Research Article

Comprehensive Evaluation and Analysis of Ecological Language Development in Consideration of Q-Learning Algorithm

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The article uses the Q-learning algorithm to investigate the development of ecological language of college students in some cities, and analyzes the results of the investigation. Including the analysis of the language ability of the university, the analysis of the impact of the language environment of the students on the language ability, the analysis of the difference in language use and the analysis of the difference in language behavior. On this basis, summarizing the usage habits and behaviors of some students and giving solutions. In terms of social factors, analyzing the status quo of students and the Mandarin mode of college students. Analyzing the causes of college students’ “bilingualism” problems from the perspectives of sociolinguistics and psycholinguistics, improving language proficiency, and providing targeted solutions from the three perspectives of school, family, and individuals. The results show that only 9.9% of the respondents think their Mandarin is “very good,” only 19% of the respondents who can speak a little Mandarin think that their Mandarin is “very good.” Mandarin is very fluent, and the corresponding respondents rated their Mandarin as “very good” accounting for 32.1%. It can be seen that the Mandarin level of the surrounding contact objects has a great influence on the Mandarin level of the surveyed persons, and there is a positive correlation.

1. Introduction

The development of ecolinguistics has a history of nearly 50 years, and scholars of different backgrounds have maintained a common concern for the issue of ecolinguistics. It symbolizes that different theoretical frameworks and research methods are combined with ecological principles and methods, and ecological problems can be solved by studying language and the relationship between language system and language. The multidisciplinary combination of language, natural environment, social cultural environment and cognitive psychological environment provides the cross-sectional characteristics of eco-linguistics, and also has a certain meaning for the meaning of the subject and the category of research. However, so far, local surveys and language surveys have mainly focused on ethnic minorities or transitional settlements and the southern open border areas, and the research on the language characteristics and language use of local youth is not comprehensive enough.

Linguistic ecology is an important practical problem, and solving ecological problems mainly depends on ecological monitoring and evaluation. Similarly, scientific monitoring and evaluation of language ecology is a basic requirement for solving language ecology problems. Language ecology is monitored through field research and technical analysis, through regular observation of various environmental factors that affect the survival and development of language and the interaction between these factors, or through regular surveys and measurements. This type of monitoring is a continuous monitoring of the representativeness of the language ecology, and its purpose is to discover the laws that lead to the change of the language ecology over time. In terms of language, ecological monitoring means scientifically constructing a network of distributed monitoring points, dynamically tracking and researching the true situation of a language and geographic area based on the ecological signs of the language, and analyzing and calculating various actual data based on the data.
Linguistic ecological evaluation is based on the language ecological monitoring data to model the language ecological quality, evaluating its advantages and disadvantages, the possibility of development, the survivability of the language, and making qualitative judgments. Monitoring is the basis of evaluation, and evaluation is the result of monitoring. Evaluation can take the lead in adjusting the direction of review and supervision and both are complete process systems.

2. Related Work

In terms of ecological language development, domestic and foreign experts also have many research results. Christoph and Benedikt proposed a method to improve robustness using generalized additive modeling, which is a statistical technique that allows the use of spatial arrangement of data. This technique is applied to the data from the British English dialect corpus FRED, and the results will be evaluated based on its interpretability and based on several quantitative indicators [1]. Montgomery C proposed a new method for processing data collected using the “map” task in dialect (PD) research. This type of task will generate a large number of maps, which contain many lines, showing nonlinguists’ views on the location and extent of the dialect area [2]. From the ecological point of view of multifactor causal mechanism, Yoida and Zmert believes that early childhood is the most sensitive period of language development, and there are few studies on the communicative and interactive environment [3]. Language as a cultural tool is closely related to almost all cognitive changes. Chan solved the language problem in education and suggested changing the teaching language. The language of instruction should not be understood as pure teaching but to study the connection between culture and language [4]. Morocho-Cayamcela and Lim creates and adjusts two deep convolutional neural networks (DCNN) to segment the ground image into different environments. The second part uses the Q-learning algorithm to find the optimal multi-hop path with the lowest propagation loss according to the results of the environment segmentation [5]. Zhao et al. uses deep reinforcement learning algorithms, combined with RL method Q-learning and deep neural networks (DNN) to approximate the value function of complex control applications, and obtain the optimal strategy when the value function reaches convergence [6]. These methods provide some references for our research, but due to the short time and small sample size, the research has not been recognized by the public.

3. Q-Learning Algorithm

3.1. Basic Principles and Models. Reinforcement learning is an online learning technology that is different from supervised learning and unsupervised learning. It believes that learning is a “test and evaluation” process.

