports show which plays the theaters performed in the respective season, including information on premieres, as well as performance and attendance figures. Other theater reports contain data on events, attendance, personnel, revenue, and expenditures. All public (mostly municipal) theaters, as well as some privately owned theaters are included. Unlike the public theaters, private theaters report their data on a voluntary basis, which is why they are covered far less reliably by the theater statistics, leading to considerable data gaps. Not only may the reports for individual private theaters be incomplete for certain years, but not all private theaters are represented. Therefore, a comprehensive comparison of public and private theaters is not possible due to the considerable data gaps in the DBV reports.

According to the DBV theater reports, there are 26 publicly owned theaters in NRW (Table 1), of which only those that offered plays in the drama category (n=22) were initially surveyed, which is why Aachener Puppentheater, the opera house Deutsche Oper am Rhein in Düsseldorf, Händel-Theater in Cologne, and Tanztheater Pina Bausch in Wuppertal were not included. Of the remaining 22 theaters, those that consistently had values for the dependent (DV1 and DV2) and independent variables (IV) each year during the study period (1995-2018) were selected. The Theater an der Ruhr in Mülheim and the Musiktheater im Revier in Gelsenkirchen could not be included in the regression analysis (n=20) due to significant data gaps. However, all 22 theaters were included in our analysis of repertoire decisions. Thus, our data represent a full survey of all public theaters in NRW that put on plays in the drama category.

For the present study, the written information had to be transcribed manually in order to subsequently analyze the statistics using Excel and Stata 16. This enabled a data set to be constructed for use in both the analysis of repertoire decisions and the regression analyses.

We derived the dependent, independent, and control variables from the relevant literature (Section 3), connecting our findings to previous results. Two dependent variables were constructed. The first dependent variable (DV1) was the number of premieres and first performances (*new plays*) for each theater in the respective season. DV1 was taken directly from the DBV play reports (“Werkstatistiken”). The second dependent variable (DV2) was a measure of the success of premieres and first performances over time (*new plays adopted into repertoire=innovations*). For this, we calculated whether a premiere or first performance was staged in at least one other theater in NRW in the subsequent 10 years. To avoid distortions in

DV2, 10-year observation periods were chosen. Thus, the data for DV2 only include premieres and independent variables from 1995/96 to 2007/08 (n=519), the seasons for which 10 additional years of observation are available. Therefore, our data structure is as follows. The different variables were available annually per theater. In the analysis of *new plays* (AV1), we considered the entire survey period (1995/96 to 2017/18), and in the analysis of *innovations* (AV2), we considered only the variables from 1995/96 to 2007/08 (i.e., only a section of our total data set).

The following independent variables (IVs) were gathered. The number of subscriptions (H2) and the amount of government subsidies (H3) were taken from the theater statistics. The number of performances (H1) and the competitive pressure index (CPI) for the public theater sector (H4) were calculated from the play statistics. DV1 was used as an independent variable in one of the regression analyses (H5). The financial data, in euros, were inflation-adjusted (base year: 1995). The number of plays (play statistics) and the number of private theaters and venues (both from theater statistics) acted as control variables. For the CPI, the shortest distances (in miles) between theaters were used. The CPI was defined as follows:

$$C_i = \sum_{j=1}^n R_j d_{ij}^{-\alpha}$$

where n is the number of theater companies in the data set, R_j denotes the number of different plays in the program of the focal theater during the study period, and d_{ij} is the distance (in 100 miles) between the focal theater and the other theaters in the data set. We assigned α the value of 2 on the assumption that the competitive pressure declines with distance. As in Jensen and Kim (2014), setting α to 1 or 3 led to similar results. Notably, the CPI reflects the competitive pressure on the public theater sector in NRW and private theaters are not included in the calculation due to the insufficient data coverage, as mentioned above.

5. Empirical findings

5.1 Frequency of new plays and innovations

The following is a closer look at the repertoire of the 22 theaters in our dataset for the entire observation period (1995/96 to 2017/18). The total number of performances per year decreased from 5,797 to 5,123 (-11.6%). In contrast, the number of plays performed at least once increased from 361 to 454 (+25.8%) and the number of plays premiered or first performed

increased from 42 to 58 (+34.9%). From these data, several descriptive findings can be derived regarding the frequency of *new plays* in the repertoire at the level of the organizational field of all NRW theaters (DV1). First, the average number of performances of a play decreased from 16 to 11 during the analysis period. Thus, finished plays were performed with decreasing frequency over the study period. Second, in accordance with this finding, the number of unique plays and the number of new plays increased during the study period. Third, it is apparent that the increase in different and new plays during the study period is due to a trend reversal in the mid-2000s (Fig. 1). Though the number of different (including new) plays averaged 393 (new: 39) over the period 1995/96–2006/07, it averaged 500 (new: 64) over the following 10 years, 2006/07–2017/18. How this trend reversal should be interpreted in terms of the artistic and economic success of the public theater sector in NRW is unclear.

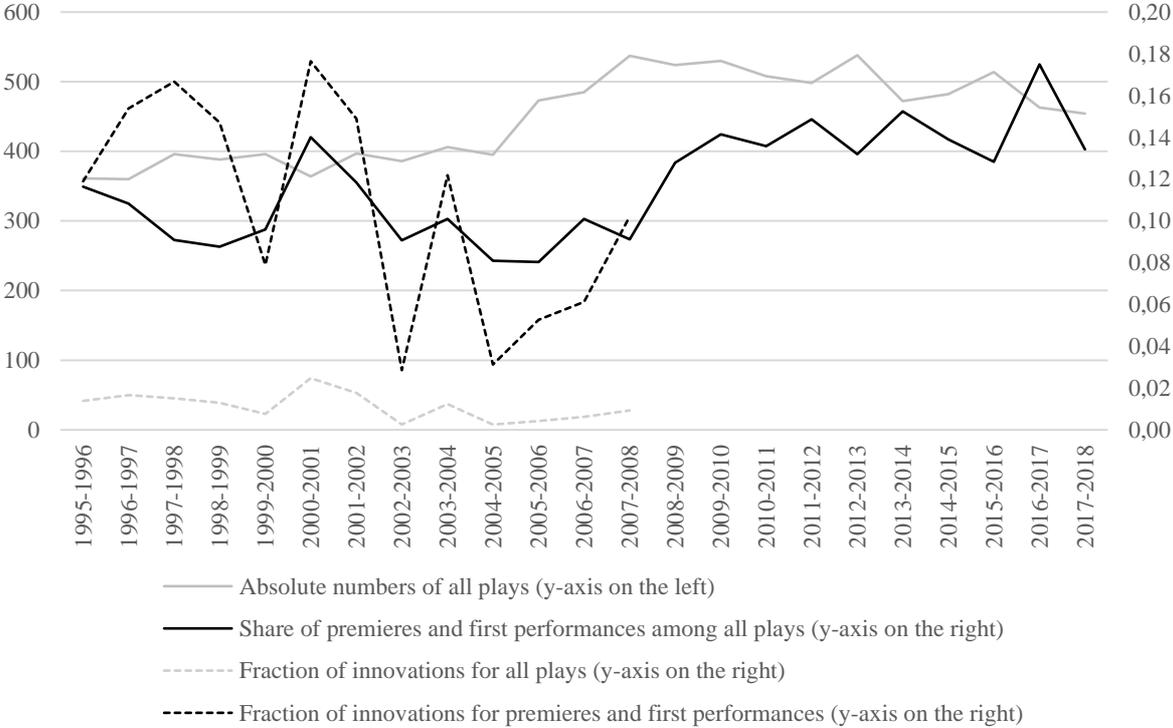
Figure 1 shows that, from the 2005/06 season onward, the total number of plays increased to more than 500 annually, before which it had (with the exception of the 2000/01 season) been relatively constant at just under 400. The associated curve representing *new plays* also exhibited a substantial increase, by several percentage points, to reach a new plateau at the end of the 2000s; however, it declined again gradually in subsequent years. The two curves are related and similarly shaped; of the 10,327 plays recorded (totaled across all seasons, including multiple performances), 1,195 (11.6%) were premieres and first performances. Over the years, the percentages deviated only slightly from this average value, which suggests that the number of premieres and first performances depends on the number of plays.

