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### The Art of Counting: Reconstructing Numeracy of the Middle and Upper Classes on the Basis of Portraits in the Early Modern Low Countries

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## The Art of Counting

### Reconstructing Numeracy of the Middle and Upper Classes on the Basis of Portraits in the Early Modern Low Countries

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**Abstract.** In the past decades, numeracy has taken an increasingly important place in the study of human capital formation, as well as in literacy studies and studies on formal education and book production. In order to understand levels of education, scholars have recently tried to develop new ways to measure the level of education, particularly because it has since become apparent that the measures of literacy historically have not always been very accurate. To measure numeracy, population surveys have been used to show that in the past respondents who were innumerate had a tendency to state their ages as round numbers, ending in 0 or 5. Finding suitable data in the pre-modern age to analyze numeracy via age heaping is a cumbersome task, however. In this article, the authors explore the possibilities of using art, especially individual portraits in which the age of the sitter is indicated on the portrait by means of the *Aetatis suae* formula, as a source to study human capital formation and numeracy. This article has two main objectives that contribute to different areas of economic history as well as art history. The authors first demonstrate which criteria should be taken into account when building a database, especially for artistic artifacts. Secondly, they use the dataset to contribute to the understanding of numeracy levels among the well-to-do in the Low Countries in the early modern period. The analysis will show that women's numeracy was often even higher than that of men. Notwithstanding the high overall level of women's numeracy compared to other countries in Europe, the authors will also test the recent hypothesis put forward by Peter Földvári, Bas Van Leeuwen, and Van Jieli Leeuwen-Li that when women's ages were mentioned, they were usually reported as part of a married couple and possibly adapted to the ages husbands reported.

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In the past decades, numeracy has taken an increasingly important place in the study of human capital formation, as well as in literacy studies and studies on formal education and book production. Since the 1980s, economists have begun to regard investments in education and research and development as a way to increase long-term growth (Lucas 2002). This "new growth theory" has contributed to the study of human capital formation in past and present-day societies: To understand why societies experienced growth, it is crucial to understand the levels of education among the various groups. To this end, scholars have developed several indicators, such as literacy rates (cf. De Moor and Van Zanden 2010). Recently, scholars have tried to develop new ways to measure the level of education, particularly because it has since become apparent that the measures of literacy historically have not always been very accurate (Reis 2004). Moreover, historians have begun to wonder whether literacy was the most important type of human capital (cf. A'Hearn, Baten, and Crayen 2009): Were counting and calculating not more important for economic and technological development?

To measure numeracy, economists and economic historians have mainly used population surveys. These show that respondents have the tendency to state their ages as round numbers, ending in 0 or 5, in particular in developing areas. This phenomenon, known as "age heaping," suggests that many people may have been uncertain of their own exact age. Scholars assume that "age heaping" is closely related to unfamiliarity with numbers, and hence, with the incapacity to count and calculate. Although a likely assumption is that of a strong correlation between literacy and numeracy (cf. Crayen 2005), this was not necessarily true historically (De Moor and Van Zanden 2010). In a sense, this should not be all too surprising because while people became literate through formal schooling, they had to acquire numeracy in practice

(see below). It is useful to study both literacy and numeracy as complementary indicators of human capital, and “age heaping” has proven to be a useful topic to study the level of numeracy over time.

In this article, we focus on the northern part of the Low Countries, which had already experienced a revolution in human capital before the eighteenth century: The level of numeracy in the Netherlands and Belgium was by the eighteenth century already much higher than elsewhere in Europe, and in fact it was even higher than in some regions elsewhere in the world today (De Moor and Jan Luiten van Zanden 2010). Evidence has also been found for striking gender differences: Women did not heap as much as men, and when they did, they showed a preference for multiples of 12. Tine De Moor and Jan Luiten van Zanden ascribe this to the denominations used in the monetary system, and suggest that women learned to count in practice, on the work floor and at the market, where the decimal system had not been introduced until the nineteenth century.

Finding suitable data in the pre-modern age to analyze numeracy via age heaping is a cumbersome task, however. Yet, the period before 1800 is probably the least ambiguous period for using data that include the subject’s name, as systematic registration of the population did not yet exist; if individuals can use other documents to verify their year of birth, it is less important whether they are very good in counting and calculating. Before the nineteenth century, the reporting of age was probably much less influenced by the availability of official documents on life events (birth, marriage, death) than later on. Notwithstanding this potential advantage for the quality of the age reporting, finding sources in which ages have been reported for that period is not straightforward either. Some creativity in finding new ways to discover sources suitable for age heaping analysis is necessary. In their studies of early modern numeracy, De Moor and Van Zanden relied on criminal records, pre-marriage acts, occupational censuses, and various other sources, while Jaco Zuijderduijn and Tine De Moor used witness statements (De Moor and Van Zanden 2010; Zuijderduijn and De Moor 2010). In this article, we rely on yet another source of an entirely different type. We explore the possibilities of using art, especially individual portraits in which the age of the sitter is indicated on the portrait by means of the *Aetatis suae* formula, as a source to study human capital formation and numeracy.<sup>1</sup>

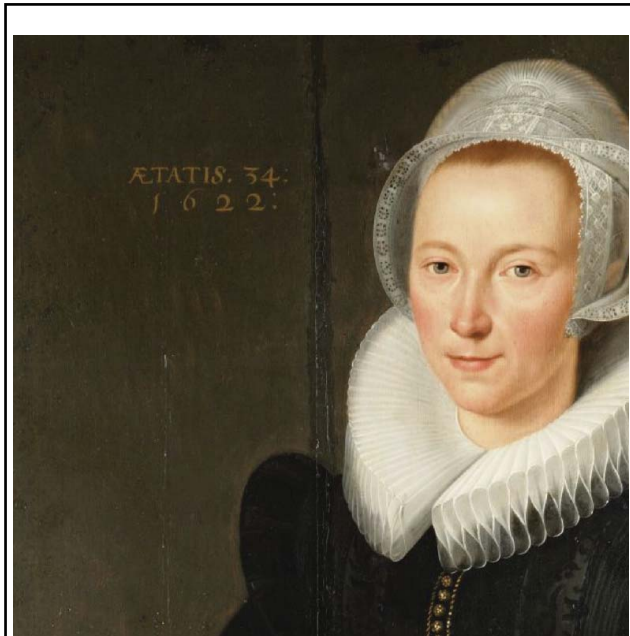
Since portraits were only commissioned by those who could afford them, this type of source also helps to fill another lacuna in numeracy studies. In addition to the difficulty of finding data that mention people’s ages, distinguishing the level of numeracy in several layers of society is often an impossible task. Although we can expect that wealthier individuals would have had better counting skills—since they received more formal training than other groups—it is very difficult to find accurate data for this group, as there are no substantial systematic sources with ages that either focus on these groups alone (with the exception of Robert Fruin [1866]) or sources that allow us to distill sufficient data about

these groups from larger bodies of sources on the society as a whole. Moreover, we usually do not have the right social and economic background information (such as occupational information and income levels) to do so. This is possible toward the end of the early-modern period (e.g., on the basis of occupations mentioned in some censuses), but not for the earlier periods, such as the fifteenth and sixteenth centuries.<sup>2</sup> What is more, when we do have sources dealing with the upper levels of society (e.g., documents on politicians), it is extremely rare to find information about women. And as we will show, it is among women that we can find the more surprising results of our analysis.

This article has two main objectives that contribute to different areas of economic history. First, we try to improve the methodology used for constructing datasets that can be used for age heaping analysis. Much of the criticism on the use of age for numeracy studies relates to the sources used and who reported the ages that were recorded in the sources. We will explain which criteria should be taken into account when building a database, especially for artistic artifacts such as portraits. We will also deal with the two main criticisms that can be given on this way of reconstructing numeracy levels: that it is not certain who reported the age that was mentioned on the painting, and that such inscriptions might have been added to the painting in a later stage, by a painter or another person not necessarily present at the time of painting.

Our second and main objective, however, is to contribute to the understanding of numeracy levels among the well-to-do in the Low Countries in the early modern period, in the hope that this will fill some of the lacunae we have just described. Although we expect that numeracy levels were fairly high in comparison to those in other layers of society in the Low Countries, and definitely compared to the rest of Europe, there is yet no substantial proof of this. We use a source that includes almost exclusively individuals belonging to the middle and upper classes with a substantial amount of surplus income to spend on luxury items such as portraits. Our analysis will show that women’s numeracy was often even higher than that of men. Notwithstanding the high overall level of women’s numeracy compared to other countries in Europe, we will also test the recent hypothesis put forward by Földvári et al. (2011) that when women’s ages were mentioned, they were usually reported as part of a married couple and possibly adapted to the ages husbands reported.