Figure 1 shows the main basic diagram of reinforcement learning.

When interacting with the environment, the following processes will occur.

1. The agent perceives the environment state \( s(t) \) at time \( t \)
2. For the current state and immediately return \( r(t) \), choose to perform an action \( a(t) \)
3. If it plays a role in the environment, it will change, \( s(t+1) \), giving an immediate return \( r(t) \), also called reward return
4. Immediately report \( r(t) \) to the agent, \( t \rightarrow t+1 \)

3.2. Evaluation Function. Smart learning aims to increase the cumulative amount of return in the future. The evaluation function \( v(t) \) is a measure of long-term returns and has three return expressions.

Limited coverage mode: Gaining profits in a limited time. \( T \) is the sampling time, \( n \) is the total number of steps the agent runs from time \( t \) to the end, and \( n \) is unpredictable.

(1) Accumulation of returns: accumulation in stages.

\[
V(t) = \sum_{n=0}^{\infty} y^n r_{t+n} \tag{2}
\]

(2) Average return model: Q-Learning uses the third standard to collect the average value of future returns. The standard is:

\[
V(t) = \lim_{n \to \infty} \frac{1}{n} \sum_{k=0}^{n} r_{t+k} \tag{3}
\]

3.3. Markov Decision Process.

\[
P_{s,s'}(a_i) = P(s_{t+1} = s|s_t = s, a_t = a) \tag{4}
\]

Dynamic planning, that is, departmental decision-making. Before making the next decision, you can predict the partial outcome of each decision. This is the core technology for learning and consolidation. The two main methods are strategy restoration and value restoration. Both methods use dynamic programming to solve the expected strategy and expected value function respectively, and improve the agent’s strategy through training and learning. At present, a more extensive study is value restoration [7].

3.4. Strategy Iteration. The strategy iteration algorithm can solve the optimal strategy, starting from the initial strategy, and improving the strategy through iteration. The algorithm is as follows:

(1) Starting with any initial strategy.
(2) For all states and actions.
Letting $V(af)$ be the approximate value of the optimal $V^*(St)$, and $rt$ is the action to make the external environment change from the ground state to the $St+1$ state. Since the environment outside the state transitions from $st$ to $St+1$, the probability of transition to other states is zero, and the best evaluation function when the state is $st$ is:

$$V(st) = rt + yV(st+1).$$

Then the time difference at time $t$ is:

$$\delta_t = rt + yV(st+1) - V(st),$$
$$V(st) = V(st) + \delta_t = V(st) + l(1 + yV(st+1) - V(st)).$$

Between them, the left side of the equation and the right side of the equation have $V(af)$, but this part cannot be moved left or right [8]. The revised valuation is the best value currently possible, but this does not mean that it is the final important value [9].

For the discrete state Markov chain, the definition of the incremental fitness trajectory of the state:

$$e_t(s) = \left\{ \begin{array}{ll} y\lambda e_{t-1}(s) & \text{if } e_t(s) < \varepsilon, \\ y\lambda e_{t-1}(s) + 1 & \text{otherwise.} \end{array} \right. \tag{11}$$

where $0 < \lambda < 1$ is a constant.

The alternative fitness trajectory of the state is defined as

$$e_t(s) = \left\{ \begin{array}{ll} y\lambda e_{t-1}(s) & \text{if } e_t(s) < \varepsilon, \\ 1 & \text{otherwise.} \end{array} \right. \tag{12}$$

The fitness trajectory definitions of the two states record the frequency of recent visits to the state in a recursive manner. When a state is visited, its fitness trajectory increases, otherwise its fitness decays exponentially.

The system gives priority to ASN (Associate Search Network) associated search and CAN (Adaptive Adjudicators...
Network) adaptive evaluation network. It performs the estimation function of quantity and space strategy at the same time, essentially adopts the Actor-Critical structure, Critics adopts the time difference algorithm, and Actor is based on the Gaussian distribution behavior of the random transition mechanism. Figure 2 shows the structure of the adaptive heuristic evaluation algorithm.