A Pearson correlation analysis supports this presumption. With $r=0.731$, there is a high positive linear correlation between the number of different plays performed (not to be mistaken with performances) and the number of premieres and first performances. In other words, a particularly large number of *new plays* were staged in those years in which a large number of different plays were performed overall.

The curve of the share of innovations in all pieces and the curve of innovations in premieres and first performances will also be considered. Due to the required calculation period of 10 subsequent years, only values for 1995/96 to 2007/08 are available to analyze innovations (see Section 4). Here, it is also clear that the curve of the share of *innovations* for all plays coincides with the two previously explained curves. This is also reflected in the high correlation value between the number of premieres and first performances and the number of innovations ($r=0.573$); the greater the number of *new plays*, the larger the number of *innovations*. However, the proportion of *innovations* is at a low percentage level; with the exception of the 2000/01 season, all values are <2%. This is consistent with the finding by Gerlach-March (2011) for

Germany as a whole during the 2000/01-2002/03 period, when new plays were not performed as often or for as long as established ones.

Fig. 1 Number of plays in the repertoire and share of new plays and innovations



Source: DBV (1997-2019).

As documented in Table A2, in absolute terms, the Schauspielhaus in Düsseldorf (n=140), the Bühnen der Stadt Köln (n=128), and Theater Dortmund (n=126) performed a particularly large number of new pieces during the period from 1996/96 to 2017/18. Theater Bonn follows slightly behind (n=90). Bringing up the rear are the Landestheater Dinslaken (n=18), the theater in Mülheim an der Ruhr (n=11), and Gelsenkirchen's Musiktheater (n=7). If one looks at the shares of new plays in all performances of the respective theaters, however, a more differentiated picture emerges. Although Cologne (20%) and Dortmund (18%) still achieve high values, Gelsenkirchen now occupies sixth place (14%). The overview of the absolute and relative distributions of the new plays and the resulting rankings shown in Table A2 forms the basis for calculating the Spearman rank correlation coefficient. A moderately strong positive correlation ($r=0.578$) was found between the two ranks, meaning that, with an increase in the absolute number of new plays, their proportion among all plays increases as well.

The question of whether new plays can establish themselves in the repertoire of theaters in NRW (DV2) will be examined descriptively with the help of a simple calculation. For this, we

determined when the premiere or first performance of a play was recorded during the period between 1995/96 and 2007/08, and then examined whether that play was performed again in the following 10 seasons. This means that, for plays recorded as premieres or first performances in the 1995/96 season, the period from 1996/97 to 2005/06 was examined. For 1996/97, the 1997/98–2006/07 seasons were examined, for 1997/98, the 1998/99–2007/08 seasons, and so forth. The number obtained was examined relative to the number of all seasons in which the play could have been staged. For example, the play "norway.today" (by Igor Bauersima) premiered in the 2000/01 season. After that, it appeared in 14 out of 18 other seasons, which corresponds to a coverage of 77.8%. This was followed by "Das Fest" (Thomas Vinterberg), which appeared in 11 of 18 possible seasons (61.1%), and "Ehrensache" (Lutz Hübner), which appeared in 7 of 13 possible seasons (53.9%). A correlation was calculated between the variables *number of seasons in which the new play appeared* and *number of seasons in which the play could have been performed*, obtaining a value of $r=0.070$, which implies that there is no linear correlation between the two variables. Thus, the plays that were performed as premieres or first performances during the study period were rarely performed again by other theaters. It appears that the theaters in NRW only very rarely succeeded in integrating new plays into the repertoire.

Table 2 Top 20 new plays

Premiere or first performance	Number of performances	Average number of performances per season	Average audience size per performance ^a
Norway.Today	369	26	121
Shakespeare's sämtliche Werke	325	30	251
Das Fest	205	19	261
Die 39 Stufen	136	34	244
Für mich soll's rote Rosen regnen	123	25	201
<i>Die Werkstatt der Schmetterlinge</i>	119	40	92
<i>Der Junge mit dem Längsten Schatten</i>	113	38	36
Kommt ein Mann zur Welt	108	27	169
Kugeln überm Broadway	107	27	532
Willkommen	106	27	233
Dornröschen oder wie man hundert Jahre spinnt	101	-	282
<i>Hinter verzauberten Fenstern</i>	93	47	358
<i>Igraine Ohnefurcht</i>	93	47	28
<i>Windsturmreiter</i>	92	15	74
Brassed off - Mit Pauken und Trompeten	91	18	323
Ehrensache	88	13	142
<i>Undine die kleine Meerjungfrau</i>	87	29	358
<i>Vom Jungen der in ein Buch fiel</i>	86	43	279
<i>Das Mond-Ei</i>	85	22	39
Männerhort	83	12	152

Source: DBV (1997-2019). Plays for children/young adults are in italics. ^a The mean number when plays were performed more than once by at least one theater.

