
RESEARCH ARTICLE

Framing China's Ageing Population: A Diachronic Transitivity Analysis of China Daily Headlines

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ABSTRACT

Adopting Systemic Functional Linguistics' transitivity as its theoretical framework, this study analyzes how news headlines in China Daily (English version) have framed China's ageing population over time. The findings show a significant shift in the discursive strategy of Chinese media. The findings reveal that: (1) In terms of participants, the central roles in the headlines have shifted from singular to multiple: in the early stage, the focus was on the "ageing population", highlighting its passivity and burden; in the middle stage, social actors such as "government", "cities" and "elderly care services" were gradually introduced, emphasizing governance and response; in the later stage, emerging roles such as the "silver economy", "innovation" and "experts" appeared, repositioning ageing as a driving force for social development. (2) In terms of process types, material processes have always dominated but with a declining proportion. The emergence and increase of mental, relational, and verbal processes indicate that news headlines have gradually shifted towards cognition, value judgment, and multi-voiced discourse. (3) In terms of circumstances, headlines increasingly provide contextual information such as time, purpose, roles, and targets, especially in the later stage, where "role division" and "goal orientation" are emphasized, highlighting the conditions and pathways of social responses to ageing. (4) In terms of attitudes, the stance of news headlines has undergone a transformation from "warning" to "positive", with the overall trajectory summarized as "crisis-oriented---neutral---positive". This study reveals the discursive strategy shifts of Chinese media in addressing the issue of population ageing, enriches the application of transitivity in social issues research, and provides insights for public opinion guidance and policy advocacy regarding population ageing.

KEYWORDS

Population ageing; news headlines; transitivity; diachronic study; discourse construction

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1. Introduction

Although China is the most populous country in the world, it is also confronted with an increasingly severe problem of ageing population. Since entering an ageing population society at the beginning of the 21st century, the ageing process in China has been accelerating, exerting a profound impact on socio-economic development, public policy-making, and family structures (Jiang & Du, 2015). As a shaper of public opinion and a crucial constructor of social cognition (McCombs & Shaw, 1972), news media bear the important functions of interpreting, disseminating, and guiding the public's understanding of the phenomenon of ageing population. News headlines, as an essential component of news discourse, are highly condensed and information-dense. They serve as the key elements for summarizing the article, attracting readers, and pre-setting directions of interpretation (Van Dijk, 1988). Headlines not only convey information about events but also reflect the media's attitude, stance, and value orientation towards those events (Fowler, 1991).

As a major social issue, ageing population is represented in news headlines through discursive strategies and linguistic resources that vary across historical periods, mirroring the evolution of social attitudes and the shifts in national strategies. Analyzing the

representation of ageing in news headlines is therefore significant for uncovering how media discourse is constructed and for exploring the underlying social ideologies. Against this backdrop, the present study conducts a diachronic transitivity analysis of news headlines on population ageing in the China Daily (English edition). The aim is to identify differences in transitivity across different periods and to reveal the evolving attitudes reflected in news reporting on ageing population. This approach not only enriches the application of transitivity in the study of social issues and news discourse but also offers valuable insights for journalists when reporting on societal topics.

2. Literature Review

As a global social issue, ageing population has gradually become a common concern in both academia and the media since the late 20th century. Overall, existing studies can be broadly divided into two major strands. The first focuses on ageing population itself, including researches on the development prospects and strategies of specific programs under the ageing context (e.g., Shao et al., 2024), the impact of ageing population on certain industries (e.g., Han et al., 2025), as well as predictions of ageing population trends (e.g., Chen et al., 2024). The second examines ageing population discourse from different perspectives. For instance, Zhang Peipei and Zhang Cai (2024) investigated the construction of positive ageing discourse in Japanese media and its implications for China. However, there remains a lack of research analyzing ageing population discourse specifically from the perspective of transitivity.