According to the gradient method, if the performance index of \( V(t) \) is maximized, the weight is adjusted to

\[
\Delta w_a(t) = \frac{1}{\Delta p(a)} \frac{\partial V(t)}{\partial w_a(t)} = \frac{1}{\Delta p(a)} \frac{\partial p(a)}{\partial w_a(t)} \frac{\partial V(t)}{\partial p(a)}
\]

\[
\frac{\partial V(t)}{\partial p(a)} = l[\tau(t) + \gamma V(t + 1) - V(t)] [1 - \rho(a)],
\]

\[
E_c = \frac{1}{2} [\tau(t) + \gamma V(t + 1) - V(t)]^2.
\]

According to the gradient descent method, the weight is adjusted to

\[
\Delta w_a(t) = -\frac{\partial E_c}{\partial w_a(t)} = l[\tau(t) + \gamma V(t + 1) - V(t)] \frac{\partial V(t)}{\partial w_a(t)}.
\]

The weight \( w_a \) of the ASN network can be adjusted by the gradient method

\[
\Delta w_a = \frac{\partial V(t)}{\partial w_a} = \frac{\partial V(t)}{\partial A} \frac{\partial A}{\partial w_a}.
\]

Through simulation experiments, the influence of the number of simulation scenarios and learning factors of the learning reinforcement algorithm on the effect of learning agents is investigated. In addition, resetting the \( Q \) value of the initial time to 0 or keep the \( Q \) value after the first training for comparison and analysis. Drawing the corresponding conclusion, the intelligent state is the coordinates of the grid position, the behavior set (up, right, down, left) caused by obstacles or a subset thereof, and the reward function given around the installation point to achieve the reward +100, rewards for falling traps and walking obstacles -50, rewards for avoiding traps and obstacles +5, rewards for other behaviors -2 [10]. The behavior value function is represented by a three-dimensional array. The first two dimensions are row and column coordinates, representing the state, that is, the position, and the third dimension is the set of possible instructions corresponding to the current situation. In order to overcome the randomness generated in the simulation, the number of scenes in the simulation experiment is set to 500 scenes. In addition, the initial value of each function value of the attribute is 0. Figure 3 is a simulation flow chart of the maze problem [11].

The algorithm flow is as follows:

1. Observing the current state \( st \)
2. Selecting the behavior \( at \)
3. Calculating the control signal, \( ut \), and sending it to the actuator
4. Receiving immediate reward, \( rt + 1 \), receiving the next moment status
5. Updating the \( Q \) value array composed of state \( st \) and behavior \( at \), and saving \( Q(st, at) \)

In the scheduling process, two key issues need to be paid attention to at all times: one is the balance between "exploration" and "utilization." The second is how to calculate, store and generalize behavioral value functions [13].

In the implementation of balanced methods, random behavior selection strategies can be used when selecting behaviors. The article chooses Greedy behavior selection strategy, \( s \) takes a smaller value, and chooses behaviors based on probability. When the probability is 0.1 - s, selecting the ladder number corresponding to the maximum behavior value function. When the probability is \( s \), selecting other behaviors at random, which can effectively avoid the target from converging to the suboptimal solution, changing the inertial thinking of the agent, and bringing long-term performance improvement of the system. For important information, such as external selection signals, we increase its initial weight to ensure priority response. First, the huge state space is reduced to a minimum, which effectively solves the combined explosion caused by the elevator group scheduling problem. Figure 5 is a flow chart of group mobilization. For the sample data obtained in the observation scheduling process, the combination of the iterative learning iterative update value function and the neural network generalization function for the entire state space is: the reinforcement learning value update algorithm provides neural network training data. That is, the \( Q \) difference between the state behavior value updated at the previous moment and the current time is used as the training data to adjust the network weight [14].

4. Comprehensive Evaluation and Analysis of Ecological Language Development

4.1. Selection of Survey Subjects. The language of young people in a region is an important symbol of the language ecology of the region. The use and behavior of young people in a specific language or dialect will affect the future inheritance and development of that language or dialect. The article proposes that it is necessary to establish a conceptual category for monitoring and evaluating linguistic ecology in the theoretical system of ecologists. This is the inevitable development of the theory of ecologists, and it is also the need for the practical application of ecologists.

The article takes university students in Q city as the main survey object. Q city is located in the Jiaodong Peninsula. The urban university students come from many provinces across China. In such an environment where students gather, a common language is inevitably needed to
communicate with each other to help students acquire the skills necessary for university study and survival [15]. There are 23 colleges and universities in Q City, with 12 undergraduates, 306,000 full-time students, 29,400 faculty members (including 17,600 full-time teachers). There are 2 universities directly under the ministry of education, 7 provincial universities, 2 city university colleges, 2 business universities, 8 private universities, and 2 colleges and universities. Among them, the national enrollment is the enrollment plan of colleges and universities directly under the Ministry of Education, and the enrollment of other colleges and universities is mostly in the province. Therefore, in this survey of college students in Q city, colleges and universities directly under the ministry of education and provincial colleges were selected, and a random sampling method was adopted to select 300 students from each of the two universities, for a total of 600 students.