Table 3 Top 20 plays (all plays)

All plays, including premieres and first performances	Number of performances	Average number of performances per season	Average audience size per performance ^a
Kabale und Liebe	892	47	361
<i>Die Schneekönigin</i>	885	68	455
<i>Pinocchio</i>	707	59	413
Ein Sommer- nachtstraum	688	31	405
<i>Ronja Räubertochter</i>	674	56	557
Romeo und Julia	647	34	381
Die Dreigroschen- oper	643	34	497
Hamlet	601	29	378
<i>Der Zauberer von Oz</i>	590	49	492
Was ihr wollt	509	30	338
Nathan der Weise	504	28	361
Antigone	487	26	246
Woyzeck	479	25	303
<i>Die Bremer Stadtmusikanten</i>	453	32	414
<i>Jim Knopf und Lukas der Lokomotivführer</i>	446	45	517
Liebesperlen	439	26	498
Der zerbrochne Krug	421	26	353
<i>Der Räuber Hotzenplotz</i>	417	52	449
Tschick	411	69	170
Maria Stuart	406	29	400

Source: DBV (1997-2019). Plays for children/young adults are in italics. Arithmetic mean.

Another question is the extent to which new plays are based on existing materials, such as books, films, or other plays. To elucidate this, each of the 50 most frequently performed premieres or first performances was examined (Tables 2 and 3 document the top 20) to determine whether it was a completely new play or a reworking of existing original material. Thirteen of the 50 plays were based on existing material (26%), 9 of which were based on a novel and 2 each on a film or another play. To illustrate this finding, the performance frequencies of the most successful new plays were contrasted with the plays that were generally performed most often during the period of 1995/96 to 2017/18 (Tables 2 and 3). It becomes clear that the 'box office hits' are all classical plays, most of which were written between the

17th century and the early 20th century, and even "Antigone" by Sophocles going back to antiquity. These classics seem to be so popular with audiences that some of them appear in the NRW theater programs every year. The highest number of performances (892) was achieved by "Kabale und Liebe", a play by Friedrich Schiller from 1784. The most frequently performed new play is "norway.today" by Igor Bauersima in 2000, with 369 performances.

The average number of performances per season in which the play was staged and the number of patrons per performance also showed that the top 20 new performances were performed less frequently than the top 20 plays overall and attracted fewer patrons (32 performances with 209 patrons per season on average vs. 40 performances with 399 patrons per season on average). The lower average number of patrons for the new plays is partly due to the plays being performed less often on average (-20%) and partly due to the new plays being more likely to be performed on secondary stages as a precaution in case the play does not attract a sufficiently large audience.

Strikingly, many of the most frequently performed plays were for children/young adults (Tables 2 and 3, titles in italics). Among all plays, 7 in the top 20 list (35%) are billed as children's/youth theater, as are 8 in the group of premiered or first performed new plays (40%). This finding is significant for our interpretation of an innovation crisis, as a large proportion of the top-20 plays address both parents with children and young people, generating a demand that is not only reflected in the high performance figures, but also in the high number of patrons, especially in the listing of the top 20 plays (Table 3): the seven children's/youth plays reach a total attendance of 1,965,578 and the remaining plays 2,611,298, suggesting that the average attendance of children's/youth plays is significantly higher (280,797 vs. 200,869).

This raises the question of whether the renewal of the theater program through the inclusion of premieres and first performances, as well as the restaging of these new plays (i.e., innovations), is actually sufficient to attract new audiences and counteract the demand crisis when it is primarily the conventional classics that attract an average high number of patrons (Tables 2 and 3). This question will be answered with the help of Table 4 and calculated on the basis of Table A3). We looked at the change between 2005/06-2009/10 and 2013/14-2017/18 with regard to the number of patrons overall to new plays (premieres and first performances) or innovations and the number of patrons of the remaining productions (excluding new plays and innovations) (Table 4). *Innovations* were defined along the lines of DV2 as follows: if a premiere or first performance is played again within the following 10 years, it is an innovation. If a new play is performed more than 10 years after its premiere, it is no longer considered an innovation, because it has become part of the repertoire of NRW theaters. This results in an observable

period from 2005/06 to 2017/18, as the 10 preceding years (1995/96 to 2004/05) could be analyzed retrospectively for only the 2005/06 season onwards.

The following example illustrates how we operationalized ‘innovation’. The play "Kochen mit Elvis" (Cooking with Elvis) by Lee Hall was performed for the first time in the 1999/00 season at Schauspiel Essen, making it a novelty in that season. Over the following 10 seasons (2000/01 to 2009/10), the play was performed by other NRW theaters in 3 seasons (2000/01, 2001/02, 2002/03) and, thus, became an innovation. When the play was performed again in 2017/18, it was no longer considered an innovation, but as part of the public NRW theaters’ repertoire.

Table 4 Changes in supply and demand

	2005/06- 2009/10	2013/14- 2017/18	Absolute change	Percentage change
Total number of visitors to new plays or innovations	152,108	179,193	+27,084	+18%
Total number of visitors to plays (excluding new plays or innovations)	1,249,072	1,102,134	-146,937	-12%
Average number of new plays or innovations per season	79	108	+29	+36%
Average number of new plays (excluding innovations) per season	54	66	+12	+22%
Average number of plays (excluding new plays or innovations) per season	430	363	-67	-12%

Source: DBV (1997-2019).

Table 4 shows the total numbers calculated in this way, with a focus on the relative numbers: in the first period (2005/06-2009/10), the number of patrons of new plays/innovations was 152,108 in total and 1,249,072 for the remaining plays (excluding new plays and innovations). In the later comparison period (2013/14-2017/18), the number of patrons of new plays/innovations grew by 18% to 179,193 (+27,084), whereas the number of patrons of the remaining plays decreased by 12% to 1,102,134 (-146,937). In comparison, the number of new plays/innovations per season increased by 36% from 79 to 108 and the remaining plays decreased by 12% from 430 to 363.

This highlights the finding from Section 2 that the supply (number of plays) has increased but the demand (number of patrons) has continuously decreased. However, with the help of the structural data, this finding can now be viewed in a more differentiated way. At first glance, it

appears as if there is an overproduction of plays (Schmidt 2017). However, Table 4 shows that new plays and innovations attract new audiences. Avoiding overproduction would require existing plays be removed from the repertoire and replaced by new plays. Such a reduction of existing plays would also free up (financial) resources for new productions (Haselbach et al. 2012).

In this context, Gerlach-March (2011) found that the British theater sector is more innovative than the German sector in terms of the number of premieres. She argued that, although the German theater sector is more heavily subsidized by the state, it does not sufficiently produce new plays. In her view, cultural policy guidelines and traditions are highly influential. For example, so-called “author's theater” is widespread in Great Britain, where authors have a great influence on the design of the program, whereas the so-called “director's theater” is pervasive in Germany, meaning that directors have more influence than authors on the plays. It is possible that cultural policy guidelines such as those in Great Britain would lead theaters to include more new plays in their repertoires.