In the first part, we will deal with the methodological issues, and will start by providing some background on the practice of mentioning the age of the subject on a portrait on the basis of the evolution in portrait making. Next, we explain how our dataset was constructed and what the implications are of using portraits as a source for age heaping analysis. In order to situate the data of the numeracy analysis that will follow thereafter, we also describe the social background of the sitters. The presentation of our numeracy analysis follows, and we link these to results that draw on other types of data useful for the study of numeracy, including the study by Földvári et al. on the influence of husbands on their wives’



**FIGURE 1.** Zoom in on the *aetatis* reference “*aetatis* 34 1622” on the painting of Grietje Adriaendr. Grootte, probably painted by Jacob Waben (1622). (Collection Westfries Museum inv. No. 00238) (color figure available online).

ages in the age-reporting process. Finally, we summarize the most important findings.

### Indications of Ages in Early Modern Portraits

Our study of numeracy is based on the inscription of the age of the sitter in many early modern paintings and engravings, in some cases also to be found on the back of the portrait.<sup>3</sup> In the Low Countries, such inscriptions were usually accompanied by the term “*aetatis*” or “*aetatis suae*” (see Figure 1), and the age was often in Roman numerals; sometimes the sitter’s name and the year in which the portrait was made were also included. The term “*aetatis suae*” is not only frequently indicated on portraits of the period, but is also a standard term on gravestones, although these are not included in our study (Van Belle 2006).<sup>4</sup> Usually, the reference to the age of the sitter on portraits was in Latin, but there are some cases in which it was indicated in German or Dutch, as in the painting of Jost Amman (De Jongh 1986, 20) and in a number of Dutch paintings where instead of *aetatis suae*, the age was preceded by “*ou*” (equivalent to the English “old”).<sup>5</sup>

Portrait painting became a major genre in the Low Countries during the fifteenth to seventeenth centuries. Even today, there are still more than 50,000 portraits from this period that were painted in the former Northern Netherlands alone.<sup>6</sup> Art historians view the portrayal of individuals, sometimes in the company of family members, as a clear indication of the emergence of an individual identity. But what were the specific motivations for having one’s portrait or that of a



**FIGURE 2.** Portrait of Elisabeth van Culemborg. (Collection Museum Elisabeth Weeshuis, Culemborg) (color figure available online).

family member or friend made? There are many answers to this question. Very generally, portraits are made to remember the person portrayed. Another obvious reason was prestige, which was true for the rising middle class as well as for the nobility. Noteworthy is that on the portraits of this latter group, however, there are often no references to age. Our analysis does indeed show that the majority of indications of age were on paintings of burghers, immortalized on the so-called “regent portraits” (Adams 1997). Portraits were made as a way to commemorate the sitter, often pictured in his/her family context, and in a substantial number of cases this commemoration should be considered as a token of gratitude for the generosity of the sitter, as in the portrait of Elisabeth van Culemborg, accompanied by both her (deceased) husbands, all of them painted as if they were 30 at the time of the painting (*etatis cuiuslibet eoru(m) circa an xxxi*) (see Figure 2).<sup>7</sup>

Age itself, especially in the case of the elderly, may also have been a reason for having a portrait painted, even if the old man or woman was not wealthy enough to pay for it him/herself. In an age when life expectancy at birth was on average no greater than 40,<sup>8</sup> individuals who were much older than this would have been exceptional and deserved to be commemorated. Even for the well-to-do who most likely had a higher life expectancy, some very old individuals earned respect. The text on the portrait of Zierick Floris (1551, portrayed by an anonymous painter of the Alkmaar school) reads “ZIERICK FLORISZ OUDT BOVEN DE HONDERT IAER WAS TEGMONT VOERDE REFORMATIE EN CLAES CORVEN WAGENAER,” indicating that he was above 100 at the time of the painting. Zierick had been a servant at the abbey of Egmont and later worked as the “coach driver” (“*waegenaar*” in the painting) by Claes Corf, who was a steward at the abbey and the duchy of Egmond as well as mayor of Alkmaar. This Claes Corf was particularly famous for invoking the Rebellion of the Cheese and Bread people,

a peasant revolt in 1491. It is unclear who commissioned the painting, but on the basis of Zierick's occupational history, it seems unlikely he would have had money to spend on a portrait (Vis 1994, 14–5). Considering the explicit mention of Zierick's master, and the fact that he by all means would have had the money to pay for a portrait, it is not unlikely the latter in fact commissioned the portrait.

In the case of women, inscriptions on portraits, especially for young women, were often added to stress their virtue and reliability as a (future) wife. Several examples can be found, for example, the portrait of Reynu Meynertsdr. Semeyns of 1595 (see Figure 3), which was part of a pair of portraits (but that of her husband has been lost) in honor of her second marriage in that year to the famous merchant and explorer Jan Huygen van Linschoten.<sup>9</sup> The *aetatis* reference (AETATIS/ SVAE 31/ 15 / 95) and the family seal were accompanied by an explicit reference to Reynu's virtue as a wife (“REYN-OV = / ER.AL.IN / LIEFDEN / GETROV / IS HET / BESTE SIERAET / VAN EEN / DEVCHTSAME / VROV”), whereby the first two parts can be translated as “thoroughly pure,” but they also include a reference to the bride's name (cf. De Jongh 1986 [cat. 15]; Ekkart 1985, 47; 1990, 188). The reference itself deserves some explanation, especially because of the lady's marital history: At the time of her marriage in 1595, she was already four months pregnant with her daughter Maritje. This text and the sober presentation in combination with the spotless white handkerchief—handkerchiefs were in those times exchanged between lovers as a token of love and loyalty (De Jongh 1986, 110)—was supposed to convey a message of virtue and honor. It is unclear whether such additions to the portraits were usually made in case women had something to hide. Other examples, such as that of an unidentified younger woman of 21 (portrait painted in 1552), with a reference to virtue on the frame of the portrait (“Prijst eerbaerheit/Anno dni 1552”), suggest that painting such references could also have been used to increase the marriage chances of young women (De Jongh 1986, 112). Several other pictorial references besides textual inscriptions were used to reflect unity of moral values, both for individuals and for couples.<sup>10</sup>

The fact that an age is indicated for the individual portrayed adds another important feature to the portrait as a source: The person was not supposed to represent an anonymous individual, but a clearly identifiable person with a name (that we may or may not know), with a specified age and status, to be inferred from their clothing or accessories. In case the painter was portraying an anonymous individual, however, it would have been most unlikely for him to add an age to this painting. Such anonymous paintings might also have been intended by the artist as ways to exercise the representation of emotions or physical expressions, as was typical in the so-called *tronies*, another type of artistic genre.<sup>11</sup> The *aetatis suae* inscriptions on portraits are a typical north-western European—in particular Dutch, Flemish, and English—custom that began in the fifteenth century and is in literature often associated



**FIGURE 3. Portrait of Reynu Meynertsdr. Semeyns, in honor of her marriage to Jan Huygen van Linschoten (April 2, 1595) at the age of 31. Portrait by Jan Claesz.**

with the historic emergence of the individual and the modern family, as recognition of an individual's age was an important factor in placing that individual in society (Aries 1962, 15–8; Wrightson 1982, ch. 3–4). By the middle of the seventeenth century, this custom of inscribing ages on portraits had dwindled substantially, as we will show on the basis of our analysis. In later periods, the inscription can still be found occasionally as on paintings by an early American (eighteenth century) painter often referred to as the “*Aetatis suae* Limner (of Albany)” (cf. Blackburn 2011; Quimby 1971), who added the expression to his paintings as a way to invoke an old European tradition that by that time had long passed.<sup>12</sup> Even in the twentieth century, it was used on some occasions as on the portrait by Gabriel Ferrier done to commemorate the art collector Harry Elkins Widener (1885–1912), who died on the Titanic, *aetatis suae* 27. But clearly, the inscription was most popular during the Dutch Golden age.

### Using the *Aetatis Suae* Reference for Critical Numeracy Reconstruction

Although age heaping is a method that opens a large source of new ways to approach human capital formation throughout

history, it must be used with care. One of the vital preconditions for sound use of the method is the selection of sources. In this article, we have dealt very carefully with this, especially because portraits have never before been used for this purpose. After describing how the analysis of age heaping should be done, we will explain how we constructed a database with as little bias as possible.

