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Knowledge Transfer in Early Modern England: The Role of Culinary Collections and Household Investigation Using THE WASPAS Method

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ABSTRACT

This study examines the progress of English agriculture during the seventeenth and eighteenth centuries, focusing on labor productivity, grain yields, and the expansion of farm size. Using estate surveys, land tax assessments, and Arthur Young's data, it explores how larger farms improved labor efficiency and contributed to agricultural transformation. The research also compares English agricultural performance with French and Russian agriculture, highlighting international differences in farming practices and productivity. Furthermore, the study evaluates five varieties of English, namely Old English, Middle English, King James Bible English, Colonial American English, and Scots English, using the WASPAS method. Four evaluation parameters—rich vocabulary, historical importance, complex grammar, and obsolete vocabulary—are considered to assess their relative significance. The findings indicate that Colonial American English achieved the highest ranking, whereas Old English received the lowest. Colonial American English demonstrated the highest preference value under the WASPAS approach. These results illustrate the usefulness of multi-criteria decision-making methods in comparative linguistic evaluation and provide insights into the historical development and distinctive characteristics of English language varieties.

1. INTRODUCTION

The hallmark of agricultural development in England was the notable increase in worker productivity. This study attributes that growth to higher grain yields and a decline in agricultural employment, driven by the expansion of farm size. Farm size changes in the 17th and 18th centuries are analyzed using assessments of land taxes and estate surveys [2]. Texts that claim to capture spoken dialogue are particularly valuable to historical linguists, as they provide one of the closest representations of real-life interactions among speakers from different social backgrounds before the advent of audio recordings [3]. Focusing on the two Fairfax family books, this essay contends that recipe collections, as records of domestic natural inquiry, offer insight into the transmission and creation of knowledge within early modern English households [4]. In simple terms, early modern Christian beliefs about submission to God inherently included interpretations of the Jewish rejection of Christ as the Messiah. The English Reformation further complicated Christian attitudes toward Jews by presenting an absolute promise of conversion within a discourse deeply influenced by anti-Semitic rhetoric [5]. At the same time, strong neighborhood connections played vital social and economic role Early Modern English communities, thriving in part due to the weakening of extended kinship ties [6]. The inclusion Formulaic practices are demonstrated by the use of

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"et cetera" in a prelude by the early seventeenth century. Men and women in early modern England had access to more than just written guides; formularies from well-known Stuart almanacs were also distributed in manuscript form. In fact, model wills feature spiritual bequests existed in manuscript beginning in the latter part of the thirteenth century [7]. The analysis reveals that both register variation and age-grading play significant roles, with the periods 1500–1575 and 1600–1710 exhibiting markedly different characteristics [8]. This study examines whether the concept of impoliteness, as developed it is possible to apply synchronic pragmatics to diachronic pragmatics. Analyzing two court trial records from Early Modern England confirms its applicability, provided additional dimensions are considered [9]. I juxtapose these perspectives not only to highlight the significant differences in academic viewpoint, but also to stress that both readings must be taken into account in any discussion of nationalism in early modern England. While one perspective places the beginnings of English nationalism—and possibly nationalism in general in the early modern era, the other recognizes how early modern England itself perceived its national roots as extending back to antiquity [10]. In this context, a typeface conveyed information about a text's origins. For example, the Italians referred to roman type as "antique," highlighting the contrast between the ancient and the modern. Moxon, however, classified the three typefaces as roman, italic, and English. A widely reprinted book, such as William Lily's A Shorte Introduction of Grammar, consistently featured its Latin text in roman type and its English text in black-letter throughout the early modern period [11]. The idea of the "public sphere" has gained popularity in early modern English literary criticism and historiography. We contend in this essay that the phrase is helpful for discussing early modern England, but we plan to use it a little differently than most academics have. In particular, we suggest that the story of the public sphere's formation as we describe it can be applied logically throughout the whole era spanning the Reformation to the eighteenth century. [12] These witnesses reflected a growing segment of early modern English society. From the middle of the sixteenth to the middle of the seventeenth centuries, the rapid population growth significantly affected the distribution of resources, leading to an increasing number of landless and land-poor laborers who relied primarily, if not exclusively, on wages for survival [13]. If restricted religious authority, the purposeful replacement of traditional, sanctified rule by authority, and the pervasive use of factory mass production driven by electricity and fossil fuels are the hallmarks of contemporary civilization, then we will not find truly "modern" societies in England before 1850 or in other parts of the world before 1900 or later [14]. Geoffrey's account quickly became a foundational element of English national history, with the English embracing it as a prestigious narrative of their ancient past. The Welsh, too, soon adopted this pseudo history, shaping their own national identity around the idea of a distinguished British heritage [15]. In their search for reasons behind the decline of traditional values and societal stability, many early modern writers expanded upon a medieval notion that the English character was inherently flawed due to environmental influences. Some theorists argued that England's island geography made its people particularly susceptible to the shifting forces of nature most notably, the cycles of the moon and the tides' ebb and flow [16]. To emphasize my perspective that such topics serve as reservoirs of tools for social action, I refer to relatively stable sets of attributions and evaluations as "repertoires." I argue that the continued use of these repertoires in social action reinforced their stability over time. Early modern descriptions and assessments of the character of scholars and gentlemen, for instance, originate from ancient sources [17]. Despite the overwhelming Early modern English culture and philosophy were influenced by Puritanism, although some aspects of Continental humanism particularly Neo-Platonism and the sensuality of Ovid and his contemporaries continued to shape English intellectual and cultural perspectives well into the seventeenth century [18]. Since the majorities of contemporary studies of medieval conduct books concentrates on English texts and are created by academics with expertise in English literature, it makes sense to compare the medieval and early modern eras using English-language works [19].