4.2. Experiment Analysis

4.2.1. Design and Distribution of Questionnaires. The questionnaire includes several aspects: basic knowledge, language ability, language environment, language use occasions, objects and topics. The questionnaire is completed anonymously, and all questions are single-selected. In order to ensure the scientific nature of the survey data, a small test will be conducted after the questions are resolved. First, each school gave 50 questionnaires and collected 99 questionnaires. SPSS is only used to sort and analyze the data, test the reliability of the problem, and make further corrections to the problems found.
Start
Start the simulation environment
Set up the maze environment
Generate maze
Set learning factor
Set the number of simulation scenes
The simulation ends successfully, save the simulation results
Finish
Start simulation
Y N

Figure 3: Simulation flow chart.

Figure 4: Neutralization reaction system and reinforcement learning algorithm neutralization reactant diagram.

Table 1: Simulation parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong alkali flow rate</td>
<td>FA</td>
</tr>
<tr>
<td>Strong acid flow rate</td>
<td>FBmin</td>
</tr>
<tr>
<td></td>
<td>FBmax</td>
</tr>
<tr>
<td>Concentration of strong base</td>
<td>CA</td>
</tr>
<tr>
<td>Concentration of strong acid</td>
<td>CB</td>
</tr>
<tr>
<td>Reaction tank volume</td>
<td>V</td>
</tr>
</tbody>
</table>
in the statistical analysis on this basis. Finally, determining the answer to the question, explaining the purpose of the survey to the interviewee, and filling in it truthfully according to the actual situation. After finishing, reminding the students to check the missing questions, and if the students do not understand, answering them immediately, and returning the questions on the same day [16].

Using SPSS and EXCEL professional statistical software to perform statistics and data analysis on the returned queries, generate result charts, and analyze data characteristics and problems.

4.2.2. Survey Data Statistics and Analysis. Table 2 shows the statistical results of valid questionnaires. There are 133 freshmen, accounting for 25.9%. There are 205 sophomores, accounting for 32.4%. There are 147 juniors, accounting for 26.7%. There are 37 adult students, accounting for 6.5%. There are also 46 graduate students, accounting for 7.7%. In terms of gender classification, 301 men were surveyed, accounting for 51.5% of the total number of surveys. A total of 264 women were surveyed, accounting for 47.7% of the total number of surveys. In the classification of majors, there are 296 people majoring in literature and history, accounting for 48.3% of the total. There are 289 people in science and engineering, accounting for 51.6% of the total. There are 301 men were surveyed, accounting for 66.2% of the total number of people surveyed. There were 213 students from outside S province, accounting for 35.6% of the total number of surveys. There are 356 people in rural households, 59% of the total number of people in the survey. There were 116 county students, accounting for 20.8% of the total number of surveys. There were 112 urban students, accounting for 20.7% of the total number of surveys.

As shown in Table 3, among the languages mastered by students, Mandarin is the language that all respondents think can be proficient. Among them, 528 respondents who can speak Mandarin and dialects, accounting for 91.3% of the total number of surveys. In addition, 61 people speak only Mandarin but not dialects, accounting for 8.7% of the total. In self-evaluation, 218 people think their Mandarin level is "very good," accounting for 20.2% of the total. 210 people think their Mandarin is "good," accounting for 34.4% of the total. There are 254 people who think their Mandarin is "average," accounting for 43.2% of the total population. 13 people think their Mandarin is "not good", accounting for 2.2% of the total. Only 87 people took the Mandarin proficiency test, accounting for 14.9% of the total number of surveys. 85.1% of the respondents did not participate in the Mandarin proficiency test survey [17].

In the Mandarin learning environment, the survey showed that 370 respondents learned Mandarin in school, accounting for 63.2% of the total. 52 people learned Mandarin from home, accounting for 8.9% of the total number of surveys. There are 85 people who have learned Mandarin from TV, radio and other media, accounting for 14.5% of the total number of surveys. In addition, there are 78 people who do not remember where they learned Mandarin, accounting for 13.3% of the total number of surveys. In the level of dialect mastery, 502 people are able to use dialect proficiently, accounting for 85.8% of the total. There are 61 people who are not very proficient in dialect, accounting for 10.4% of the total. There are 22 people who do not speak dialects, accounting for 3.8% of the total population. In the dialect and mandarin learning sequence, 117 people learned dialect and mandarin at the same time, accounting for 20% of the total number of surveys. There are 45 respondents who learn Mandarin first, accounting for 7.7% of the total number of
surveys. The number of people who learn dialect first is the largest, with 423 people, accounting for 72 of the total. 128 people think that Mandarin can express themselves more proficiently and accurately [18].