The method we apply in this article uses the Whipple index. This measure indicates to what extent reports of ages ending in a five or a zero are overrepresented in the population distribution (A'Hearn et al. 2009; Crayen and Baten 2006; United Nations 2011). The total number of persons with an age ending in a five or zero is divided by one-fifth of the total number of people in this age group, because logically one-fifth is the number of persons that may have actually been that age. The result is multiplied by 100.<sup>13</sup> By implication, a Whipple-index of 100 indicates there is no age heaping; the maximum value is 500, or when all respondents report an age ending in a zero or five. This measure is only used for ages 23 to 62, as in demographic terms this is the most stable population group (after 62, there is a greater chance that mortality will influence the patterns).<sup>14</sup>

The most common criticism about the use of ages for reconstructing numeracy is that it is uncertain whether the person's age was given by the person him/herself. Considering portraits, the only case in which there can be certainty about the age indicated is for a contemporary self-portrait, but these were only a small minority, such as the self-portrait of Dürer from 1500<sup>15</sup> or the self-portrait of Poussin from 1650.<sup>16</sup> Although it is impossible to be absolutely certain about who was responsible for providing the information in any historical source, there is some variation among sources: In some criminal records (e.g., witness statements), people themselves are more likely to have reported their ages than in others (e.g., a census that noted the ages of the whole household and the head of household may have added all the ages of the members of the household). In portraits, it is not always clear: On the one hand, it is possible that the painter spent a substantial amount of time with the sitter in the same room and thus had plenty of time to ask the latter for his or her age, although in many cases, the painter started off with making drawings of the face and hands of the sitter and later returned; the sitter did thus not have to sit through the whole process of portrait making. The duration could vary from only two visits, as with a remarkably fast and productive painter like Michel van Mierevelt (see below) to several days or weeks (as in the case of the painter Gerard Dou (De Jongh 1986, 21)). On the other hand, the inscriptions on the painting may have been agreed upon in advance between the commissioner and the painter. In our selection of cases, we try to take into account both possible options by excluding as many doubtful cases as possible, on the basis of a number of criteria we will now discuss.

The most essential condition for including a portrait in our analysis is that the sitter was still alive at the time the

portrait was painted. Elsewhere, De Moor and Van Zanden have argued that age heaping analysis cannot be done on the basis of ages mentioned on gravestones, a method that has been used for the reconstruction of numeracy in Roman times, simply because it is obvious that the person cannot have reported his/her own age to the stonecutter. Following the same reasoning, we will not include portraits of individuals who were most likely no longer alive when the painting was done. There are several ways to identify such cases. The most obvious way is to exclude all those paintings that were made after the sitter's death. This, however, requires that we are informed about the sitter's identity, which is not always the case. In our final database, still one-third of the sitters remain unidentified. And still, we could not find the year of death of all of the identified sitters. For those of whom we did know the year of death of the sitter and of the portrait, it was possible to exclude those painted after the life of the sitter.

Besides this basic method, we must find additional ways to exclude potential biases from the database, on the basis of other assumptions. To start with, there are examples in which a deceased person is portrayed but whose age is not recorded unlike the other people in the painting. In the painting of Pieter Pieters and his wife Gertrude Swinnens, their respective ages of 77 and 72 are indicated, but the age of their only daughter Anna is not given. Pieters and his wife were the founders of the Saint-Nicolas-foundation established to care for poor orphans. The painting was intended to commemorate their generosity to the orphanage for many years. Anna had died a few years before, when she was not older than 28, and this was indicated by the painter by a red cross next to her head, rather than an *aetatis suae* reference (De Sloovere 1959).

Another example is the portrait of Elisabeth van Culemborg and her two husbands (see Portrait 2).<sup>17</sup> The unusual mention of "circa" in the indication of the ages suggests that the painting was not intended to provide a precise indication of Elisabeth's age. Moreover, the fact that both her husbands were shown in the same painting indicates that in this case the *aetatis* reference was only provided to situate the painting in Elisabeth's life. It is also known that the painting was made after her death in 1555, and that it was composed on the basis of other paintings made of Elisabeth in the company of one of her husbands (Van Bueren 1999, 253–4). The age of 30 is probably based on the age of her first husband, Jan of Luxemburg, at the time of his death.<sup>18</sup> What we can glean from the above examples is that they suggest the possibility that the sitters could be pictured (in any portrait) as if they were at a particular age. However, both of the above examples were not commissioned by the sitters themselves but by the orphanages they founded. The Nicolas orphanage in Bruges had been founded in 1599, 17 years before the actual painting; the Elisabeth orphanage was built between 1557 and 1560, a few years after Elisabeth's death.



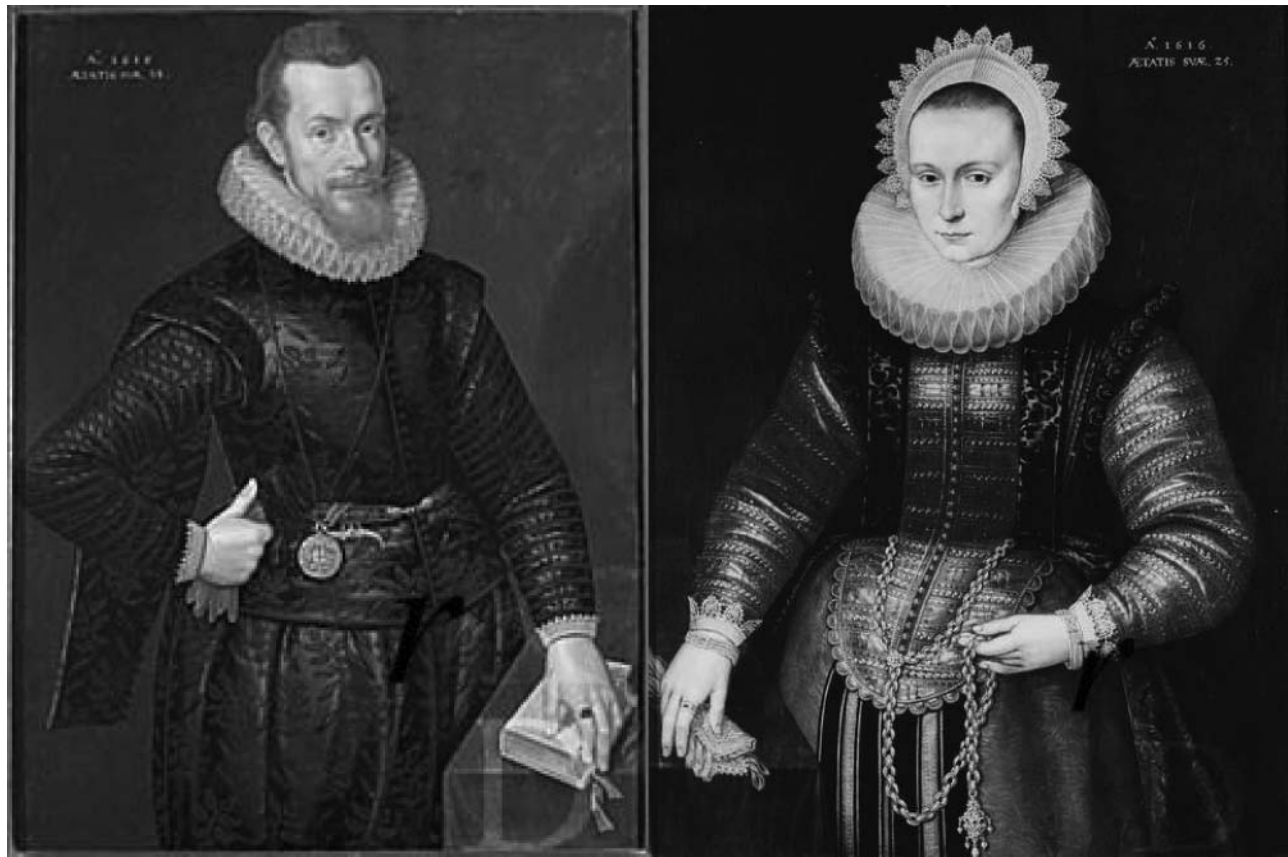
**FIGURE 4.** Portrait of a family (1620), attributed to Jacob Lambrechtsz. Loncke, showing *Aetati* above every person (left to right: woman: 20; man: 29; man: 24; woman: 29; man: 6; woman: 57; child: 1 3/4; man: 25; woman: 40; man: 24).

Other portraits were clearly painted after the death of the sitter (e.g., deathbed portraits) such as the “Doodsbedportret van Franciscus van der Meersch S. J. (1608–1661),” an anonymous work dating from 1661.<sup>19</sup> A number of other portraits do not bear any reference to the death of the sitter but have obviously been painted much later. This can be seen from a comparison between the period of the painter’s life (if identified) and the life of the sitter (if identifiable), or when the sitter was a renowned individual, such as Ubbo Emmius, a Frisian historian who lived from 1547 to 1625, but was painted by Fridericus Carolus de Hosson (1718–99) in 1793 (cf. Thieme and Becker 1924, 549).<sup>20</sup> The same goes for the portrait of Volcher Coiter, a well-known Dutch anatomist, painted by Johann Friedrich Leonart (1718–99), who was portrayed as being 41, which is no less than 93 years after his death. For well-known sitters such as the above two gentlemen, it was quite common that the painter (or the one commissioning the work) preferred that the subject be portrayed when he produced his most important work. Coiter, for example, wrote his masterpiece on ornithology *De Avium Sceletis et Praecipuis Musculis* in 1575, at the age of 41. But there are some other ambiguous cases: We have excluded from our database a drawing of the famous Kenau Simonsdr. Hasselaer (1526–89), published by Isaac Tirion 171 years after her death, but copied from an original of 1573, thus within the lifetime of Kenau.<sup>21</sup> Copies of paintings have also been excluded from the dataset<sup>22</sup> if the copies were made

within the lifetime of the sitter, insofar as we could trace this.