2. METHODOLOGY

Alternatives

- **Old English:** From around the fifth to the eleventh century, the English language was spoken and written in its earliest form in England Centuries. It was characterized by a complex system of inflections, a rich vocabulary of Germanic origin, and a structure that is markedly different from Modern English.
- **Middle English:** The written and spoken English language stage between the late 11th and the 15th centuries,

following the Norman Conquest. It saw the simplification of Old English's grammar, significant borrowing of vocabulary from French and Latin, and the development of a more recognizable form of English.

- **King James Bible English:** The form of King James Bible, first published in 1611, uses early modern English. It is known for its distinctive phrasing, grandeur, and use of biblical idioms, representing an important moment in English's evolution, particularly in the context of religion and literature.
- **Colonial American English:** The different dialects of English used in the American colonies from the early 17th century until the Revolutionary War. It reflects a mix of British English with regional influences, including aspects of Native American, African, and other immigrant languages.
- **Scots English:** A variety of English spoken in Scotland, which has its own distinct vocabulary, grammar, and pronunciation. It has strong historical connections to Old English but is influenced by Gaelic and Latin, reflecting Scotland's unique cultural and linguistic heritage.

Evaluation Preference

- **Rich Vocabulary:** Refers to the diversity and depth of a language's lexicon. A language with rich vocabulary offers a wide range of words to express various concepts, nuances, and emotions, enhancing its expressive power.
- **Historical Importance:** Describes the significance of a language or period in shaping cultural, literary, or societal developments. A language with high historical importance has had a significant impact on how literature, philosophy, and culture have developed.
- **Complex Grammar:** Refers to the intricacy of a language's syntactic and morphological rules. A language with complex grammar features multiple inflections, rules for word order, and other structures that demand a higher level of linguistic skill for proper use.
- **Obsolete Vocabulary**: Refers to words that were once commonly used in a language but have fallen out of everyday usage. Obsolete vocabulary typically reflects older periods of a language and may be preserved in historical texts, literature, or specialized contexts.

3. WASPAS METHOD

The WASPAS method, short for WASPAS, stands as a sophisticated strategy within multiple MCDA stands for criterion decision analysis. It accomplishes the goal of evaluating and arranging alternatives according to a set of standards [16] Essentially, WASPAS entails several key steps. Initially, decision-makers pinpoint the criteria pertinent to the specific decision conundrum. These criteria can vary widely, spanning from financial considerations to environmental and social impacts, contingent upon the decision's context [17] With the criteria and their weights established, decision-makers proceed to assess how well each option does in respect to each criterion [18] The WASPAS approach introduces a novel method developed alongside HFS. It utilizes expert insights and diverse information to compute scale weights for actions. Modifications to the WASPAS technique include HF-operators and enhancements to the scalar weight estimation procedure [19] Additionally, it harnesses the advantages of the weighted product model (WPM) and the weighted sum model (WSM). However, existing works often overlook precision concepts, focusing instead on temporal evaluations of WSM and WPM composition parameters. Solar energy project implementation priorities have been determined. The effectiveness of the TSPS intuitive fuzzy weighted aggregate is currently being assessed (IF-WASPAS) technique for comparative purposes. This method introduces IFSS operators and a new approach for calculating scale weights, resulting in more objective and reasonable weight determinations. The proposed methodology emphasizes elegance and demonstrates enhanced characteristics through a variety of harmony activities. [20] Following the acquisition of scores for all alternatives and criteria, the WASPAS method calculates an aggregated score for each alternative by summing the weighted scores across all criteria. However, unlike the conventional weighted sum model, WASPAS also acknowledges the interdependencies among criteria by introducing aggregation operators that capture their relationships. These aggregation