As shown in Table 4, in childhood, 496 people lived with their parents the longest, accounting for 84.6% of the total number of surveys. Another 90 lived with grandparents or grandparents the longest, accounting for 15.4% of the total.

Table 2: Basic situation of survey subjects.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Number of people</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>123</td>
<td>22.7</td>
</tr>
<tr>
<td>Sophomore</td>
<td>215</td>
<td>35.2</td>
</tr>
<tr>
<td>Junior</td>
<td>159</td>
<td>27.9</td>
</tr>
<tr>
<td>Senior year</td>
<td>37</td>
<td>6.5</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>48</td>
<td>7.7</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>301</td>
<td>51.5</td>
</tr>
<tr>
<td>Female</td>
<td>284</td>
<td>48.5</td>
</tr>
<tr>
<td>Professional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Literature and history</td>
<td>296</td>
<td>48.4</td>
</tr>
<tr>
<td>Science and engineering</td>
<td>289</td>
<td>51.6</td>
</tr>
<tr>
<td>Inside and outside the ministry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S Province</td>
<td>380</td>
<td>66.2</td>
</tr>
<tr>
<td>Outside the province</td>
<td>205</td>
<td>33.8</td>
</tr>
<tr>
<td>Family location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural area</td>
<td>356</td>
<td>59.0</td>
</tr>
<tr>
<td>County seat</td>
<td>120</td>
<td>21.7</td>
</tr>
<tr>
<td>City</td>
<td>109</td>
<td>19.3</td>
</tr>
</tbody>
</table>

Table 3: The distribution of language ability of survey respondents.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Number of people</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mandarin and dialects</td>
<td>528</td>
<td>91.3</td>
</tr>
<tr>
<td>Can only speak Mandarin, not dialect</td>
<td>61</td>
<td>8.7</td>
</tr>
<tr>
<td>Can only speak dialect, not Mandarin</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Self-evaluation of Mandarin level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Better</td>
<td>210</td>
<td>34.4</td>
</tr>
<tr>
<td>Generally</td>
<td>254</td>
<td>43.2</td>
</tr>
<tr>
<td>Not good</td>
<td>12</td>
<td>2.2</td>
</tr>
<tr>
<td>Have you participated in the putonghua side test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>486</td>
<td>85.1</td>
</tr>
<tr>
<td>Participated</td>
<td>95</td>
<td>14.9</td>
</tr>
<tr>
<td>Time to start learning Mandarin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Since childhood</td>
<td>154</td>
<td>26.5</td>
</tr>
<tr>
<td>Kindergarten</td>
<td>91</td>
<td>15.4</td>
</tr>
<tr>
<td>Primary school</td>
<td>190</td>
<td>34</td>
</tr>
<tr>
<td>Junior high school</td>
<td>62</td>
<td>9.9</td>
</tr>
<tr>
<td>High school</td>
<td>50</td>
<td>9.7</td>
</tr>
<tr>
<td>University</td>
<td>29</td>
<td>5.5</td>
</tr>
<tr>
<td>Environment for learning Mandarin (location)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School</td>
<td>375</td>
<td>63.2</td>
</tr>
<tr>
<td>Home</td>
<td>57</td>
<td>8.9</td>
</tr>
<tr>
<td>TV, radio</td>
<td>85</td>
<td>41.5</td>
</tr>
<tr>
<td>Can not remember</td>
<td>78</td>
<td>13.3</td>
</tr>
<tr>
<td>Dialect mastery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skilled</td>
<td>505</td>
<td>85.8</td>
</tr>
<tr>
<td>Not very familiar</td>
<td>58</td>
<td>10.4</td>
</tr>
<tr>
<td>Will not</td>
<td>20</td>
<td>3.8</td>
</tr>
<tr>
<td>The first language to learn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dialect</td>
<td>420</td>
<td>72.3</td>
</tr>
<tr>
<td>Mandarin</td>
<td>40</td>
<td>7.7</td>
</tr>
<tr>
<td>Both together</td>
<td>116</td>
<td>20</td>
</tr>
<tr>
<td>Which language is more proficient and accurate in expressing what you mean</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mandarin</td>
<td>130</td>
<td>22.6</td>
</tr>
<tr>
<td>Dialect</td>
<td>125</td>
<td>21.9</td>
</tr>
<tr>
<td>Both are ok</td>
<td>315</td>
<td>56.5</td>
</tr>
<tr>
<td>Evaluation of putonghua proficiency of surrounding students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Mandarin</td>
<td>245</td>
<td>40.5</td>
</tr>
<tr>
<td>Mandarin with dialect accent</td>
<td>335</td>
<td>57.2</td>
</tr>
</tbody>
</table>
number of surveys. In the Mandarin proficiency survey with the respondents who lived the longest childhood, the results showed that 111 people did not understand Mandarin at all, accounting for 19% of the total number of surveys. There were 343 people who could speak a little Mandarin, accounting for 58.6% of the total number of surveys. There are also 131 people who are fluent in Mandarin, accounting for 22.4% of the total survey [19].