Halliday argues that language serves three metafunctions: the ideational function, the interpersonal function, and the textual function. Transitivity is the primary means through which language realizes the ideational function. The transitivity system was first established by Halliday in 1964. According to Halliday (2000), the transitivity system is a semantic system of language that, through clauses, expresses speakers' experiences of the external world and their inner states, while presenting participants and circumstances involved in these experiences. Based on different types of experience, the system is categorized into six process types: material, relational, mental, verbal, behavioral, and existential processes. Material processes describe actions or happenings, involving primary participants such as the actor and the goal. Relational processes describe participants' attributes or the relationships between two participants. These are divided into identifying and attributive types, with different participant roles in each. Mental processes depict participants' psychological activities, such as perception, cognition, affection, and desideration. These subcategories respectively capture perception (e.g., hearing, seeing, smelling), affection (e.g., liking, disliking), cognition (e.g., knowing, recognizing), and volition (e.g., wanting, desiring). Behavioral processes involve participants' physiological states, such as breathing, coughing, laughing, or crying. Verbal processes refer to communication acts in which participants convey information. Existential processes describe the existence of something, typically realized through the "there be" structure. In news discourse studies, transitivity analysis has been widely applied to uncover how media construct ideology through grammatical choices. In Chinese academia, research using transitivity has mainly concentrated on two domains: (1) Social issues. Scholars analyze how media construct social topics such as national image, gender discourse, and ecological discourse through process type selection. For example, Tang, Zhu, and Yang (2024) analyzed the image of China in American media from the perspective of transitivity. Sun and Guo (2022) applied transitivity to analyze ecological discourse in news reports on the Amazon rainforest fires. (2) Educational discourse. For instance, Yu and Wang (2020) examined ecological discourse and orientations in educational texts through transitivity analysis. While existing research has explored ageing population from various perspectives, there is a notable lack of studies analyzing ageing population discourse specifically from the perspective of transitivity. This study fills that gap by conducting a diachronic transitivity analysis of news headlines on ageing population from the China Daily (English version), aiming to identify how transitivity choices have changed over time and to uncover the evolving attitudes reflected in news reports. This approach not only enriches the application of transitivity in social issue research but also provides valuable insights for journalists reporting on societal topics.

3. Data and Method

(1) Data collection. The data for this study were drawn from news headlines on population ageing published in China Daily (English version), a mainstream Chinese media outlet. Using the keyword "ageing population" on the official website of China Daily, all relevant headlines from January 1, 2002, to August 31, 2025 were retrieved. After eliminating duplicates and irrelevant samples, a total of 103 news headlines were obtained.

(2) Diachronic periodization. Based on the release of national policies on population ageing, the data were divided into three periods: (1) Early stage (2002-2009, 15 headlines); (2) Middle stage (2010-2021, 67 headlines); (3) Late stage (2022-2025, 21 headlines).

The reasons for this classification are as follows: In the early 2000s, ageing population began to attract government attention and entered the field of public discourse in China. In 2010, the Government Work Report delivered by the State Council explicitly proposed "strengthening strategic research on coping with population ageing" for the first time. In 2021, the 14th Five-Year Plan and the Long-Range Objectives through 2035 was approved at the National People's Congress, elevating "ageing population" to a national strategic issue. In 2022, General Secretary Xi Jinping emphasized the implementation of the national strategy for actively responding to ageing population in his report to the 20th National Congress.

(3) Transitivity annotation and analysis. This study adopted a mixed-method approach combining quantitative and qualitative analysis. Quantitatively, the transitivity categories (participants, processes, and circumstances) were set and annotated in UAM Corpus Tool 6.0v. Furthermore, based on the transitivity, attitude categories were added. Headlines were classified into “warning” “neutral” and “positive” according to semantic orientation, in order to reveal the stance and value orientation of ageing-related news headlines. Qualitatively, the annotation results produced by UAM Corpus Tool 6.0v were analyzed diachronically to explore the changes in transitivity and attitudes in the headlines, thereby uncovering the evolutionary trends in ageing discourse across different periods.

4. Findings and Results

4.1 Subheading

As shown in Figure 2, participants consistently accounted for the highest proportion across all three stages (42.4%, 46.2%, and 43.8% respectively), indicating that ageing population reports focused primarily on “who” or “what” was at the center of the issue. Processes remained relatively stable, around 22-24%, showing that ageing population narratives consistently relied on event processes to drive news reports. Circumstances exhibited a gradual upward trend (from 3.0% to 8.7% and then to 10.1%), suggesting that later reports increasingly emphasized contextual conditions and causal explanations. Attitudes varied significantly across the three stages: relatively high in the early period (30.3%), decreasing in the middle stage (22.4%), and remaining stable in the late stage (22.5%). This demonstrates that the emotional coloring of headlines shifted from being intense to becoming relatively rationalized over time.