operators enable decision-makers to model intricate interactions and trade-offs between criteria with greater accuracy. [21] A frequently utilized aggregation operator in WASPAS is the Choquet integral, which extends the concept of a weighted sum to accommodate interactions between criteria. The Choquet integral takes into consideration not only the individual contributions of each criterion but also their combined effects, thereby presenting a more nuanced and realistic portrayal of decision-makers' preferences. [22] Subsequent to the computation of aggregated scores using the chosen aggregation operator, the alternatives can be ranked according to their general performance. The option that receives the highest total score is the best or most preferred one in accordance with the decision criteria and their respective weights. [23] Decision-makers can incorporate the relative relevance of criteria as well as the relationships between them using the WASPAS method, which offers a systematic and flexible approach to multi-criteria decision-making them into the process of making decisions. By providing a more thorough and nuanced assessment of alternatives, WASPAS facilitates decision-makers in making more well-informed and robust decisions across a diverse array of applications and domains. [24-25]

4. RESULT AND DISCUSSION

TABLE 1. Early Modern English

Alternatives	Rich Vocabulary	Historical Importance	Complex Grammar	Obsolete Vocabulary
Old English	0.43000	0.61000	40.15000	78.00000
Middle English	0.53000	0.81000	39.69000	96.00000
King James Bible English	0.85000	0.23000	49.18000	41.00000
Colonial American English	0.96000	0.35000	58.00000	35.00000
Scots English	0.87000	0.45000	47.96000	67.00000

Table 1 Compares five varieties of early English based on vocabulary richness, historical significance, grammatical complexity, and obsolete vocabulary. Old English exhibits moderate vocabulary richness and high grammatical complexity, reflecting its archaic structure. Middle English demonstrates increased vocabulary richness and historical significance, alongside the highest obsolete vocabulary proportion. King James Bible English shows substantial vocabulary richness and reduced obsolete vocabulary. Colonial American English achieves the highest vocabulary richness and grammatical complexity, with the lowest obsolete vocabulary level. Scots English maintains high vocabulary richness and considerable obsolete vocabulary, preserving traditional linguistic features.