Among the respondents who participated in the Mandarin proficiency test, 45 people had a test score of Grade A or above, accounting for 51.7% of the number of people who participated in the test. There are 35 people with test scores of second and second class, accounting for 40.2% of the total number of surveys. There are 7 people with a score below 80, accounting for 8.1% of the total number of surveys. Different people start to learn Mandarin at different times. The survey shows: 155 people started learning Mandarin since childhood, accounting for 26.5% of the total number of surveys. 90 people started to learn Mandarin from kindergarten, accounting for 15.4% of the total number of surveys. 199 people started learning Mandarin from elementary school, accounting for 34% of the total number of surveys. 58 people started learning Mandarin from junior high school, accounting for 9.9% of the overall survey. There are 51 people who have learned Mandarin since high school, accounting for 8.7% of the overall survey. There are also 32 people who started learning Mandarin after university, accounting for 5.5% of the overall survey.

In school education, 240 primary and middle school teachers use Mandarin to give lectures, accounting for 41% of the total number of surveys. There are 95 primary and middle school teachers who use dialect to give lectures, accounting for 16.2% of the total number of surveys. There are also 250 primary and middle school teachers using both dialect and Mandarin, accounting for 42.7% of the total survey. On university campuses, there are 489 university teachers who use Mandarin to give lectures, accounting for 83.6% of the total number of surveys. There are 11 university teachers who use dialects to give lectures, accounting for 1.9% of the total number of surveys. There are also 85 respondents whose university teachers used both dialect and Mandarin in their lectures, accounting for 14.5% of the total survey [20].

After entering the university, the probability of using Mandarin has changed. There are 504 people with an increase in the probability of using Mandarin, accounting for 86.2% of the total number of surveys. There are 12 people with reduced usage probability, accounting for 2.1% of the total number of surveys. There is still no change in the probability of using Mandarin for 69 respondents, accounting for 11.8% of the total number of surveys. Table 5 is the chi-square test table.

As shown in Figure 6, in the survey of language use occasions, in family occasions, most people use dialect to communicate, there are 443 people, accounting for 75.7% of the total number of surveys. 102 people used Mandarin to talk at home, accounting for 17.4% of the total number of surveys. 40 people were not sure about using dialect or Mandarin, accounting for 6.9%. In more formal occasions such as classrooms, 570 people spoke Mandarin, accounting for 97.4% of the total number of surveys. Seven people speak dialect, accounting for 1.2% of all people. There are 8 respondents who use both dialect and Mandarin, accounting for 1.4% of the overall survey. In more open and casual occasions such as shops, new bids, and small stalls, 481 people used Mandarin to communicate, accounting for 82.2% of the total number of surveys. 18 dialects are spoken, accounting for 3.1% of all people. 86 people are not sure which language they use, accounting for 14.7% of all people. When talking in a relatively private setting in the dormitory, 509 respondents used Mandarin, accounting for 87% of the total number of surveys. 24 people spoke dialects, accounting for 4.1% of the total number of surveys. Fifty-two respondents were not sure what language they used, accounting for 8.9% of the total number of surveys. In the survey of language use subjects, data shows that when talking with teachers, all people use Mandarin, accounting for 100% of the total number of people. When talking with classmates, 515 respondents used Mandarin, accounting for 88% of the total number of surveys. 16 people used dialects to communicate with classmates, accounting for 2.7% of the overall survey. 54 respondents do not necessarily use Mandarin or dialect, which accounts for 9.2% of the total survey. In conversations with fellow villagers, 183 people spoke Mandarin, accounting for 31.3% of the total survey. 255 respondents used dialects to communicate with fellow villagers, accounting for 42.6% of the total number of surveys, and 141 respondents did not necessarily use dialects or Mandarin [21].
4.2.3. Differences in Language Attitude. Regarding their own feelings when speaking Mandarin, most respondents (90.6%) felt natural when speaking Mandarin, while a few felt unnatural, nervous or awkward. This shows that although most college students have become accustomed to using Mandarin, there are still a small number of people who are unfamiliar with Mandarin, so they will feel unnatural, nervous or even awkward in using it. Facing the villagers who speak Mandarin to themselves, more people (44.1%) feel unnatural and awkward. It has already surpassed those who feel natural (39.5%), which shows that most people are still used to speaking dialects to themselves, and dialects are still a bond to maintain the nostalgia. So can the respondents accept that people outside the villagers speak dialect to themselves? In the survey of how others speak dialects to themselves, the dialect is still very popular, and nearly one-third (31.8%) of the respondents felt natural when facing others speaking in dialects, and nearly one-third (31.8%) are in this situation feeling unnatural or even awkward. The rest of the people do not care about it. It can be seen from Figure 7 that most of the respondents have psychologically agreed with and are accustomed to using Mandarin, and although most of the respondents have psychologically more inclined to accept the locals speaking in dialects to themselves, they cannot tolerate the exception of the locals people speak dialects to themselves [22].