Another criterion for restricting the selection of portraits was to exclude portraits with more than one sitter, such as family portraits (as in Figure 4) or group portraits, as it is very unclear who was responsible for providing the ages of all the sitters in such portraits. This is also true for the portraits of a husband and wife in a single painting, as well as for larger groups (e.g., militia). In some cases, mythological figures were added to group portraits, such as in “Mozes en de Tafelen der wet, omgeven door leden van de Antwerpse familie Panhuys” (Moses and the Ten Commandments, surrounded by members of the Antwerp family Panhuys), by Maerten de Vos, dated 1574.<sup>23</sup> Whether painted from real life or mythological, all portraits containing more than one person have been excluded from the database. Although some might argue that even in the case there were more people being portrayed, it is still possible that each was asked for their age directly by the painter, we prefer to exclude this potentially biased material from the database.

One of the situations we can check for potential influence by others in reporting the age is the possibility that the husband reported his wife’s age, as may have been the case in separate pair portraits. In these, the man was usually depicted on the left, with his body twisted slightly to his left, and the opposite was the case in the wife’s portrait on the right, with her body twisted slightly to her right (see the example in



**FIGURE 5.** (Separate) portraits of Johan Kelffken and his wife Suzanna Dorre, 1616 (unknown painter), aged 33 and 25, respectively (De Jongh 1986, 117; RKD 2012, nos. 71943–4). *Note.* See also “Portretten van echt en trouw,” (117) and the RKD portraits database (IB nos. 71943 and 71944).

Figure 5.)<sup>24</sup> Földvári et al. argue that the levels of female numeracy in large parts of the Low Countries in the early modern period were probably influenced by their husbands; they claim this was so based on an analysis of nineteenth-century sources, and that the age heaping of married couples was substantially lower than that of singles, thus suggesting that men had a significant say in the process of reporting their wife’s age. As we will show, a substantial part of our database consists of portraits that were the “pendant” of another portrait. Rather than excluding them from our dataset, we will compare these cases with other paintings that were not identified as being “pendants,” and thus test Földvári et al.’s hypothesis.

As with all age heaping studies, special attention should also be paid to preferred ages because of their symbolic value. The most notorious example often referred to in age heaping studies is the Chinese preference for being born in the year of the dragon, which leads to exceptional age heaping in some years.<sup>25</sup> With respect to portraits, the literature mentions that commissioners often had a preference for being pictured as

being 30 or 33, referring to the ages of Jesus at his first public appearance and at his death. During the Middle Ages, being portrayed at these ages was a common practice, stimulated by the texts of Paul, Augustine, and Honorius of Autun, but it still occurs in later periods as well (De Jongh 1986, 23, fn. 4). The 1630 portrait of a Catholic couple painted by Gerrit de Jongh including the reference “*uterque aetatis 30*” (both 30) is a clear example of this (Thiers 2005, 16).<sup>26</sup> The text on the portrait made by Jost Amman (1565) of an unidentified, angry-looking man directly links the age of 30 to the (beginning of the public) life of Christ: “*Christus ist mein Leben/Seines Alters XXX Iar/Anno Domii M.D.LXV*” (“Christ is my life/his age 30 year/1565 AD”) (De Jongh 1986, 22). To a certain extent, the paintings that indicate a symbolic age were made for commemorative reasons (see also the painting by Ebbo Emmius), thus making it logical to exclude them from the database, because they were painted after the death of the sitter. Extra biographical information and information on the timing of the painting was used to confirm our assumptions about this aspect.



**TABLE 1. Distribution of the Data According to Category of (Reported) Age and Sex**

Reported age ( <i>aetatis</i> )	% Women	% Men	% Total	<i>N</i> Women	<i>N</i> Men	<i>N</i> Total
23–30	30.86	22.00	25.18	200	255	455
31–40	26.39	30.28	28.89	171	351	522
41–50	21.45	23.12	22.52	139	268	407
51–62	21.30	24.59	23.41	138	285	423
Total	100.00	100.00	100.00	648	1,159	1,807

Source. Portrait database.

Although extra biographic information about the portrayed individuals gave us additional possibilities for analysis, we have not excluded portraits of all men and women whom we could not identify. We could provide a name for the sitter for nearly two-thirds of the portraits (678 out of 1,807 could not be identified). As we will show in the next section, knowledge about the year of birth, when combined with the year of the portrait, allows us to reconstruct the real age and compare it to the reported age, which is unique in numeracy studies, giving us a fairly unusual empirical starting point for our analysis. There is, of course, a possibility that the dating of the painting was incorrect. As much as possible, we have excluded such doubtful cases on the basis of references by art historians in the literature. This was the case for the portrait of Laurens Portman gen. van den Bergh (1562–99). Although the inscription mentions “AETAT. 29 ANO 1575,” the date of 1575 is probably about 20 years too early, considering the clothing the man wears. This painting was heavily restored, and the date was probably confused with 1595 at that time. This would explain why there is an age difference of 16 years between the probable age of Laurens at the time and the indicated *aetatis* age. The doubtful inscription urged us to exclude this, and similar cases, from our sample.

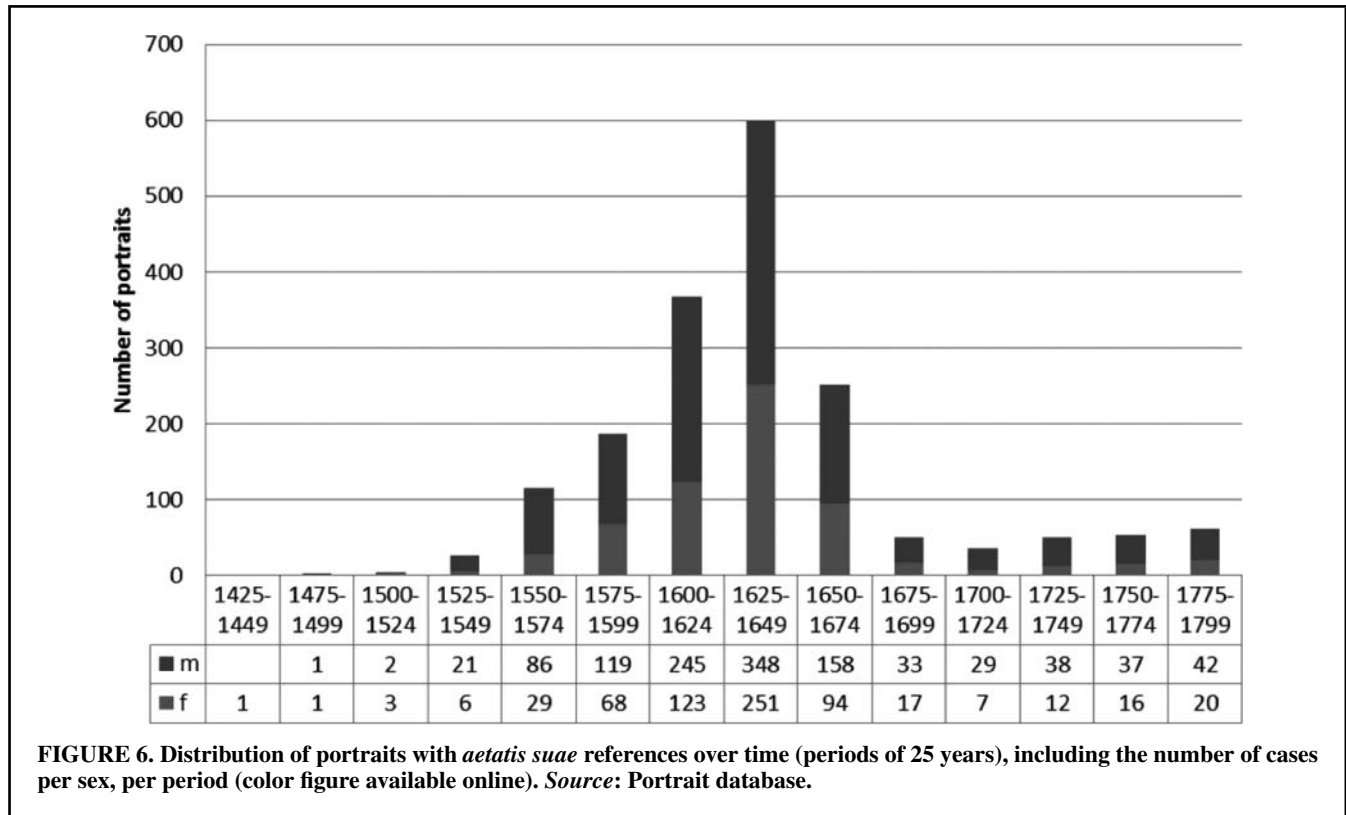
To enable a systematic analysis of the influence of gender differences in terms of numeracy, we have only included those cases where the gender of the sitter could be established. This means that a substantial number of children’s portraits were not included in our selection. Nevertheless, this does not affect the age heaping analyses. In line with normal age heaping procedure, we have restricted the selection to *aetatis* references between 23 and 62 years (see above, Introduction). Children would thus not be included in our age heaping analyses anyhow.