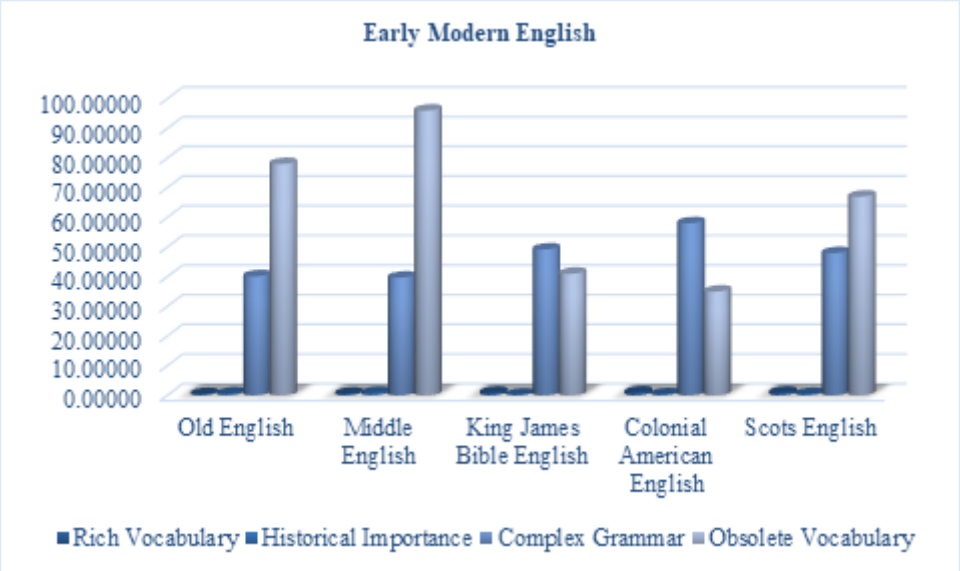


FIGURE 1. Early Modern English

Figure 1 shows the compares different stages of English based on rich vocabulary, historical importance, complex grammar, and obsolete vocabulary. Old English has the lowest rich vocabulary (0.43000) and high obsolete vocabulary (78.00000), reflecting its archaic nature. Middle English shows linguistic growth with higher historical importance (0.81000) but the most obsolete vocabulary (96.00000). King James Bible English has strong rich vocabulary (0.85000) and moderate grammar complexity (49.18000). Colonial American English ranks highest in rich vocabulary (0.96000) and lowest in obsolete vocabulary (35.00000), making it the most modern. Scots English balances vocabulary richness (0.87000) with moderate linguistic complexity.

TABLE 2. Performance Value

Alternatives	Parameter 1	Parameter 2	Parameter 3	Parameter 4
Old English	0.44792	0.75309	0.98854	0.44872
Middle English	0.55208	1.00000	1.00000	0.36458
King James Bible English	0.88542	0.28395	0.80704	0.85366
Colonial American English	1.00000	0.43210	0.68431	1.00000
Scots English	0.90625	0.55556	0.82756	0.52239

Table 2 shows the compares five English language varieties across four evaluation parameters. Old English achieves its highest score of 0.98854 in the third parameter. Middle English records maximum values of 1.00000 in the second and third parameters, indicating strong performance. King James Bible English demonstrates notable scores of 0.88542 and 0.80704 in the first and third parameters, respectively. Colonial American English achieves the highest scores of 1.00000 in the first and fourth parameters. Scots English exhibits relatively consistent performance across all parameters. Colonial American English and Middle English demonstrate the strongest comparative results within the evaluation framework.

TABLE 3. Weights

Alternatives	Parameter 1	Parameter 2	Parameter 3	Parameter 4
Old English	0.25	0.25	0.25	0.25
Middle English	0.25	0.25	0.25	0.25
King James Bible English	0.25	0.25	0.25	0.25
Colonial American English	0.25	0.25	0.25	0.25
Scots English	0.25	0.25	0.25	0.25

Table 3 shows the weight values assigned to four linguistic parameters across different stages of early English. Interestingly, all five forms of English Old English, Middle English, King James Bible English, Colonial American English, and Scots English show identical values across all parameters. Each value is set at 0.25, indicating equal weighting for the parameters under consideration. This consistency suggests that the comparison across the stages of English in terms of the weight distribution is intended to reflect equal importance of each aspect in assessing the linguistic developments of the period. Despite the different evolutionary stages and historical contexts of these forms of English, the parameters themselves are treated as equally influential in shaping the language.This might be a methodological choice to ensure fairness and balance in the comparison, allowing each stage of the language to be analyzed within the same framework, regardless of its unique historical and structural features.

TABLE 4. Weighted Normalized Decision Matrix 1

Alternatives	Parameter 1	Parameter 2	Parameter 3	Parameter 4
Old English	0.11198	0.18827	0.24714	0.11218
Middle English	0.13802	0.25000	0.25000	0.09115
King James Bible English	0.22135	0.07099	0.20176	0.21341
Colonial American English	0.25000	0.10802	0.17108	0.25000
Scots English	0.22656	0.13889	0.20689	0.13060

Table 4 presents the weighted normalized decision matrix for five English language varieties across four evaluation parameters. Old English achieves its highest value of 0.24714 in the third parameter. Middle English records maximum

values of 0.25000 in the second and third parameters, demonstrating strong relative performance. King James Bible English obtains its highest score of 0.22135 in the first parameter. Colonial American English achieves maximum values of 0.25000 in the first and fourth parameters, indicating its leading performance in these dimensions. Scots English shows comparatively balanced results. the matrix highlights differences among language varieties and supports their systematic comparison.

TABLE 5. Weighted Normalized Decision Matrix 2

Alternatives	Parameter 1	Parameter 2	Parameter 3	Parameter 4
Old English	0.81809	0.93156	0.99712	0.81845
Middle English	0.86199	1.00000	1.00000	0.77705
King James Bible English	0.97003	0.72998	0.94781	0.96122
Colonial American English	1.00000	0.81077	0.90952	1.00000
Scots English	0.97569	0.86334	0.95378	0.85016

Table 5 presents the weighted normalized performance of five English language varieties across four linguistic parameters. Old English achieves its highest score of 0.99712 in complex grammar, highlighting its structural complexity. Middle English records maximum values of 1.00000 in historical importance and complex grammar, demonstrating strong performance in these dimensions. King James Bible English scores highly in rich vocabulary (0.97003) and obsolete vocabulary (0.96122). Colonial American English achieves the maximum score of 1.00000 in both rich vocabulary and obsolete vocabulary. Scots English also demonstrates consistently high values, particularly in rich vocabulary (0.97569) and complex grammar (0.95378).the matrix illustrates the comparative strengths of each language variety across the selected evaluation parameters.