The preceding findings can be interpreted as evidence of an ‘innovation crisis’ in the public theaters of NRW. Theaters rarely succeed in turning new plays into audience successes. Although some plays (“norway.today”, “Das Fest”, or “Shakespeare’s sämtliche Werke”) become audience successes, only a few such plays have been adopted into the repertoire. However, Table 4 shows that there is a demand for new, innovative plays. In addition, we were able to show that young people, as well as children and their parents, are especially targeted. Using surveys among both theatergoers and non-theatergoers, Mandel (2021) confirmed such expectations. The most frequently mentioned expectation (89%) with regard to the performance schedule was “programs for children and young people.” Furthermore, 66% of respondents stated that they would like to see “current plays and artistic experiments.” In addition, Mandel (2020) found that people aged 18 to 39 years want contemporary and experimental plays. Based on these expectations, it may be possible to attract more theatergoers in the medium- and long-term if more premieres and first performances (including artistic experiments), as well as more children's and youth plays, were put on stage.

5.2 Explanation of new plays and innovations

For hypothesis testing, regressions were performed using STATA (version 16). In the following section, we first explain our analysis strategy for examining DV1, and then go into more detail about the results based on the previously established H1 to H4. We then explain our analysis strategy for DV2 and state the results for H5.

For the analysis of DV1, we calculated an ordinary least square (OLS) regression, several robustness tests, and a fixed-effects regression (FE). The IVs in our main analysis are listed in Table 5, starting on the left, in descending order of their univariate R² value following the control variables that are listed in models (1) and (2). For the models, robust standard errors were estimated to counteract biased standard errors, as the homoscedasticity assumption of the regression residuals is violated according to the Breusch-Pagan test. This also applies to the subsequent OLS robustness analyses. Our main models (6) and (7)¹ in Table 5 have R² values of 0.435 and 0.420, respectively, and very low p-values, giving them significant explanatory power at a significance level of $\alpha=0.001$. In the above model, all UVs were significant: *number of performances*, *subsidies*, *competitive pressure*, *number of subscriptions*, and *number of private theaters*. In addition, two control variables were significant: *number of plays performed* and *number of venues*. We also checked whether the logarithms of variables in the OLS analysis led to changed results, but this was not the case. A variation of the OLS (Table 5) was to use the proportion of new plays in all plays for DV1 instead of the absolute number of new plays (Table A5); models (6) and (7) achieved lower R² values and the significance of the individual UVs was preserved, with the exception of subscriptions.

Furthermore, several robustness tests for the results of the OLS regression analysis (Table 5) were part of our analysis strategy. First, the values of DV1 and the IVs were replaced with 3-year and 5-year moving averages (Tables A6 and A7). This calculation smooths out the year-to-year fluctuations that could perturb the model. However, the results remained unchanged, which argues for the robustness of the results obtained with the OLS model (Table 5). Second, the OLS regression was carried out on model (6) with two variations (Tables A8 and A9). In one variation, Cologne was excluded from the analysis as the city with the highest population. In the other variation, Dinslaken, the city with the lowest population, was excluded from the analysis. These variations allowed us to check the extent to which their exclusion leads to a change in the results. However, their exclusion did not lead to any change in the R² value of the model and did the significance values of the IVs did not change. Thus, the results in Table 5 are very robust.

An FE model was calculated in which robust standard errors (Driscoll-Kraay) were also estimated (Table A10). The FE model was supported by the Hausman specification test, which simultaneously rejected a random effects regression. Using the FE, we examined year- and theater-specific effects. The significance values of the variables from models (6) and (7)

¹ Thus, a review of the correlations (Table A4) showed that the variables *subsidies* and *private theaters* correlate ($r=0.703$), which is why they are analyzed separately in models (6) and (7).

deteriorated slightly for the theater-linked variables in the FE model compared to the OLS model, but the OLS model was essentially confirmed with the exception of *private theaters*. In addition, dummy variables were generated at the level of the categorical variables *season* (=23 years) and *theaters* (n=20). The year- and theater-specific effects of the dummy coefficients, which were explicitly calculated by means of corresponding regressions, did not show any significant influence on the models. This also speaks for the robustness of the OLS, as the influences remained the same across all theaters and seasons. Below, the results of the regression analyses are related to the hypotheses with the help of the main models, (6) and (7) (Table 5).

Table 5 OLS regressions for premieres and first performances (DV1)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of plays	0.085*** (0.012)	0.074*** (0.012)	-0.038** (0.014)	-0.037** (0.013)	-0.121*** (0.019)	-0.126*** (0.019)	-0.141*** (0.019)
Venues	-	0.23*** (0.043)	0.255*** (0.04)	0.129** (0.047)	0.165** (0.048)	0.161** (0.048)	0.283*** (0.043)
Performances (in hundreds)	-	-	1.010*** (0.106)	0.858*** (0.107)	0.865*** (0.105)	0.888*** (0.107)	0.958*** (0.11)
Subsidies (in million euros)	-	-	-	0.058*** (0.014)	0.058*** (0.013)	0.089*** (0.014)	-
Competition	-	-	-	-	3.392*** (0.593)	3.223*** (0.571)	3.703*** (0.549)
Subscriptions (in ten thousands)	-	-	-	-	-	-0.025*** (0.004)	-0.015*** (0.003)
Number of private theaters	-	-	-	-	-	-	0.185*** (0.043)
N	454	454	454	453	453	435	435
Prop > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(adj) R-squared	0.111	0.171	0.326	0.361	0.410	0.435	0.42
RMSE	2.412	2.332	2.105	2.053	1.975	1.947	1.973

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.

H1: In model (6), the variable *performances* had a positive influence (p < 0.001) on DV1. The coefficient in model (6) was 0.888 and the IV was scaled to 100, which means that, on average,

113 additional performances are associated with one additional new play.² The higher the number of performances, the higher the possibility of (or demand for) new plays. At the same time, the control variable *plays* exerted a significant negative influence ($p < 0.001$) on DV1 (*premieres and first performances*). The coefficient was -0.126, which means that, to add eight already known plays to a theater's program, one new play is omitted. The more plays that are staged, the greater the number of new plays that are displaced from the program. Thus, theaters that schedule a few different plays and perform them frequently are especially open to new plays.

Two examples may illustrate this. The Schauspielhaus in Düsseldorf performed a total of 923 different plays between 1995/96 and 2017/18, 140 of which were premieres or first performances. Although the control variable *plays* had a negative influence in the OLS and was quantitatively high in the example given, its influence was compensated for in the case of Düsseldorf by the large number of performances ($N=15,682$). In contrast, the Schauspielhaus in Bochum had significantly more plays than Düsseldorf ($N=1,023$) but fewer performances ($N=11,322$). Therefore, Düsseldorf had a higher ranking for new plays than Bochum (Table A2).

H3: *Subsidies* had a positive coefficient ($p < 0.001$). The coefficient of 0.089 indicates that, on average, 11.2 million euros would be needed for a theater to add another new play to its program. This confirms H3, but the effect size of this IV is very small. An increase in new plays with the help of additional subsidies would only be possible by accepting very high costs. At the same time, the control variable *venues* had a positive coefficient ($p < 0.001$). The coefficient of 0.161 indicates that six additional venues would be needed to add a new play to the program.