To summarize, portraits that met one or more of the following criteria were not included in our database:

- portraits that were made after the death of the sitter,
- portraits with more than one sitter,
- copies of older portraits,
- portraits that included deceased sitters,
- portraits that were of a clear mythological nature,
- portraits in which the sex of the sitter could not be identified, and
- portraits with sitters younger than 23 or older than 62.

Based on the criteria described, we collected a dataset of 1,807 portraits, of which 648 were of women and 1,159 were of men, all within the range of 23–62 years of age. The age distribution (according to the reported age) in our dataset was fairly uniform over the various age categories, but there was a majority for the age category 23–30 for women, and 31–40 for men, which corresponds to what was expected, as weddings were particularly important occasions for (pairs of) portraits (Table 1).<sup>27</sup> This is confirmed by the fact that the respective age categories are also those in which most portraits that were part of a pair portrait could be found.<sup>28</sup> To a certain extent, this concentration around marriageable age affects the age distribution in the database, but as will be explained, this is taken into account in the interpretation of the results.

The dataset covered data for the period 1439–1799, and very few actually date from the fifteenth century. We have an exact year of painting in 95% of the cases ( $N = 1,730$ ), but in order to include the other paintings, each of the portraits has been attributed to a specific quarter of a century on the basis of pictographic elements such as dress. Not surprisingly, more than half (53%) of the portraits dated from the first half of the seventeenth century. Although our data are also influenced by the availability of the portraits and by our previously described selection criteria, Figure 6 shows a clear increase in the popularity of *aetatis suae* references, especially from the mid-sixteenth century onward. In the genre of regent portraits, the *aetatis* reference was especially popular.<sup>29</sup> The literature provides various reasons for the enormous growth in the number of regent portraits in the seventeenth century. Some stress the supply side: Painters were increasingly willing to paint for money, even if some art critics, such as Karel van Mander in 1604 and Gerard de Lairese in 1707, claimed that portrait painting was just a menial type of art (Adams 2009, 13; Van Mander 1604, 280v–1v). Some portrait painters even became wealthy, and in any case



portrait painting guaranteed a steady income (Adams 2009, 12). Others stressed the changes on the demand side, with burghers wanting to present themselves as important individuals able to pay for portraits.

As Figure 6 shows, soon after the middle of the seventeenth century, the reference appears significantly less often. There are a number of potential explanations for this. This may have to do with a decreasing interest in portraits, but also in what one really wanted on the painting. As so many painters by that time had adopted the inscription, it might have lost some of its exclusiveness and maybe had even become slightly vulgar in the eyes of the sitters and/or painters, and thus lost some of its attractiveness. Another potential and more artistic explanation is the increasing demand for paintings that were real-life-like and the increasing role of illusionism in the design of the piece of art. An inscription might have ruined the illusion that the portrait was actually made on a flat surface.<sup>30</sup>

Notwithstanding the methodological consistency we applied to compose our dataset, there are of course still some potentially worrying issues, mainly from the art historians' perspective. We should mention in particular the possibility that the age might have been added to the painting later. Absolute certainty about this can only be established by scrutinizing the layers of paint and varnish on every single portrait, which would be a most time-consuming effort for experts

in the field, probably leading to a very small sample with great certainty about the quality of the data but insufficient critical mass to analyze it properly for numeracy purposes. It should be stressed, however, that the main objective of our article is to use these data for the study of numeracy, not the study of the portraits themselves. As such, the question is whether the use of the *aetatis suae* inscription should stand the “methodological validity”-test in comparison with other sources used for numeracy-studies, not with studies on the history of portraiture. Overall, the main concern in numeracy studies is—apart from finding sources that mention ages—the question of whether the age mentioned in the source has also been given by the person him- or herself. This remains a concern with portraits, but there is no reason to assume that the *aetatis suae* inscriptions would be a worse reference than any other age-mentioning source. The main concern in this sense usually goes to the position of women in the whole process: Did they themselves or the husband or fiancée or sometimes even their father report their age? This issue has already been addressed in studies of data other than portraits. A similar concern might be relevant for paintings, whenever the (future) husband was keen on having his fiancée or new wife eternalized in two dimensions and also had the money to make this happen. As we will demonstrate, however, there are even more options with paintings to analyze this, thanks to the availability of pairs of portraits. We

will address this issue in our analysis of age heaping further on in this article.

### Who Was on the Portraits?

Except for the example of Floris Zierickz, all cases mentioned suggest that the sitters that form the subject of this study clearly did not belong to the lower classes. Although by the seventeenth century paintings were to be found in many Dutch homes (Adams 2009, 12; Schuurman 1989, 87–9), as suggested by historians of art and material culture and by contemporaries such as the Italian Vincenzo Giustiniani (Bok 1994, 53–4), most paintings would have been produced for an anonymous market. Portraits of individuals were usually painted on a commission, and hence, were probably relatively expensive. Estimates of the popularity of portraits are somewhat optimistic. Michael Montias suggested that “most newly married men with at least moderate assets—say in excess of 500 guilder . . . had their portraits painted, usually along with their spouses” (Montias 1982, 193). His claims about the income level of the commissioners were in part confirmed by Thera Wijsenbeek, who counted the average number of portraits in probate inventories in Delft, in the eighteenth century.<sup>31</sup> For the wealthiest classes, she was able to demonstrate the availability of a substantial number of portraits (for instance, an average of 12 in 1706–30), in contrast to far less evidence for the availability of portraits among lower classes (Wijsenbeek 1987, 455). It is even more difficult to say anything about the popularity of portraits in the fifteenth and sixteenth centuries: Filip Vermeylen’s study of sixteenth-century Antwerp shows that by and large, 18% of the paintings found in probate inventories were portraits. Many of these were ordered by members of the “commercial classes” (Vermeylen 2003, 149).

The general price level of portraits in the fifteenth and sixteenth centuries is equally difficult to reconstruct. We know that in the seventeenth century, when a market for art had emerged, it was possible to have a portrait painted for as little as 6 guilders. Another indication is provided by the debts

customers owed to the deceased painter Mierevelt, sums between 18 and 60 guilders (Montias 1982, 193). These prices are in the same range of those reported by Ad van der Woude. He used the Getty-Montias database of seventeenth-century paintings to calculate average prices for portraits and arrived at 13 guilders for anonymous paintings and 82 guilders for those ascribed to a master (Van der Woude 1997, 248). Bearing in mind that prices depended on the cost of materials, the time needed to execute the painting, and the artist’s reputation (cf. Boer-Goossens 2006, 60; for a recent survey of research into the art market of the Dutch Republic, cf. Sluijter 2008), it seems reasonable to assume that the majority of paintings would have to be situated in the range of 10–100 guilders, although certainly more expensive portraits were being made as well. This would have amounted to 11–111 days’ wages for an unskilled laborer and 7–71 days’ wages for a master.<sup>32</sup> If we consider that these were the prices paid in the commercialized context of the seventeenth-century art market, it seems safe to assume that in the fifteenth and sixteenth centuries prices of portraits were more likely to be at the higher end of these estimates.<sup>33</sup>

Another way to estimate the wealth of the sitters is to check the names in our dataset with the 1631 two-hundredth penny tax of Amsterdam and its surroundings. This property tax was levied on everyone with possessions in total valued at more than 1,000 guilders (Frederiks and Frederiks 1890). To ensure that the taxation source would provide representative results, we sampled the sitters of those portraits painted between 1627 and 1634. This yielded 114 portraits, in 58 of which the sitters could be identified. Seven of them could be traced to the registers of the 200th penny tax of Amsterdam, a somewhat low figure, but nonetheless a realistic one, since many sitters are likely to have lived outside Amsterdam.<sup>34</sup> Although these people were all quite wealthy, tax assessments ranged from 5 to 1,000 guilder, which indicates that portraits could be purchased by a relatively large group of people (Table 2). In fact, even Pieter Seijen, who could be found in the lower tax strata, was able to commission a portrait to be painted by Rembrandt, which seems to suggest

**TABLE 2. Estimated Wealth of Sitters in Guilders, 1631**

Sitter	Painter	Year	Tax assessment	Estimated wealth
Loncke, Hendrik Cornelisz	Hondius, Willem	1630	60	12,000
Pauw, Reinier	Vliet, Willem van der	1631	1,000	200,000
Baeck, Laurens Joosten	Pickenoy, Nicolaes Eliasz	1629	500	100,000
Teylingen, Maria van	Hals, Frans (I)	1628	25	5,000
Boelens, Pieter	—	1627	150	30,000
Seijen, Pieter	Rembrandt	1633	5	1,000
Limborch, Frans van	Keyser, Thomas de	1632	250	50,000

*Note.* A tax of 0.5% was levied over the estimated wealth, but only of those householders worth 1,000 guilders or more.