TABLE 6. Preference Score 1 and Preference Score 2

Alternatives	Preference Score 1	Preference Score 2
Old English	0.65957	0.62195
Middle English	0.72917	0.66981
King James Bible English	0.70752	0.64512
Colonial American English	0.77910	0.73741
Scots English	0.70294	0.68303
λ	0.5	

Table 6 compares five English language varieties using two preference scores, with equal weighting ($\lambda = 0.5$). Old English records scores of 0.65957 and 0.62195, while Middle English achieves 0.72917 and 0.66981, indicating improved comparative performance. King James Bible English obtains preference scores of 0.70752 and 0.64512, reflecting its position within the evaluation framework. Colonial American English achieves the highest scores, at 0.77910 and 0.73741, demonstrating its leading performance across both criteria. Scots English records 0.70294 and 0.68303, showing relatively consistent results.Colonial American English emerges as the most preferred alternative, followed by Middle English. The equal weighting ensures that both preference scores contribute equally to the comparative assessment of the selected English varieties.

TABLE 7. WASPAS Coefficient

English Variety	WASPAS Coefficient
Old English	0.64076
Middle English	0.69949
King James Bible English	0.67632
Colonial American English	0.75826
Scots English	0.69299

Table 7 presents the WASPAS coefficients for five English language varieties, illustrating their comparative performance based on the selected evaluation criteria. Colonial American English achieves the highest coefficient of 0.75826, ranking

first among the alternatives. Middle English follows with 0.69949, while Scots English records 0.69299, indicating comparable overall scores. King James Bible English obtains a coefficient of 0.67632, whereas Old English has the lowest value of 0.64076. These results identify Colonial American English as the most preferred alternative within the applied WASPAS framework, followed by Middle English. Although Old English has the lowest coefficient, this does not diminish its historical and linguistic significance. the findings demonstrate how the WASPAS method combines the evaluated criteria into an aggregate score to rank the selected English varieties systematically.

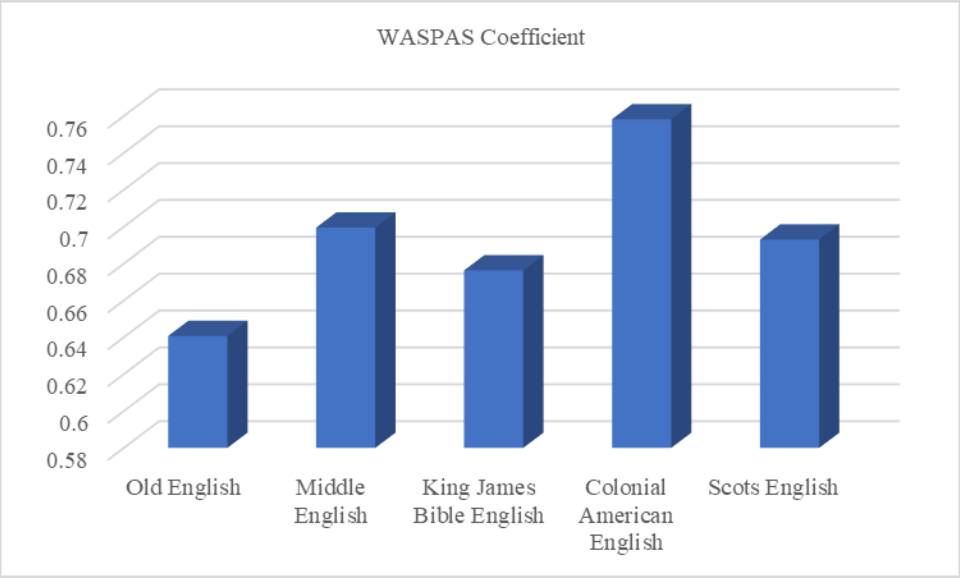


FIGURE 2. WASPAS Coefficient

Figure 2 presents the WASPAS coefficients for different stages of early English, representing their overall linguistic performance based on multiple criteria. Old English scores 0.64076, reflecting its foundational but less refined structure. Middle English achieves a higher score of 0.69949, showing its significant role in the transition to modern English. King James Bible English scores 0.67632, highlighting its influence in shaping literary English, though with a slightly lower coefficient. Colonial American English leads with 0.75826, indicating its pivotal role in modernizing the language. Scots English scores 0.69299, reflecting its preservation of older features while incorporating modern elements.