In this context, it is worth reiterating that, since the mid-2000s, the number of venues in NRW theaters and the number of new plays have increased substantially. Thus, the regression analysis confirms the descriptive findings. However, the effect strength of this IV is relatively low. An increase in new plays with the help of new venues is only possible to a limited extent (for cost reasons). Thus, theaters that operate many venues and are heavily subsidized appear more open to new plays than theaters with only one venue and little state support. However, the low effect

² The value is obtained as follows: $1/0.888=1.126$. As the performances are given in 100, rounding up the result gives 113 performances. Notably, this is an average value. This does not mean that 113 performances are necessarily needed to increase the dependent variable by 1 unit (one new play), but that the calculated value can vary for the different cities or theaters (because it is an average value). The same applies to the variable *subsidies* (H3).

sizes should be taken into account here. In the FE model (Table A10), these two IVs were only weakly significant. Therefore, their significance must be interpreted with caution. Due to the high costs involved, it is not recommended, in terms of cultural policy, to support the production of new plays with additional *venues* and *subsidies* alone.

H4³: A significantly more effective way to generate new plays is given by the IV *competition*, which had a significant positive influence ($p < 0.001$) on DV1. According to our results, theaters that are exposed to increased competitive pressure try to distinguish themselves from the competition by having new plays in their programs. The highest average CPI value (1995-2018) was found for the Bochum Schauspielhaus (1.04), the Düsseldorf Schauspielhaus (0.83), and Schauspiel Essen (0.70). Thus, these three theaters are exposed to the strongest competitive pressure. They are centrally located in NRW and spatially close to one another, and to other theaters. In contrast, the Theater in Bielefeld (0.07), the Landestheater Detmold (0.06), and Aachen's Grenzlandtheater (0.04) are exposed to the least competition, in accordance with their peripheral geographical location in NRW. Looking at the number of new plays (Table A2), it becomes clear that Düsseldorf (1st), Bochum (5th), and Essen (8th) are not only exposed to increased competition, but also have particularly high numbers of new plays, whereas Detmold (16th) and the Grenzlandtheater in Aachen (18th) have considerably fewer new plays. Therefore, we reject H4. Notably, Jensen and Kim (2014), from which H4 was derived, examined conventionality, not new plays, in their study.

The variable *private theaters* was significant with a coefficient of 0.185 (model 7), which means that five additional private theaters in the same city is associated with one additional innovation. This is a plausible value, as the variable takes on a maximum value of 23 (Cologne) in our data set. Nevertheless, the submission of data for private theaters is done on a voluntary basis, which is why there may be significant data gaps and self-selection in the data.

H2: The variable *subscriptions* was also highly significant ($p < 0.001$), and the coefficient was negative with a value of -0.025 per 1,000 subscriptions (model 6). This means that, on average, 40,000 fewer subscriptions per theater were needed to obtain a new play. However, this is very unrealistic; the average number of subscriptions per theater in NRW is 32,000 (max. 87,000).

³ We also recalculated the CPI of our OLS regression (Table 5) on the basis of kilometers instead of miles (Table A11). The results of both tables are essentially the same, except that the coefficient of the competition variable was larger when calculated on the basis of kilometers (1 mile = 1,609 km). To ensure comparability with the existing literature, which calculates competition based on miles, we also calculated the CPI based on miles in our main OLS regression.

Therefore, although H2 is confirmed, the small effect size does not suggest that lowering subscriptions is a meaningful variable to influence the production of new plays.

In a further step, the DV2 (*innovation*) was examined using a Poisson regression (Table 6). Here, the N was almost 200 units smaller than in the OLS regression because, in order to determine whether a premiere or first performance was staged in at least one other NRW theater in the subsequent 10 years, only premieres or first performances from the 1995/96 to 2007/08 seasons could be taken into account. This means that, for the analysis of AV2, we only considered a portion of the total data set (1995/96 to 2007/08). DV2 has a maximum value of $n=2$. This means that, per season, a given theater staged a maximum of two new plays that were adopted by at least one other NRW theater in the following 10 seasons.

The Pearson goodness-of-fit test indicates a solid model fit and, thus, speaks in favor of running this regression, which depends on the assumption that the conditional variance and the mean of the observations are equal. As in the OLS regression, comparative analyses with moving averages were performed to check robustness, and these largely confirmed the results of the non-smoothed data (Tables A12 and A13). To avoid overdispersion and to check robustness, a negative binomial regression was performed. The results hardly differed from those in Table 6 (Table A14).

Table 6 Poisson regression for innovative premieres and first performances (DV2)

Variable	(1)	(2)
Plays per year	-0.007* (0.003)	-0.006 (0.003)
Number of premieres or first performances (DV1)	-	0.343*** (0.05)
N	260	254
Prop > chi ²	0.02	0.000
LR chi ²	5.41	47.70
Pseudo R ²	0.018	0.161

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Standard errors are given in parentheses.

H5: As can be seen from model (2), the variable originally defined as DV1 has a positive influence on DV2 in the Poisson regression ($p < 0.001$). This means that, with an increasing

number of new plays in all NRW theaters (organizational field), the chance of a concrete premiere or first performance of a concrete theater being included in the repertoire of NRW in the medium- and long-term increases. Therefore, an organizational field that is open to new plays is important for the establishment of new plays. However, this also means that an individual theater can do little on its own if other theaters do not include new plays in their programs. In this sense, it would not be enough for only a few ‘theaters of excellence’ to stage many new plays; instead, new plays should be present as a cultural pattern across the theater field. Only then are innovations possible.

6. Discussion

The aim of our study was to investigate which factors influence program decisions with regard to new plays and innovations. In contrast to the Anglo-Saxon world, research in cultural sociology has hardly examined the innovative activities of the public theater sector in Germany. Therefore, the study takes up findings from such studies, including the variables and hypotheses investigated, in order to connect our results with the broader cultural innovation literature. Above all, this paper attempts to close the research gap that exists regarding public theaters in Germany, using NRW as an example, and to supplement what we know about aging and declining audiences (demand side) with findings on the production of new plays and their adoption into the repertoire (supply side).

Of the approximately 12% of premieres and first performances that were staged during the study period, 1995/96–2007/08, by the public theaters in NRW, very few made it into the repertoire of other NRW theaters in subsequent years. However, it is innovations and new plays that create new groups of theatergoers. Of the new plays that did achieve high performance numbers, many were based on books for children or young adults, which suggests that parents with children are a target group. However, though a play may be based on children's or young adult literature, the production of a play can also be aimed at adults in general. In order to arrive at empirically valid results in this regard, future studies could examine program data in terms of qualitative properties and scheduling times (children's performances tend to be scheduled before 6 p.m.).