*Source:* Portrait database and Frederiks and Frederiks (1890).

that the range of wealth classes portrait buyers would have come from was not so restricted.

Apart from their ability to invest in portraits, we also must have at least a general understanding of the education of this group of sitters, as we will be analyzing their level of numeracy later in this article. Without any doubt, the people in our population had received a primary education: The well-to-do were already schooled before the “dramatic growth in education” in England and elsewhere in Europe from 1480 to 1530 (Moran 1985). Nobles at least prepared their children for an academic education, and in practice quite a few had themselves received some education: Almost 31% of the high nobility in Holland had received an academic education (Janse 2004, 37). A degree opened doors to a career in the Church and government: In the fifteenth and sixteenth centuries, 25%–43% of the members of the Council and *Chambre des comptes* in The Hague had studied at a university.<sup>35</sup>

Whether and how students also learned to count and calculate is difficult to say. We know from literature such as the knightly romances what virtues noblemen and women should possess. However, as the historian of education Nicolas Orme remarked, “the list of what should be learnt remained by contrast relatively undefined” (Orme 1984 113; 2006). What little we do know of schooling does indicate that teachers dedicated much of their time to making children literate, and that counting and calculating only became part of the curriculum over time (Kool 1999, 43–5; Post 1954, 97).<sup>36</sup> In the Low Countries, and probably elsewhere as well, an education in basic arithmetic was initially only provided in a private schooling system, which gradually emerged in the sixteenth century. This may be where the children of merchants and magistrates learned how to count, but it is difficult to imagine nobles arranging for private education in arithmetic, at least at this early stage (Kool 1999, 45–52; cf. Roberts 1988, 108). Education is not the only way in which the skills of counting and calculating could be mastered, however. Elsewhere, De Moor and Van Zanden have suggested that there may be a clear link between the socio-economic activity in the North Sea area and the remarkable and early high levels of numeracy in the region (De Moor and Van Zanden 2010, 182). Because of their role in selling commodities and as wage laborers, women were often active participants in economic exchange, and they may have been actively trained in dealing with small budgets in addition to the usual household budget. Moreover, there are indications that their relatively equal position within the household played an important role in their human capital formation (Van den Heuvel 2007).

### From Ages in Paintings to Reconstructing Numeracy

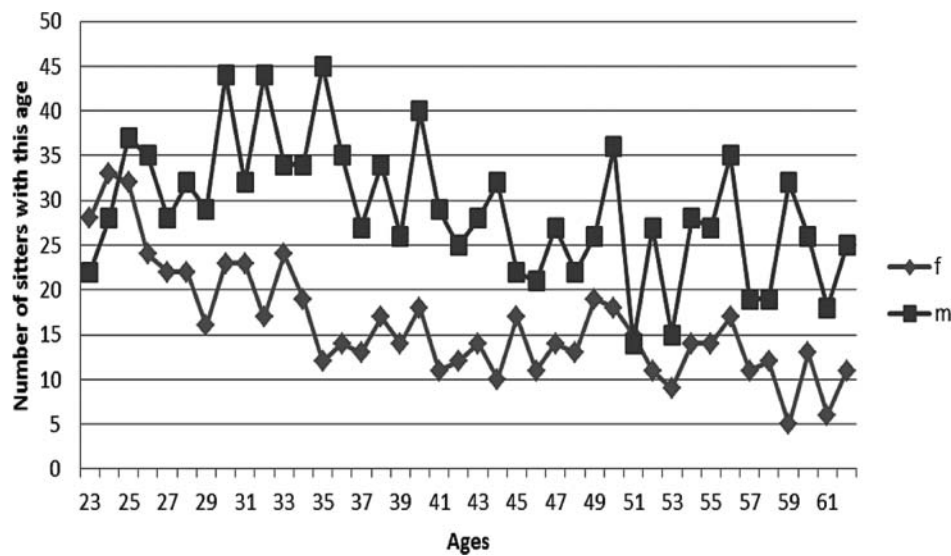
In this section, we focus on several issues: the basic numeracy analysis, supplemented by a gender analysis, and an analysis through time. Then we investigate whether the results of numeracy levels among married women can be explained by the fact they adjusted their reported ages to those

of their husbands, as has been suggested by Földvári et al. in a recent article. They noticed relatively low Whipple indices for married women compared to single women and offer three explanations for this. First, when husbands selected spouses, numeracy skills were one of the selection criteria. Another explanation could be that men taught women how to count in the course of their marriage. Although these authors acknowledge that such elements may have contributed to numeracy among married women, they believe a third element to have been more decisive: “Wives (and to a lesser extent husbands) adjusted their reported ages to that of their spouses, causing an underestimation of age heaping for women.” They therefore suggest that “a comparison of female age heaping should be made by focusing on unmarried women” (Földvári et al. 2011, 305).

For general levels of numeracy, the results of our analysis are within our expectations. As we have shown in other articles, the levels of age heaping in the Low Countries were very low compared to other areas such as southern Europe and even compared to developing countries today. In previous studies, De Moor and Van Zanden registered very low levels of numeracy, partly based on the Amsterdam pre-marriage acts from 1585–1800, which provided an excellent cross-cut of levels of numeracy in urban society, although there is clustering around the age of 25 due to the nature of the source. The analysis of this source for a large number of data gives a Whipple index with values around 150–160 in 1585, followed by a drop to 110–120, which is very low for a pre-industrial society. From 1600–1700, the level remains fairly stable, but after 1700 there is a noticeable increase in age heaping, to 132 (in 1700) and 127 (in 1750). Nevertheless, these remain remarkably low for this period, and what is as noteworthy is that women do particularly well. While at first they age heap more than men, that level drops under the male Whipple indices from the seventeenth century onward (Kuijpers 1997, 11).

Apart from the previously mentioned work by Fruin (1866), it is particularly difficult to distinguish on the basis of occupation for these datasets. For 1796, De Moor and Van Zanden were able to demonstrate, from a population census for the southern Netherlands, that indeed the educated professionals (such as lawyers, clerks, etc.) and the clergy did particularly well for eighteenth-century standards, with indices of 151 and 163, respectively. Craftsmen did quite well with a level of 171, but among those registered as poor, 60% were innumerate (Whipple index of 302) (De Moor and Van Zanden 2008).

Based on ages reported in the portraits database, Figure 7 suggests age heaping was very low in the population studied. The Whipple index calculated for our portrait dataset amounts to a level of 117.3, which indicates that the collection of sitters in this group was extremely numerate.<sup>37</sup> The intervals in the dataset are subdivided in periods of 50 years, which enables us to see an evolution in the level of age heaping from 112 for the second half of the sixteenth century to



**FIGURE 7.** Ages mentioned in portraits in portrait database, sorted by sex (color figure available online). *Source:* Portrait database.