Figure 1 Overall features of transitivity in ageing population news headlines

Transitivity-Type	2002-2009 headlines		2010-2021 headlines		2022-2025 headlines	
	N	%	N	%	N	%
participants	14	42.4	138	46.2	39	43.8
process	8	24.2	68	22.7	21	23.6
circumstances	1	3.0	26	8.7	9	10.1
attitude	10	30.3	67	22.4	20	22.5
TOTAL	33	100	299	100	89	100

Note: N stands for “Number”.

4.2 Analysis of Participant Types

As shown in Figure 3, the proportion of actors declined significantly, dropping from 57.1% in the early stage to 30.8% in the late stage. This indicates that headlines gradually weakened the focus on “who is doing” and shifted toward other participant types. Conversely, the proportion of goals rose from 21.4% to 33.3%, suggesting that reports increasingly represented population ageing (or the ageing population) as the object of certain actions, emphasizing its passivity and the need for societal responses.

In addition, new categories such as sayer, verbiage, and senser appeared in the middle and late stages, reflecting the growing presence of expert opinions and policy discourses. For example, mid-period headlines included expressions such as “General Secretary Xi Jinping urges...,” which highlighted the voices of political leaders. This demonstrates the transition toward multi-voiced narratives.

Specifically, “ageing population” consistently occupied a central position but its proportion declined from 50.0% to 30.8%. This shows that the reporting focus expanded from a single group or phenomenon to a more diversified set of issues. In the middle stage, new referents emerged, such as care (8.0%), opportunities (8.7%), and China’s cities (10.1%), placing ageing within the broader context of social governance and development. In the late stage, additional referents such as silver economy (2.6%), innovation (5.1%), and experts (2.6%) appeared, indicating that ageing was reframed as an economic opportunity and a driver of social innovation.

Figure 2 Types of participants in ageing population news headlines

Participants-Type	2002-2009 headlines		2010-2021 headlines		2022-2025 headlines	
	N	%	N	%	N	%
actor	8	57.1	47	34.1	12	30.8
goal	3	21.4	37	26.8	13	33.3
carrier	1	7.1	14	10.1	2	5.1
attribute	1	7.1	12	8.7	3	7.7
sayer	0	0.0	4	2.9	3	7.7
verbiage	0	0.0	4	2.9	2	5.1
range	1	7.1	6	4.3	2	5.1
beneficiary	0	0.0	3	2.2	1	2.6
senser	0	0.0	5	3.6	0	0.0
phenomenon	0	0.0	6	4.3	1	2.6
TOTAL	14	100	138	100	39	100

4.3 Analysis of Process Types

As shown in Figure 4, material processes dominated throughout but declined from 100% in the early stage to 71.4% in the late stage. This indicates that headlines moved from simple descriptions of actions or events to more cognitive and discursive representations. From the middle stage onward, mental processes (8.8%) and relational processes (7.4%) appeared. For example: “Aging population is a solvable problem” (2017-02-16) illustrates a relational process. In the late stage, mental and relational processes continued to appear, such as in “Expert urges all to view aging population as a sign of success” (2023-09-13), where “view” reflects a mental process. Particularly noteworthy is the significant increase in verbal processes (14.3%) in the late stage. For instance: “An aging population brings challenges and hidden opportunities, says Premier Li” (2024-08-26) directly quotes government voices to enhance persuasion and credibility. This shows that later reporting increasingly valued the voices of experts and authorities.

Figure 3 Types of processes in ageing population news headlines

Process-Type	2002-2009 headlines		2010-2021 headlines		2022-2025 headlines	
	N	%	N	%	N	%
material	8	100	53	77.9	15	71.4
mental	0	0.0	6	8.8	1	4.8
relational	0	0.0	5	7.4	2	9.5
verbal	0	0.0	4	5.9	3	14.3
behavioral	0	0.0	0	0.0	0	0.0
existence	0	0.0	0	0.0	0	0.0
TOTAL	8	100	299	100	21	100

4.4 Analysis of Circumstances

As shown in Figure 5, circumstances increased significantly from only 3.0% in the early stage to 10.1% in the late stage, suggesting that headlines gradually placed more emphasis on background and conditions.