Our descriptive findings suggest that, since the mid-1990s, there has been a significant decline in demand (audience numbers) in public theaters in NRW which, in turn, has led to a significant expansion of the supply side. During the study period, significantly more venues were opened (+41%), and numerous new plays (+38%) and more plays overall (+26%) were added to the program. We presume that the theaters have tried to counteract audience decline in this way. However, we were able to show that most of the new plays did not establish themselves in the

repertoire. Thus, when we speak of a ‘theater crisis’, we do not just mean a socio-structural phenomenon. Rather, the crisis also results from a supply problem: the dominance of well-known plays and too few new plays and innovations. This is supported by our finding that the number of patrons of new plays and innovations increased over the study period (+18%), whereas the number of patrons to the remaining plays decreased (−12%). A possible follow-up project could investigate what kind of patrons are attracted by new plays and innovations, linking socio-structural and cultural innovation research.

The regression analyses further suggested that the renewal capability of municipal or state-owned theaters, as exemplified by NRW, could be increased if both individual theaters and the public theater sector as a whole were to introduce significantly more new plays and remove old plays from their programs. The renewal rate of approximately 12% of new plays (premieres and first performances) is clearly too low. Based on our results, one could argue that the theater programs in NRW are filled with 'old plays' and provide too little room for new ones. The expansion of venues and considerable efforts of theaters since the mid-2000s to stage new plays have not come at the expense of the old plays. The degree of displacement that would be needed to substantially expand the scope for new plays, at the level of both specific theaters and the entire organizational field, has not occurred. The more that capacities that were previously tied up are made available, the more that each theater can not only include more new plays in its own program, but also adopt new plays performed elsewhere and make them part of the repertoire.

Our analyses have also shown that a mere increase in venues or subsidies would not be a solution to the innovation crisis. The coefficients of our regression analyses indicate orders of magnitude that would be difficult or impossible to implement in terms of cultural policy (e.g., 11.2 million euros per premiere or new performance on average). In contrast, competitive pressure has a positive effect on the number of new plays. Theaters embedded in decentralized competition put on new plays in order to stand out from the crowd. The strong effect of the competition variable also suggests that it would not be a sensible cultural policy strategy to simply close theaters as audiences dwindle. This is because such closures would reduce competition and, with it, the rate of new plays.

This study produced a number of findings for the theater sector in NRW. However, it remains unclear as to what extent these results can be generalized to the entire German theater sector (and over a longer period of time). NRW may be a special case in that, in contrast to the other regional states (Länder), it has a comparatively high density of theaters in close spatial proximity. Therefore, for a full nationwide survey, it would be necessary to examine the extent to which the findings need to be regionally differentiated. An expansion to Germany as a whole

would provide an assessment of the adoption of new plays into the repertoire of all public theaters, enabling broader determination of the innovation variable.

With our data set, we only consider innovations within NRW, which is why cases in which a NRW theater adopts an innovation of a theater from another federal state or vice versa would not be taken into account. This may create a bias that could be avoided by a full survey of all theaters in Germany. Furthermore, our analysis investigated only public theaters. The data from private theaters is based on optional self-reporting and, therefore, only incompletely recorded by the DBV. This suggests a possible, and longer-term, research project involving the creation of a significantly improved database on private theaters through further examination of theater and municipal archives.

Another research gap is to examine whether other German cultural sectors, such as opera houses and symphony orchestras, are also affected by the *innovation crisis* diagnosed here. Yet another possible research step could consist of a comparative analysis of the new plays using conformity as in DiMaggio und Stenberg (1985a, 1985b).

Finally, our analysis describes the situation before the COVID-19 pandemic. The enforced pause caused by the closure of all cultural institutions ('lockdown') will presumably pose certain problems for a restart of the public cultural sector. These problems include the fact that the high level of additional debt in public (municipal) budgets makes it not unlikely that priorities will be set at the expense of the cultural sector. In addition, the question of the legitimacy of cultural subsidies for a highly socio-structurally select audience may be debated. This could exacerbate the financial crisis in the theater sector mentioned above. For example, Alexander and Spiegel (2021) argued that, due to budget cuts caused by the pandemic, many cities are uncertain about how to fund expensive theater construction projects. They further note the existential importance for a theater to keep operating, as subscribers are difficult to win back once they are lost.

In addition, the previous (dwindling) audience has become accustomed to new online culture-related formats during the lockdowns and may only partially return to theaters, or cultural venues in general. This is because the older birth cohorts over-represented in the audiences have been particularly vulnerable to the pandemic in terms of health. It is possible that the enforced pause will create pressure to realign the program. In this way, new, particularly younger, audience members could be accessed. Social science research should accompany the pandemic-related structural change in the theater sector with further empirical-analytical studies and contribute to establishing a basis for rational cultural policy decisions.

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Supplementary Material

Table A1 Figures for municipal and regional (Länder) theaters in Germany

	1995/ 1996	2000/ 2001	2005/ 2006	2010/ 2011	2015/ 2016	2017/ 2018
Number of theaters	154	150	143	140	143	143
Number of venues	655	728	793	890	815	838
Number of seats (in thousands)	242	260	278	278	258	266
On-site performances	61,914	62,989	62,749	67,755	67,257	65,794
Full-price/day tickets (in thousands)	6,720	7,321	6,813	7,968	8,337	8,097
Subscriptions (in thousands)	4,727	4,392	3,885	3,423	3,205	3,131
On-site audience size (in thousands)	20,550	20,057	18,769	19,017	19,078	18,529
Real operating revenue	315,131	344,740	353,454	376,889	386,665	378,589
Funding from private institutions	7,615	11,462	16,307	23,769	26,858	27,080
Real subsidies (federal + state)	1,988,545	1,925,869	1,827,501	1,836,607	1,908,026	1,940,139
Total revenue	2,328,403	2,294,059	2,214,431	2,254,708	2,344,159	2,303,723

Source: DBV (1997-2019a); Financial data in thousands of euros, inflation-adjusted (base year: 1995)

Table A2 Number and proportion of new plays at NRW theaters, 1995-2018

Theater	Number of new plays	Share of new plays in all pieces	Rank number	Rank share
Düsseldorfer Schauspielhaus	140	0.152	1	5
Köln Bühnen der Stadt	128	0.201	2	1
Dortmund Theater	125	0.177	3	3
Bonn Theater der Bundesstadt	90	0.155	4	4
Bochum Schauspielhaus	90	0.088	5	16
Bielefeld Bühne und Orchester der Stadt	85	0.180	6	2
Oberhausen Theater	80	0.135	7	7
Essen Schauspiel	65	0.109	8	13
Münster Städtische Bühne	58	0.120	9	10
Aachen Stadttheater	53	0.127	10	8
Neuss Rheinisches Landestheater	35	0.092	11	15
Krefeld und Mönchengladbach Theater	32	0.079	12	18
Castrop-Rauxel Westfälisches Landestheater	30	0.057	13	19
Wuppertaler Bühnen	29	0.088	14	17
Hagen Theater	28	0.111	15	12
Detmold Landestheater	25	0.047	16	20
Moers Schlosstheater	25	0.102	17	14
Aachen Grenzlandtheater	21	0.117	18	11
Duisburg Theater	20	0.126	19	9
Dinslaken Landestheater Burghofbühne	18	0.045	20	21
Mülheim an der Ruhr Theater an der Ruhr	11	0.025	21	22
Gelsenkirchen Musiktheater im Revier	7	0.137	22	6

Source: DBV (1997-2019b).