As shown in Figure 7, from the perspective of emotional value, the pleasantness of Mandarin (54.5%) is higher than that of dialects (12.6%), but the familiarity of Mandarin (12.5%) is far inferior to that of dialects (53.7%). There are also many respondents who think that both are nice and friendly, nearly one-third of the total. It can be seen that in the minds of college students, from an emotional point of view, the recognition of dialect and Mandarin is relatively high, and Mandarin is also relatively high. It sounds nice, but the dialect is more cordial.

In terms of practical value, 65.1% think Mandarin is more useful, which is much higher than the proportion who think dialects are useful (7.2%), and many people think that both are useful (<27.5%). It can be seen that in the eyes of college students, Mandarin has a higher practical value, while dialects are relatively low. From the perspective of social influence, the social influence of Mandarin (77.3%) is much higher than that of dialects (3.6%). There are 18.996 people who think that both have social influence. It can be seen that more people think that Mandarin has greater social influence and is more conducive to improving their own image and quality, which is a good image and high-quality performance.

Regarding the development prospects of dialects and Mandarin, we will investigate from three aspects: the necessity of popularizing Mandarin, the language expected to
be mastered by children, and the development trend of dialects and Mandarin. Regarding whether it is necessary to promote Mandarin, most of the respondents (91.6%) think it is necessary to promote Mandarin, and only 8.4% think it is unnecessary or indifferent. It can be seen from Figure 8 that in the minds of college students, Mandarin has a great social influence whether in life, study or work. It is convenient for communication and facilitates communication. It has strong practical value and has irreplaceable status [23].

The language education for the next generation is to examine the views on the preservation and inheritance of dialects. The proportion of respondents who want their children to learn Mandarin (33.2%) is much higher than the proportion who want their children to learn dialects (0.5%), and the majority (66.3%) want their children to learn Mandarin and dialects. It can be seen that most people hope that children can not only retain and pass on dialects, but also master Mandarin to facilitate communication.

The survey results show that university students from cities have significantly higher evaluations of their Mandarin level than those from rural areas, and university students from county towns are not as good as university students from cities in their self-evaluation of Mandarin (Figure 9). Most rural college students think that their Mandarin level is average, and the frequency of evaluating their Mandarin very well and relatively well is less than half (49%). The proportion of college students in county towns evaluating their Mandarin proficiency in general has declined, and more than half (57.2%) think that their Mandarin proficiency evaluation is very good and relatively good. And college students from cities rated their Mandarin very well and relatively well as high as 79.696. It can be seen that the difference between urban and rural areas is an important reason for the difference in Mandarin proficiency among college students.

As shown in Figure 10, in the Mandarin self-evaluation, women have a relatively high evaluation of their Mandarin level, and women think that their Mandarin is very good and relatively good, both of which are higher than men. And men think that their Mandarin is generally higher than women in this dimension. Regarding Mandarin and dialects, which language is more proficient in using and able to express oneself better. The survey results show that women choose Mandarin or both. Although men also choose these two more, the proportion of men who choose dialects is
significantly higher than that of women. When speaking Mandarin, women who feel natural are significantly higher than men, and men who feel unnatural, nervous or awkward are higher than women. It can be seen that women are more accustomed to using Mandarin than men, and it is more natural to use Mandarin. For the next generation of language education, women are more inclined to want their children to learn Mandarin than men, and the proportion of children who want to learn both is more men than women. This also reflects that men have a deeper dialect complex than women [24].