Specifically, purpose was present in all three periods but declined in proportion (100% --- 15.4% --- 11.1%). Time and location mainly appeared in the middle stage, reflecting attention to the temporal and spatial features of ageing population. In the late stage, new categories such as role (22.2%) and target (22.2%) emerged, highlighting “who is the agent of response” and “what is the object of intervention.” This indicates that as ageing became a national strategic issue, headlines not only presented events but also emphasized the goals and role distribution of social responses.

Figure 4 Types of circumstances in ageing population news headlines

Circumstances-Type	2002-2009 headlines		2010-2021 headlines		2022-2025 headlines	
	N	%	N	%	N	%
time	0	0.0	12	46.2	0	0.0
location	0	0.0	4	15.4	0	0.0
purpose	1	100.0	4	15.4	1	11.1
manner	0	0.0	2	7.7	1	11.1
extent	0	0.0	2	7.7	1	11.1
target	0	0.0	2	7.7	2	22.2
accompany	0	0.0	0	0.0	1	11.1
role	0	0.0	0	0.0	2	22.2
concession	0	0.0	0	0.0	1	11.1
TOTAL	1	100	26	100	9	100

4.5 Analysis of Attitudes

Changes in attitudes most clearly reflect the shift in discursive stance. In the early stage, warning attitudes accounted for as much as 60.0%, such as “Ageing population fuels rise in cancer” (2005-04-29), which underscores a crisis-oriented framing. However, by the late stage, warning-oriented headlines disappeared completely, indicating that the media no longer emphasized risks and threats exclusively. Neutral attitudes remained relatively stable across all three periods (30-40%), suggesting that reports consistently maintained a degree of caution and objectivity. Positive attitudes rose sharply (0% --- 40.3% --- 70.0%). In the late stage, terms such as “silver economy” and “elderly care industry development” frequently appeared in headlines. For example: “Silver economy grows with aging population” (2023-01-26), illustrating the media’s construction of an “opportunity discourse” around ageing. Overall, the trajectory of attitudes evolved from crisis-oriented to neutral stance to positive stance.

4.6 Discussion

As a linguistic reflection of social reality, the diachronic evolution of news headlines is directly linked to China’s process of ageing population and its corresponding social policies. In the early stage (2002-2009), China had just entered an ageing society, and the

issue of “getting old before getting rich” became prominent. Society at that time was widely concerned about the insufficiency of resources such as pensions and healthcare (Jiang & Du, 2015). Headlines frequently adopted a crisis-oriented framing, emphasizing the threats and challenges of ageing population. Participants were mainly “the ageing population” processes were almost entirely material, and attitudes were dominated by “warning” tones. Such discursive strategies not only heightened public alertness but also generated public opinion support for policy advocacy. In the middle stage (2010-2021), China’s ageing population intensified, but the government simultaneously introduced a series of countermeasures, including the development of elderly care systems, reforms in social security, and the “universal two-child” policy. Accordingly, headlines became increasingly objective, with fewer crisis-oriented expressions and more policy- and explanation-oriented language. Participants expanded from the singular “ageing population” to include “government” “cities,” and “elderly care services,” reflecting the involvement of multiple social actors. Circumstances also increased significantly, showing that headlines emphasized the timeliness and direction of policy measures. This discursive transformation closely aligned with practices of national governance. In the late stage (2022-2025), with the introduction of the “National Strategy for Actively Responding to Population Ageing” media discourse shifted markedly toward positivity. Headlines began to feature keywords such as “silver economy” “innovation” and “opportunities”. Participants showed clear diversification, while attitudes were dominated by positivity. This change not only diminished the negative label of ageing but also repositioned it as a new driver of economic and social development. At this point, news headlines were no longer merely warnings of a “social problem” but became promotional tools for framing ageing as a “development opportunity”.