TABLE 8. Ranking of English Varieties

English Variety	Rank
Old English	5
Middle English	2
King James Bible English	4
Colonial American English	1
Scots English	3

Table 8 presents the rankings of five English language varieties based on their performance across the selected evaluation criteria. Colonial American English ranks first, indicating the highest overall preference, followed by Middle English in second place. Scots English occupies the third position, demonstrating moderate comparative performance. King James Bible English ranks fourth, reflecting its position within the evaluation framework despite its considerable literary and historical importance. Old English ranks fifth, although it remains fundamental to understanding the origins and development of the English language.the rankings identify Colonial American English as the most preferred alternative according to the applied WASPAS method.

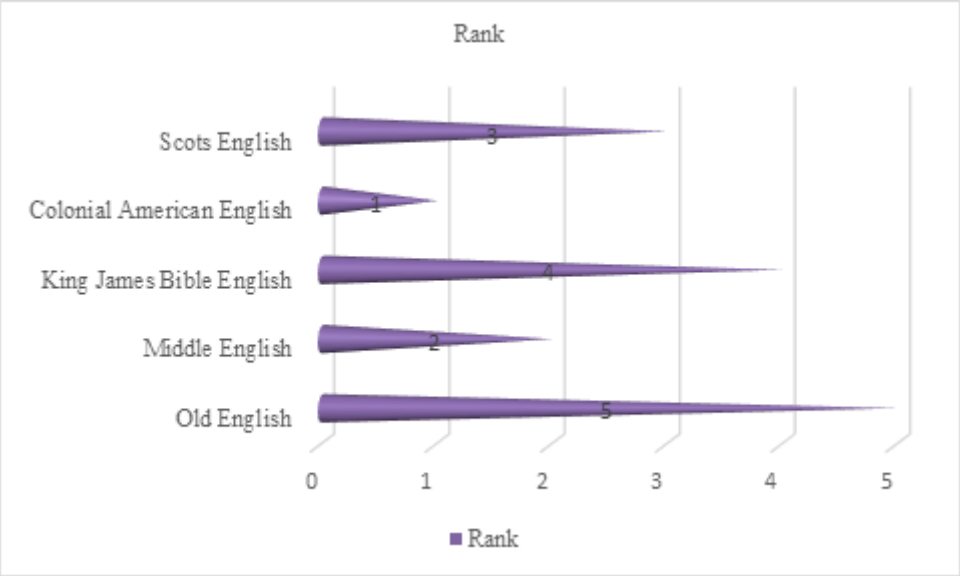


FIGURE 3. Rank

5. CONCLUSION

The study of early modern English agricultural development reveals a clear link between increased labor productivity and the expansion of farm size. The rise decrease grain production, as well as the decline in agricultural employment, was central to this productivity growth. By examining land tax assessments and estate surveys from the 17th and 18th centuries, the study highlights how larger farms were able to reduce labor costs efficiently. Arthur Young's data, which provided valuable insights into Farm size's impact on employment levels, shows that between 1600 and 1800, labor productivity improved significantly, aligning with independent estimates and comparisons with agricultural productivity in France and Russia. This marked a key period in the transformation of English agriculture, driven by innovative land use and the efficient management of labor. The historical significance of early modern English texts, particularly those capturing spoken dialogue, also plays a crucial role in understanding linguistic and social change. Witness depositions, trial proceedings, and other speech-related texts offer valuable insights into the real-life interactions of individuals from various social backgrounds. These sources, which became available in various formats such as manuscripts and printed editions, serve as important tools for historical linguists seeking to understand how language evolved within the social and political context of early modern England. These texts reflect both the linguistic shifts of the period and the growing complexity of social structures. The study of recipe collections, such as those compiled by the Fairfax family, further illuminates the intersection of knowledge transmission and gender roles in early modern households. These domestic texts, which captured the collective efforts of men and women, reveal how household life fostered intellectual engagement and the creation of knowledge. Such texts not only demonstrate the household's role as a site of learning but also highlight the collaborative nature of knowledge production during this time.

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