Table A3 Changes in supply and demand per season

Season	Total number of visitors to new plays and innovations	Total number of visitors to plays (excluding new plays and innovations)	Total number of visitors	Total number of new plays and innovations	Total number of plays (excluding new plays and innovations)	Total number of plays
1995/1996	113,596	1,411,247	1,524,843	42	319	361
1996/1997	189,197	1,410,212	1,599,409	50	310	360
1997/1998	117,903	1,421,726	1,539,629	55	341	396
1998/1999	116,415	1,427,689	1,544,104	53	335	388
1999/2000	137,192	1,274,482	1,411,674	61	335	396
2000/2001	179,516	1,224,306	1,403,822	66	298	364
2001/2002	234,985	1,302,162	1,537,147	75	322	397
2002/2003	184,940	1,387,371	1,572,311	70	316	386
2003/2004	144,062	1,259,891	1,403,953	64	342	406
2004/2005	108,462	1,179,240	1,287,702	61	334	395
2005/2006	116,628	1,215,698	1,332,326	61	412	473

2006/2007	127,934	1,255,683	1,383,617	62	423	485
2007/2008	140,664	1,321,316	1,461,980	74	463	537
2008/2009	191,184	1,208,931	1,400,115	89	432	524
2009/2010	184,131	1,243,732	1,427,863	111	418	530
2010/2011	202,097	1,176,860	1,378,957	108	400	508
2011/2012	194,284	1,115,956	1,310,240	113	384	498
2012/2013	179,590	1,083,464	1,263,054	118	415	538
2013/2014	201,528	1,019,488	1,221,016	106	362	472
2014/2015	151,720	1,225,303	1,377,023	94	380	482
2015/2016	119,806	1,222,275	1,342,081	107	399	514
2016/2017	221,435	1,044,669	1,266,104	123	334	463
2017/2018	201,476	998,939	1,200,415	110	339	454

Source: DBV (1997-2019b).

Table A4 Correlation analysis

	DV1	Performances	Subsidies	Competition	Venues	Subscriptions	Plays	Private theaters
DV1	1.000							
Performances	0.499*	1.000						
Subsidies	0.472*	0.384*	1.000					
Competition	0.370*	0.606*	0.219*	1.000				
Venues	0.298*	0.084	0.569*	0.042	1.000			
Subscriptions	0.049	0.125*	0.524*	0.009	0.252*	1.000		
Plays	0.334*	0.742	0.335*	0.817*	0.175*	0.075	1.000	
Private theaters	0.389*	0.359*	0.703*	0.171*	0.261*	0.309	0.312*	1.000

Note: *p < 0.05.

Table A5 OLS regression: share of premieres or first performances in total plays (DV1)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of plays	-0.002** (0.001)	-0.002*** (0.001)	-0.005*** (0.001)	-0.006*** (0.001)	-0.009*** (0.001)	-0.01*** (0.001)	-0.01*** (0.001)
Venues	-	0.01*** (0.002)	0.011*** (0.002)	0.006* (0.003)	0.008** (0.003)	0.007** (0.003)	0.011*** (0.002)
Performances (in hundreds)	-	-	0.032*** (0.004)	0.027*** (0.004)	0.027*** (0.004)	0.028*** (0.001)	0.029*** (0.004)
Subsidies (in million euros)	-	-	-	0.002** (0.001)	0.002*** (0.006)	0.003*** (0.001)	-
Competition	-	-	-	-	0.148*** (0.024)	0.144*** (0.024)	0.161*** (0.023)
Subscriptions (in ten thousands)	-	-	-	-	-	-0.001* (0.000)	-0.001 (0.000)
Number of private theaters	-	-	-	-	-	-	0.007*** (0.002)
N	454	454	454	453	453	435	435
Prop > F	0.001	0.000	0.000	0.000	0.000	0.000	0.000
(adj) R-squared	0.027	0.089	0.179	0.206	0.259	0.261	0.263
RMSE	0.106	0.102	0.097	0.096	0.093	0.093	0.093

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.

Table A6 OLS regression of DV1 with 3-year moving averages

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of plays	0.115*** (0.011)	0.103*** (0.011)	0.006 (0.012)	0.008 (0.011)	-0.039* (0.018)	-0.047** (0.017)	-0.063*** (0.016)
Venues	-	0.241*** (0.035)	0.261*** (0.032)	0.133*** (0.037)	0.155*** (0.039)	0.151*** (0.036)	0.286*** (0.032)
Performances (in hundred)s	-	-	0.817*** (0.084)	0.669*** (0.087)	0.685*** (0.089)	0.698*** (0.091)	0.008*** (0.001)
Subsidies (in million euros)	-	-	-	0.055*** (0.011)	0.054*** (0.011)	0.087*** (0.011)	-
Competition	-	-	-	-	1.735*** (0.487)	1.677*** (0.453)	2.151*** (0.412)
Subscriptions (in ten thousands)	-	-	-	-	-	-0.025*** (0.003)	-0.016*** (0.003)
Number of private theaters	-	-	-	-	-	-	0.165*** (0.035)
N	418	418	418	418	415	402	405
Prop > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(adj) R-squared	0.254	0.337	0.46	0.497	0.514	0.551	0.528
RMSE	1.874	1.769	1.598	1.546	1.521	1.467	1.502

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.

Table A7 OLS regression of DV1 with 5-year moving averages

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of plays	0.124*** (0.011)	0.112*** (0.01)	0.015 (0.011)	0.019 (0.01)	-0.021 (0.017)	-0.031* (0.016)	-0.04* (0.018)
Venues	-	0.248*** (0.034)	0.268*** (0.031)	0.128*** (0.035)	0.148*** (0.037)	0.142*** (0.033)	0.38*** (0.036)
Performances (in hundreds)	-	-	0.792*** (0.083)	0.632*** (0.089)	0.652*** (0.09)	0.66*** (0.092)	0.009*** (0.001)
Subsidies (in million euros)	-	-	-	0.057*** (0.01)	0.057*** (0.01)	0.092*** (0.011)	-
Competition	-	-	-	-	1.393** (0.469)	1.416** (0.43)	1.757*** (0.461)
Subscriptions (in ten thousands)	-	-	-	-	-	-0.026*** (0.003)	-0.006 (0.003)
Number of private theaters	-	-	-	-	-	-	0.114*** (0.023)
N	380	380	380	375	375	366	371
Prop > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(adj) R-squared	0.317	0.407	0.525	0.569	0.581	0.622	0.564
RMSE	1.717	1.601	1.435	1.373	1.356	1.29	1.382

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.