Based on the results of transitivity analysis, the discursive strategies in ageing-related news headlines reveal three evolutionary patterns: (1) From panic-oriented discourse to constructive discourse. Early headlines used warning expressions to reinforce the sense of crisis surrounding ageing population. Although this strategy drew public attention, it risked reinforcing the stereotype of ageing as a societal burden. With the implementation of social policies, the discourse shifted toward constructive narratives that emphasized policy actions, social responsibility, and future opportunities. (2) From event-centered narration to multi-voiced narration. In the early stage, nearly all processes were material, and headlines mainly presented events. In the middle stage, mental and relational processes began to appear, reflecting cognitive and evaluative perspectives. In the late stage, verbal processes increased, introducing more voices such as those of government officials and experts. This shift illustrates the move from single-narrative to multi-voiced discourse, reflecting broader changes in national policy and governance. (3) From singular participants to diversified participants. Early headlines centered on the “ageing population”, stressing its size and rapid growth. In the middle stage, participants expanded to include “government” “society” and “cities”, highlighting shared responsibility in addressing ageing population. In the late stage, diversification accelerated with the inclusion of “silver economy” “innovation” “experts” and “industry”. This reflects the transformation of ageing population from being framed as a “population problem” to being positioned as a “development issue”.

News headlines are not only carriers of information but also tools for ideological construction. Through transitivity choices, the media subtly influence public cognition and attitudes toward ageing. First of all, the evolution of participants reflects ideological shifts: early headlines centered on the burden of the ageing population, the middle period highlighted governance roles of the state and cities, while the late stage reframed ageing population as an economic driver through terms such as “silver economy” and “innovation”. This transformation embodies a shift from a “population crisis ideology” to a “development opportunity ideology”. Secondly, the diversification of process types reveals the layered nature of ideology: material processes dominated the factual narrative; mental and relational processes expressed cognition and value judgments; verbal processes reflected the diversification of voices. Together, these changes demonstrate that ideology moved beyond a singular “crisis frame” toward more complex and multi-layered social events. Lastly, the diachronic transformation of attitudes directly reflects ideological updates. Early crisis-oriented and warning attitudes mirrored social anxiety and resource scarcity. Middle-stage neutral attitudes signaled a transition toward rational governance. Late-stage positive attitudes aligned with the national strategy of “active ageing”, illustrating the media’s synchronization with policy in ideological construction.

5. Conclusion

This study, taking transitivity as its theoretical framework, conducted a diachronic analysis of news headlines on population ageing in China Daily. The findings reveal the following: (1) Participants. The central roles in the headlines evolved from singular to diversified. In the early stage, the “ageing population” was the core focus, highlighting its passivity and burden. In the middle stage, social actors such as “government” “cities” and “elderly care services” were gradually introduced, emphasizing governance and social responses. In the late stage, emerging participants such as the “silver economy” “innovation” and “experts” appeared, reframing ageing as a driving force for social development. (2) Process types. Material processes remained dominant throughout, but their proportion declined over time. The emergence and increase of mental, relational, and verbal processes suggest that headlines gradually moved beyond factual description, incorporating cognition, value judgments, and multi-voiced discourse. (3) Circumstances. Headlines increasingly included contextual information such as time, purpose, roles, and targets. Particularly in the late stage, emphasis was placed on “role distribution” and “goal orientation”, reflecting how news reports highlighted the conditions and pathways of social responses to ageing population. (4) Attitudes. The stance of the headlines shifted from “warning” to “positive”. In the early stage, crisis-oriented discourse dominated with a large share of

warning attitudes. In the middle stage, attitudes became more neutral, stressing the realities of ageing and policy measures. In the late stage, positive attitudes prevailed, highlighting opportunities and developmental potential. The overall trajectory can thus be summarized as: crisis-oriented --- neutral --- positive. By combining transitivity with diachronic news discourse analysis, this study uncovers the discursive strategy shifts of Chinese media in addressing ageing population. It enriches the application of transitivity to the study of social issues and news discourse, while also offering insights for guiding public opinion and policy communication on ageing.

Nevertheless, this study has certain limitations: (1) The corpus size is relatively limited, which may affect the comprehensiveness of the statistical results. (2) The analysis focused solely on headlines without examining the full news texts. Future research could expand the dataset and conduct in-depth analysis of complete news reports to provide a more holistic picture.

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