5. Discussion

From quantitative sampling and statistics to qualitative analysis and research, these are the basic methods of modern language research. If the samples are true and reliable, the number of samples has reached a certain proportion, and the statistical methods are also in line with the basic principles of social science, then the final conclusion should be credible. The article combines social psychology paired language change experiments with sociolinguistic questions and interviews, which are necessary for college students to investigate their specific language characteristics and the use of dialects and Mandarin.

The essence of language is expressed through the use of language, and the frequency of language use has a subtle influence on the essence of language. In the paired language transfer experiments and subsequent questions and interviews, we can clearly feel the emotional cohesion of each dialect. Although they often think that the dialect is a bit earthy and not very pleasant, sometimes it sounds low quality and not elegant enough, but it sounds very kind and true. It is a manifestation of local customs and customs, and a symbol of regional identity and cultural identity. It represents the characteristics of the locals and the attitude of the citizens, and embodies the characteristics of enthusiasm, wisdom and humor.

College students have a high degree of understanding of social conditions and the value of Mandarin. They believe that Mandarin speakers are more educated, wealthier, more capable, and have a higher social status. Mandarin is
regarded as a popular language in the hearts of young people. It is suitable for formal occasions and facilitates communication between people of different backgrounds. The function of communication and the scope of its use go beyond dialects. Teenagers have a high degree of psychological acceptance of Mandarin, and they have a profound psychological need for the development and use of Mandarin. The survey results show that college students are more bilingual. They often use dialects to communicate with their parents and relatives and friends at home, and they use Mandarin in public places such as schools, shops and restaurants. They use Mandarin when dealing with formal topics such as learning, and dialects when dealing with informal topics such as daily life. The language life of college students reflects bilingual integration, and Mandarin has become the main thinking and communication language for young people to learn.

So far, as far as the local laws of Chinese development and language life are concerned, with the development of a common language, there is no doubt that the influence of Mandarin dialect will be very huge. Not only the use of dialects, but the number of users is also declining, and the pronunciation of certain dialects has also changed, which is the difference between "new dialects" and "old dialects". Generally speaking, "old school" dialects exist among the elderly, while young people are more likely to speak "new school" dialects. The ancient dialects have the characteristic of "all letters still exist", but the initials of the dialects used by young people no longer exist. Of course, the influence of Mandarin accent is not only in pronunciation, but also in words and grammar. Most college students also find that their dialect is not as good as their parents and predecessors. Mandarin has a great effect, so will the dialect one day change? The survey results show that the future language development is: Mandarin will not replace dialects, and dialects will coexist with Mandarin for a long time. Mandarin and dialects play different roles in their fields.

6. Conclusion

As a new subject at the beginning of this century, ecolinguisitics has an incomplete theoretical foundation. For example, at the microlevel, ecolinguisitics mainly uses the relevant methods of analyzing a system of functional linguistics. It is analyzed from the perspective of ecological discourse, but a logical interpretation method has not yet been developed to explain systematic functional linguistics. Therefore, it is necessary for scholars to develop an independent ecological linguistic methodology to explain the ecological phenomena in the text. In addition, the macrolevel of ecolinguisitics mainly studies the diversity of languages, the development of languages and the protection of endangered languages. It does not discuss the impact of language on ecology or the language created by ecology. The process of human language creation and production in nature depends on the nature of the environment. Therefore, the complementary relationship between ecological environment and language needs to be resolved. Scholars should investigate the interaction between language and ecology from the macrolevel in future research. The article uses the Q-learning algorithm to perform key word qualitative and quantitative analysis on some academic achievements of domestic ecological linguistics, to identify hot spots of ecological linguistics by identifying high-frequency key words, to analyze experiments, and to create research content. In addition, it puts forward the current problems facing ecolinguisitics and the future development direction, which provides a research background for future ecolinguisitics research and highlights the research direction. However, there are still shortcomings in the experiment. In terms of the scope and number of subjects, due to the constraints of objective conditions, the subjects surveyed are only college students in Q City. The sample size is not large enough and the scope is not wide enough, and this will affect some research results to a certain extent. Finally, due to the extremely limited breadth and depth of linguistics, coupled with the complexity of people’s language attitude and language use, the article is only capable of reflecting the language attitude and language usage of college students in a more realistic and objective way as a whole. At the same time, it is limited by the lack of time and manpower and material resources. In the process of analyzing the data, the article considers the possibility and convenience of interpretation. Age and other aspects to thoroughly investigate the differences between different individuals, cross-listing related factors, so the revealed characteristics may not be comprehensive.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest.

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