Table A8 OLS regression of DV1 (exclusive Köln)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of plays	0.086*** (0.012)	0.079*** (0.012)	-0.028* (0.014)	-0.027* (0.014)	-0.11*** (0.02)	-0.113*** (0.019)	-0.128*** (0.019)
Venues	-	0.179*** (0.039)	0.209*** (0.038)	0.131** (0.049)	0.178** (0.051)	0.163** (0.052)	0.254*** (0.044)
Performances (in hundreds)	-	-	0.946*** (0.105)	0.849*** (0.109)	0.877*** (0.107)	0.875*** (0.108)	0.888*** (0.115)
Subsidies (in million euros)	-	-	-	0.043** (0.016)	0.035* (0.016)	0.074*** (0.019)	-
Competition	-	-	-	-	3.325*** (0.596)	3.033*** (0.574)	3.432*** (0.554)
Subscriptions (in ten thousands)	-	-	-	-	-	-0.023*** (0.004)	-0.014*** (0.003)
Number of private theaters	-	-	-	-	-	-	0.244** (0.072)
N	431	431	431	430	430	412	412
Prop > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(adj) R-squared	0.129	0.168	0.321	0.333	0.383	0.404	0.403
RMSE	2.28	2.232	2.018	2.004	1.93	1.913	1.915

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.

Table A9 OLS regression of DV1 (exclusive Dinslaken)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of plays	0.083*** (0.012)	0.074*** (0.012)	-0.045** (0.014)	-0.043** (0.014)	-0.13*** (0.02)	-0.129*** (0.019)	-0.144*** (0.019)
Venues	-	0.21*** (0.047)	0.27*** (0.046)	0.148** (0.051)	0.188*** (0.052)	0.169** (0.05)	0.291*** (0.045)
Performances (in hundreds)	-	-	1.054*** (0.111)	0.905*** (0.112)	0.918*** (0.110)	0.902*** (0.109)	0.975*** (0.112)
Subsidies (in million euros)	-	-	-	0.058*** (0.014)	0.058*** (0.013)	0.089*** (0.015)	-
Competition	-	-	-	-	3.428*** (0.593)	3.242*** (0.571)	3.723*** (0.55)
Subscriptions (in ten thousands)	-	-	-	-	-	-0.024*** (0.004)	-0.014*** (0.003)
Number of private theaters	-	-	-	-	-	-	0.184*** (0.435)
N	431	431	431	430	430	430	430
Prop > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(adj) R-squared	0.108	0.152	0.315	0.35	0.402	0.434	0.491
RMSE	2.44	2.381	2.143	2.091	2.009	1.956	1.982

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.

Table A10 Fixed-effects regression of DV1 with Driscoll-Kraay standard errors

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of plays	-0.029 (0.017)	-0.035 (0.018)	-0.076*** (0.017)	-0.076** (0.017)	-0.486*** (0.039)	-0.488*** (0.037)	-0.487*** (0.03)
Venues	-	0.178** (0.061)	0.217** (0.068)	0.207** (0.066)	0.203* (0.078)	0.19* (0.074)	0.216* (0.043)
Performances (in hundreds)	-	-	0.752*** (0.182)	0.773** (0.201)	0.672** (0.203)	0.717** (0.203)	0.677** (0.145)
Subsidies (in million euros)	-	-	-	0.041 (0.05)	0.055 (0.031)	0.089* (0.036)	-
Competition	-	-	-	-	23.114*** (2.383)	22.838*** (2.213)	22.719*** (1.449)
Subscriptions (in ten thousands)	-	-	-	-	-	-0.023*** (0.005)	-0.016** (0.006)
Number of private theaters	-	-	-	-	-	-	-0.024 (0.064)
N	454	454	454	453	453	435	435
Prop > F	0.103	0.015	0.000	0.000	0.000	0.000	0.000
Within R-squared	0.008	0.033	0.071	0.073	0.425	0.444	0.435

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.

Table A11 OLS regression for premieres or first performances (DV1) and measurement of *competition* in km

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of plays	0.085*** (0.012)	0.074*** (0.012)	-0.038** (0.014)	-0.037** (0.013)	-0.116*** (0.019)	-0.120*** (0.019)	-0.137*** (0.019)
Venues	-	0.23*** (0.043)	0.255*** (0.04)	0.129** (0.047)	0.159** (0.048)	0.155** (0.048)	0.276*** (0.043)
Performances (in hundreds)	-	-	1.010*** (0.106)	0.858*** (0.107)	0.861*** (0.105)	0.883*** (0.107)	0.95*** (0.11)
Subsidies (in million euros)	-	-	-	0.058*** (0.014)	0.059*** (0.013)	0.089*** (0.015)	-
Competition	-	-	-	-	8.402*** (1.506)	7.84*** (1.453)	9.311*** (1.387)
Subscriptions (in ten thousands)	-	-	-	-	-	-0.024*** (0.004)	-0.014*** (0.003)
Number of private theaters	-	-	-	-	-	-	0.19*** (0.042)
N	454	454	454	453	453	435	435
Prop > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(adj) R-squared	0.111	0.171	0.326	0.361	0.408	0.432	0.419
RMSE	2.412	2.332	2.105	2.053	1.978	1.953	1.975

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.

Table A12 Poisson regression of DV2 with 3-year moving averages

Variable	(1)	(2)
Plays per year	-0.006* (0.003)	-0.007** (0.003)
Number of premieres or first performances (DV1)	-	0.319*** (0.063)
N	260	258
Prop > chi ²	0.029	0.000
LR chi ²	4.77	28.00
Pseudo R ²	0.018	0.107

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.

Table A13 Poisson regression of DV2 with 5-year moving averages

Variable	(1)	(2)
Plays per year	-0.006* (0.003)	-0.008** (0.003)
Number of premieres or first performances (DV1)	-	0.296*** (0.064)
N	260	260
Prop > chi ²	0.027	0.000
LR chi ²	4.91	23.87
Pseudo R ²	0.02	0.095

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.

Table A14 Negative binominal regression of DV2

Variable	(1)	(2)
Plays per year	-0.006* (0.003)	-0.006 (0.003)
Number of premieres or first performances (DV1)	-	0.343*** (0.05)
N	260	254
Prop > chi ²	0.029	0.000
LR chi ²	4.78	46.57
Pseudo R ²	0.016	0.158

Note: *p < 0.05, **p < 0.01, ***p < 0.001. Standard errors are given in parentheses.