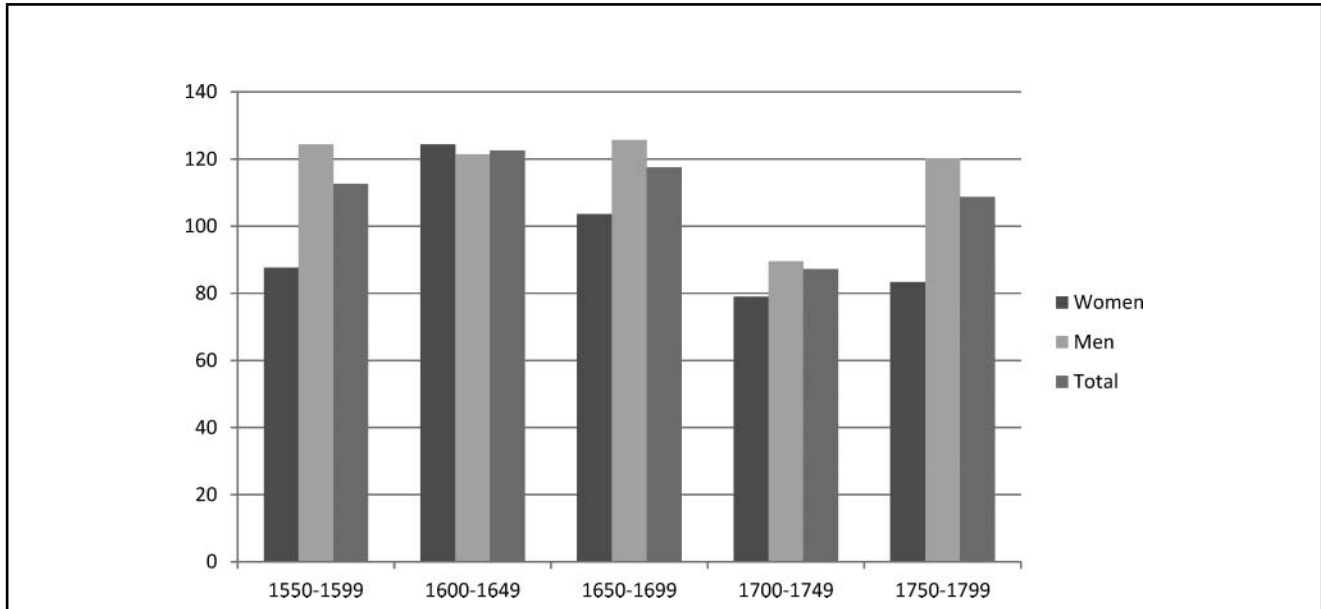
122 in the first half, and 117 in the second half of the seventeenth century. Subsequently, there is a drop in the eighteenth century to a level even below 100 in the first half of the century.<sup>38</sup> For the seventeenth century, this is in line with the findings for Amsterdam (see above), although the level of age heaping does not increase in the eighteenth century. For the upper classes, this should not be surprising: Their level of education would probably be less affected by economic downturns than that of the population in general. Our findings are also in line with earlier publications on the remarkable difference between levels of numeracy for women and men. Contrary to expectations based on literacy studies—where men usually score much better than women (Kuijpers 1997; Van Nierop 1934)—women again do better, or are at least as good in counting and calculating as men (a total Whipple index of 113 for women versus 119 for men). Looking at the distribution of the data over the ages divided by sex in Figure 8, it becomes immediately clear that most of the difference in age heaping is probably due to the much higher heaping among men of 50 and older. This is truer for men than for women over 50 compared to younger women. Remarkably enough, there is no age heaping at all at the age of 30 or 33 for men, which could have been expected in light of the symbolic value of these ages.

The cause of the marked difference between the sexes is still a subject of discussion, but one explanation may be found in a bias in age reporting, especially for married women. The recent findings of Földvári and colleagues leads us to turn to the information we have about the “pendant” of a portrait. As Montias and Smith suggested, a large portion of the portraits made in the sixteenth–seventeenth centuries were of couples,

often to commemorate their marriage. Nearly 40% of our database consists of paintings that were most likely part of a husband and wife portrait made as two separate portraits, whereby the torsos of husband and wife were turned toward one another (see above) (Montias 1982, 193). Although not all pendants have been preserved, we were able to identify whether a portrait had had a counterpart at the time of the painting.

A comparison of pendants with portraits without pendants (see Table 3) shows several important things. First, women portrayed with their husbands show lower levels of age heaping than single women, although the differences are rather small (Whipple indices of 110 and 115, respectively). This is in line with Földvári et al.’s claim that age heaping is higher among single women. Women portrayed individually had exactly the same level of numeracy as men portrayed individually however (Whipple index of 115), which is not in line with the claims of these authors. Perhaps the most striking result of our data is that men in pendant portraits had a higher level of age heaping than women. This is at odds with Földvári et al.’s claim that “since men, on average, had lower age heaping, this reduced the observed age heaping among married women as well.” Stated another way, men reported their true age, women chose to report an age close to that of their spouses, and hence their age heaping was reduced. Our data suggest that this type of adjusting to the age reported by the husband was not very notable.

In general, our analysis of numeracy among people from the middle and upper classes in the period studied yields some results that are not in line with Földvári and colleagues. By using sources that include the entire taxable community, they



**FIGURE 8. Evolution of the Whipple index per half century for women (F), men (M), and total (T) (color figure available online).<sup>1</sup> Source: Portrait database.**

<sup>1</sup>Table: Whipple indices per half century, per sex

	1550–99	1600–49	1650–99	1700–49	1750–99
Women	87.63	124.33	103.60	78.95	83
Men	124.39	121.42	125.65	89.55	120.25

It must be noted that in some cases—in particular the beginning and end of the studied period—the Whipple index drops below 100. This is most likely due to the fact that our sample sizes are small for these periods, as some random individuals preferring non-round ages might gain excessive weight.

were able to confirm two hypotheses: (a) gender difference in age heaping is smaller for married individuals than for the rest of the population, and (b) marriage significantly improves the age heaping of women but not of men. Using our sources, we find no confirmation for either hypothesis.

Although the above suggests that women’s numeracy may be slightly overestimated when including married women, the overall picture of numeracy levels of women remains remarkable: Women scored the same as men, and both sexes do particularly well. Whereas for lower class women, their activities in local trade may have contributed to lower age heaping levels compared to those of men (especially in the more commercial areas such as the coastal area of the Low Countries), middle- and upper-class women may not have been active in selling at all. The only explanation that can be given for women’s excellent performance in numeracy in the “portrayed classes” would be they had a better education in arithmetic.

If we leave out all those portraits that were “pendants” to another painting, both for men and women,<sup>39</sup> the Whipple

index amounts to 115, which is very low, but again, not unexpected. The reasons for the high levels of numeracy can probably be attributed to the high socioeconomic classes of the sitters.

### Conclusions

The purpose of this article was to contribute to the study of numeracy and the methodology of age heaping in particular in a number of ways. Firstly, we offer analyses on the basis of source material that has never been used before in this field of study, which offers us the opportunity to understand processes of identity formation with respect to the importance of age, and thus provides methodological contributions to age heaping methods. Portraits clearly offer new opportunities to study age heaping, but a well-described selection strategy is absolutely vital to create a sound basis for such analyses. This article provides a large number of conditions to enable sensible sampling of portraits, which can be easily taken as a starting point for further endeavors in this field. Apart from

**TABLE 3. Whipple Indices for Women and Men in Portraits That Figured as Pendants and Those That Were “Stand-Alone” (Whole Period)**

	Pendant women	Single women	Total women	Pendant men	Single men	Total men	End total
<i>N</i>	249	399	648	448	711	1,159	1,807
<i>H<sub>w</sub></i>	110.4417671	115.3	113.43	126.1160714	115.3	119.5	117.32153

*Source.* Portrait database.

the usefulness of a clear data selection method, the type of source used here also offers some exceptional possibilities to test assumptions made elsewhere, using sources of an entirely different kind. The reasoning behind our selection method and the method itself might serve as a way to improve the source selection basis of other studies that use the age heaping method in the future.

Apart from the methodological issues dealt with in this article, we have also been able to demonstrate several findings on the basis of the analysis of our portraits database. First, we show for the first time that numeracy levels among the Dutch well-to-do in the early modern period were very high. This in itself is not surprising, but the article provides conclusive proof of this for a period as early as the late fifteenth century. Total numeracy figures also improve over time, which is in line with the expectations on the basis of other literature for the same period and area. Moreover, we show that women have high levels of numeracy, which is in line with earlier studies by De Moor and Van Zanden on other social classes. In addition, in the sample of pendant portraits (where the portraits of women were paired with another portrait usually made for the occasion of the couple’s wedding), the Whipple score reported for the wife was usually lower. Our data results show that the positive influence of marriage on age reporting that Földvári et al. claim to have found for nineteenth-century data was not very significant: Single women also had very low levels of age heaping, but in both circumstances men did worse than their female counterparts. The reason why women were markedly better in numeracy remains puzzling.

Finally, our analyses also have shed some light on the practice of including *aetatis suae* references on portraits. This seems to have become very fashionable in the second half of the sixteenth and particularly the first half of the seventeenth century. Mentionings of the age of the sitter appear less frequently later on. So far, the “*aetatis suae*” reference has, however, received fairly little attention from art historians and economic and social historians. In our article we have—for methodological reasons—worked with a subset of all possible portraits with such a reference. On the basis of our results, we have demonstrated that the widespread—though regionally and temporally concentrated—use of the reference deserves further research on the social, economic, and artistic dimensions of this intriguing practice.

## NOTES

1. The *Aetatis suae* formula was a note of the age of the sitter, usually painted on the portrait by the painter.

2. Elsewhere, De Moor and Van Zanden have shown that an analysis per occupational group of the Amsterdam marriage acts for men (after about 1590, the marriage acts do not register the occupation of women anymore; after 1700, they stop doing this for men altogether) shows that professionals, including surgeons, doctors, chemists, and merchants, have very high levels of numeracy. For the end of the eighteenth century, they found a similar picture whereby the professionals, including occupations such as civil servants and teachers, have a fairly high level of age heaping with a Whipple index of 151.

3. For our analysis, we have also considered such information when written on the back of the painting, assuming that this would have the same informative value if it had been on the front, although indeed there is no absolute certainty about the actual time when this information was added (but this goes, of course, also for inscriptions on the front).

4. We have not included any of these in our analysis for obvious reasons: As the person the age refers to would have been dead at the moment the tombstone was engraved, it is not likely that this person had reported on his or her age directly to the engraver.

5. See, for example, the painting by Zierick Florisz, or the painting of a child, by Peter van Lint, painted in 1645 (currently in the Arts museum in Antwerp) which mentioned: OUT 5 M. Den 16 MAERT A 1645, meaning “age 5 months on 16 March 1645”; see also the pair portrait of an unidentified mother and daughter.

6. This is an estimate on the basis of contents of the images database of the Rijksbureau voor Kunsthistorische Documentatie (RKD). This article is mainly based on data from a selection of cases—we explain in the article what the selection criteria were—that were collected by the RKD and by the Koninklijke Musea voor Schone Kunsten van België (Royal Museums of Fine Art of Belgium; MSK) in Brussels. We would like to express our gratitude to Rudi Ekkart, Peter Voorloop, and Sabine Craft-Giepmans of the RKD, and Sabine van Sprang of the MSK.

7. As we will explain, for a number of reasons we have not included this portrait in our database (see further).

8. This is the average life expectancy at birth as reported by Adrianus Maria Van der Woude for 1840 in the Netherlands (Van der Woude 1972, 209). Considering the downward evolution of life expectancy that Voigtlander and Voth found for England, from the sixteenth to the nineteenth century, we must not necessarily assume that average life expectancy before the period studied by Van der Woude was much lower (Voigtländer and Voth 2010).

9. The term pair portrait refers to a situation whereby a couple was portrayed individually, each in a separate painting, but clearly as pendants of one another. In this case, a couple is portrayed together in the same painting, which is referred to as a double portrait.

10. See for example the coin (Dutch: *penning*) pictured on the portrait of Johan Kelffken, part of the pendant portraits with his wife (see illustration elsewhere in this article) which can be considered (De Jongh 1986, 116) a way to show his loyalty to and unity with his wife Suzanne, on the basis of the theme of Castor and Pollux, as shown on the *penning*.

11. “*Tronies*” stand out as a fairly well recognizable genre, as the facial expression of the individuals that are being portrayed is often exaggerated or emotional, also intended as a sort of exercise for the painter (although the paintings were sold as works of art). On the difference between

portrait and “*tronie*” see the works by Dagmar Hirschfelder (e.g., Hirschfelder 2001).

12. For the record, these paintings have not been added to the sample we use for this article.

13. The formula for the Whipple index is as follows:

$$H_w = \frac{\sum(n_{25} + n_{30} + n_{35} \dots + n_{60})}{1/5 \sum_{i=23}^{62} n_i}$$

$H_w$  gives the sum for all ages that are multiples of 5, divided by one-fifth of the total sample (for the age group 23 to 62 years old). There are other methods to calculate numeracy, such as the ABCC-index. The latter was mainly set up to make the comparison between numeracy and literacy rates an easier exercise but this is not the objective of this article on portraits. For further information on the ABCC-index, see Brian A’Hearn et al. (2009).

14. A slight bias may occur in the other age groups because of the gradual “thinning out” of the elderly, but by taking the cohort of 23 to 62, there is an implicit comparison: For example, those who are 60 with the “surrounding” ages of 58, 59, 61, and 62; the 58 and 59 age groups will normally be larger than those who are 60, and the 61 and 62 age groups will be smaller, but on balance the degree of distortion will be very small. Methods have been developed to check the age categories with the most age heaping, such as the Myer’s Blended Index (see A’Hearn et al. 2009, 789).

15. Which notes: “Albertus Durerus Noricus ipsam me propriis sic effingebam coloribus aetatis anno xxviii”: I, Albrecht Dürer of Nuremberg painted myself thus, with undying colors, at the age of twenty-eight years.

16. Poussin, Self-Portrait, 1649–50, (oil on canvas, 98 × 74 cm), Musée du Louvre, Paris. Inscribed: EFFIGIES NICCOLAI POVSSINI ANDELYENSIS PICTORIS. ANNO AETATIS. 56. ROMAE ANNO IVBILEI 1650 (MCAH Columbia 2011). Noteworthy here is also Ingres’ 1862 erotic painting of women in a harem taking a bath upon which he indicated his own age (*AETATIS LXXXII*) but without including himself in the painting. In the literature, it is supposed that he did this to stress his virility, even at the age of 82 (Hagen and Hagen 2005; Pach 1973, 158).

17. Several other paintings picture men or women with their long-deceased partners (e.g., in the seventeenth century, Johan van Wassenaar van Duivenvoorde commissioned a painting of himself with his two deceased wives [De Jongh 1986, ill. 29]).

18. Although other sources mention that he was 31 when he died, 30 was probably an elegant way to fit everything in one and the same picture. For a full description of the painting, see De Jongh (1986, 104–5).

19. Inscription: R.P.F.V.M. / AETATIS. SV.E. 54 / OBYT SV.E. 16 DE-SEMBRIS / 1661. DIE S. STEFANI; in the possession of the Teylers Museum in Haarlem; information from RKD.

20. Currently in the Groninger Museum.

21. On the life of Kenau Simonsdochter Hassealaer, see the extensive biography by Els Kloek (2011); on the publisher Isaac Tirion, see RKD (2011).

22. Even if we could have retrieved the original date of the image it was copied from, it was not included as this original was in most cases already in our dataset. A separate analysis of copies, however, does show—and this might be interesting from an art history point of view—that the copiers were most faithful to the original.

23. Museum Catharijneconvent, Utrecht; information from RKD.

24. Portraits in which husband and wife were portrayed together on a single canvas were excluded from the selection as these do not meet the criterion of individual portraits.

25. But this hypothesis has been recently rejected by Baten et al. (2010).

26. Apart from the potentially symbolic nature of the timing, this painting would have been excluded from the database also due to the fact that it is a double portrait.

27. However, we do not necessarily have both portraits of the couple in our database, as they may have not been preserved.

28. Eighty-five of 249 of such cases for women were found in the age category 23–30 and 138 of 448 of such cases were found in the age category 31–40 for men.

29. Personal communication of Ann Jensen Adams.

30. We are very grateful to one of the anonymous referees for this suggestion on how to interpret the evolution of the number of portraits with an *aetatis suae* inscription. Thijs Weststeijn (2008, 282–3) referred to this practice of increasing attention for more lifelike portraits as the practice

of “virtual reality” whereby not only the painting was sometimes part of the real-life representation but also the frame around the portrait was used to suggest a three-dimensional effect (e.g., the portrait of Agatha Bas by Rembrandt (1641), whereby “a fan extends over a suggested frame, and the sitter herself grasps the frame”). Rembrandt van Rijn was one of the earliest and best known representatives of this new approach in portraiture (see Van de Wetering 1997, 155–68; also Weststeijn 2005, 113).

31. Montias’ claims about the dominance of paintings to commemorate couples, usually on the occasion of their wedding, will be confirmed later on in the article.

32. The wage of an unskilled laborer was c. 18 *stuiver* and that of a master c. 28 *stuiver* per day (De Vries and Van der Woude 1995, 705).

33. This is particularly so because in the course of the sixteenth century, apart from the relatively expensive panel painting, cheaper canvas painting also became available (Martens and Peeters 2006, 46–7).

34. At the time, Amsterdam had c. 115,000 inhabitants (Frederiks and Fredriks 1890, v) whereas the total population of the Dutch Republic was c. 1,500,000 (De Vries and Van der Woude 1997, 50).

35. Council and *Chambre des comptes* based on Damen (2000, 201) and calculation based on Ter Braake (2007, 141).

36. In commercial centers such as London, children were taught in school how to count and to keep accounts (Hanawalt 1993, 82–3).

37. A Whipple index of 200 shows that the ages that are multiples of five occur twice as often as expected. Because this group is normally one-fifth of the population, a value of 200 means that 20% does not know his or her age correctly. Similarly, a Whipple index of 300 means that this percentage is 40%, etc.

38. We have excluded any cases before 1600 and after 1800 as their total number was too small; because of this, the total Whipple index for the period in the bar chart is slightly different compared to the total Whipple of the whole dataset.

39. This is true considering that even for men there is a difference between age heaping on portraits that are “pendant” and those “not pendant.”

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