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Reconstructing numeracy in the middle and upper classes on the basis of
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Abstract

In this paper we contribute to literature on human capital formation by investigating age references on early-modern portraits from the Low Countries. We use the very popular *aetatis* formulae to estimate to what degree sitters to portraits were able to give their age in an accurate way. This approach allows us to estimate the numeracy of single men and women, as well as couples who commissioned pair portraits to commemorate marriage. The paper suggests a methodology to be used for this type of research and also uses some specific characteristics of portraits to contribute to recent discussions in the field of numeracy studies, particularly with respect to gender differences in numeracy.

Keywords: Portraits, human capital, numeracy, Holland, early modern period, gender

JEL Codes: N33, O43

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I Introduction

In the past several 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.¹ 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.² 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.³ Moreover, historians have begun to wonder whether literacy was the most important type of human capital: were counting and calculating not more important for economic and technological development?⁴

To measure numeracy, economists and economic historians have mainly used population surveys. These show that in the past, respondents had a tendency to state their ages as round numbers, ending in 0 or 5. 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,⁵ this was not necessarily true historically.⁶ In a sense this is not 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 instrument 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 human capital revolution before the eighteenth century: the level of numeracy in present-day Netherlands and Belgium was much higher than elsewhere in Europe, and in fact, it was even higher than in some regions elsewhere in the world today (see studies by De Moor and Van Zanden).⁷ They also found evidence for striking gender differences: women did not heap as much as men, and when they did, they showed a preference for multiples of 12. De Moor and 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.

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

¹Robert E. Lucas, *Lectures on economic growth* (New Delhi 2002).

² Cf. a survey of this literature De Moor and Van Zanden, ‘Every woman counts’.

³Jaime Reis, ‘Economic growth, human capital formation and consumption in western Europe before 1800’, in: R.C. Allen, T. Bengtsson and M. Dribe (eds.), *Living standards in the past* (Oxford 2004) 195-227.

⁴ Cf. literature linking numeracy to economic growth: B. A’Hearn, D. Crayen, J. Baten, *Quantifying quantitative literacy*, 3, notes 5 and 6.

⁵Dorothee Crayen demonstrated a strong correlation between literacy and numeracy (Dorothee Crayen, *The relationship of literacy, numeracy, and age heaping: patterns in recent ldc data*, Working Paper (Tübingen 2005).

⁶ De Moor and Van Zanden, ‘Every woman counts’.

⁷ De Moor and Van Zanden, ‘Every woman counts’.

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. It is important to be creative in finding new ways to discover sources suitable for age heaping analysis. 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 Zuijderduijn and De Moor used witness statements.⁸ 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* formula⁹ as a source to study human capital formation and numeracy.

Since portraits were only commissioned by those who could afford them, this type of source also helps 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 alone¹⁰ or sources that allow us to distill sufficient data about these groups from the larger bodies of sources. 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 towards the end of the old regime, e.g. on the basis of occupations mentioned in some censuses, but not for the earlier periods, such as the fifteenth and sixteenth^h centuries.¹¹ What is more, when we do have sources dealing with the upper levels of society, for example, 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 as well as art 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 demonstrate which criteria should be taken into account when building a database, especially for artistic artefacts. Our 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 hopes that this will fill some of the lacunae we have just described. Although we expect that numeracy levels were fairly high in comparison with other layers of society in the Low Countries, and definitely compared to the rest of Europe, there is yet no proof of this. We begin with a source that includes almost solely individuals with a substantial amount of surplus

⁸ De Moor and Van Zanden, 'Every woman counts'; Zuijderduijn and De Moor, 'Tel uit je winst'.

⁹ The *Aetatis sue* formula was a note of the age of the sitter, usually painted on the portrait by the painter.

¹⁰ With the exception of e.g. *R. Fruin (ed.), Informacie Up Den Staet Faculteyt Ende Geleghentheit Van De Steden Ende Dorpen Van Hollant Ende Vrieslant Om Daerna Te Reguleren De Nyeuwe Schiltaele Gedaen in Den Jaere MDXIV* (Leiden 1866).

¹¹ 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 18th century they found a similar picture, again, only for men, the data on women are lacking for the southern Netherlands. In this sample, the professionals, including occupations such as civil servants and teachers, have a fairly high level of age heaping with a Whipple index of 151.

income to spend on non-essential items such as portraits, individuals belonging to the middle and upper classes. Our analysis will show that women's numeracy was often even higher than that of men (see De Moor and Van Zanden, elsewhere and on the basis of other data). Notwithstanding the high overall level of women's numeracy compared to other countries in Europe, we will also be able to test the recent hypothesis put forward by Földvári et al. that when women's ages were mentioned, they were usually reported as part of a married couple and influenced by the ages husbands reported.¹²

Portrait 1: zoom-in on the *aetatis* reference “*aetatis 34 1622*” on the painting of Grietje Adriaendr. Groote, painted by Jacob Waben (?) (1622) (Collection Westfries Museum inv. No. 00238).



We will first provide some background on the practice of mentioning the age of the subject on a portrait by explaining 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. Finally, we present the results of our portrait analysis, and we link these to other results that draw on other types of data useful for the study of numeracy. While this article focuses on the Low Countries, we compare the aggregated analysis results with other areas in Europe as well.

II 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 on the back of the portrait.¹³ In the Low Countries such inscriptions were usually accompanied by a combination of the terms “*aetatis suae*”, and the age was often in Roman numbers; sometimes the sitter's name and the year 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

¹² Földvári, van Leeuwen, van Leeuwen-Li, *How did women count? A note on gender-specific age heaping differences in the sixteenth to nineteenth centuries*, *Economic History Review*, 2011.

¹³ 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.

gravestones, although these are not included in our study.¹⁴ 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 Amman¹⁵ and in a number of Dutch paintings where instead of *aetatis suae*, the age was preceded by “out” (equivalent to the English, Old).¹⁶

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.¹⁷ 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 motivations for having one’s portrait or that of a 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 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 burgers, or regent portraits. 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 husbands, all of them painted as if they were 30 at the time of the painting (*etatis cuiuslibet eoru(m) circa an xxxi*) (see illustration below).¹⁸

Age itself, especially 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 40,¹⁹ 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

¹⁴ See: [Ronald Van Belle](#), *Vlakke grafmonumenten en memorietaferelen met persoonsafbeeldingen in West-Vlaanderen: een inventaris, funeraire symboliek en een overzicht van het kostuum*. 2006 (Uitgeverij van de Wiele).

¹⁵ German *aetatis*-mentioning in painting by Jost Amman, E. De Jong, publication p. 22.

¹⁶ See, for example, the painting by Zierick Florisz, fig. x in this article, or the painting of a child, by Peter van Lint, painted in 1645 (currently in the Arts museum in Antwerp) which mentions: OUT 5 M. Den 16 MAERT A°1645, meaning “age 5 months on 16 March 1645”. See *Le portrait dans l’art Flamand*, p. 40; see also the pair portrait of an unidentified mother and daughter by Jacob Adriaensz. Backer, which mentioned in the inscription “O]VT.80 JAREN/NO.1639’ EN ’OYT [OUT].6.JA”, see [http://www.rkd.nl/rkddb/\(td01n355wcfv5kick4rjtlug\)/detail.aspx](http://www.rkd.nl/rkddb/(td01n355wcfv5kick4rjtlug)/detail.aspx).

¹⁷ This is an estimate on the basis of contents of the images database of the Rijksdienst for Kunsthistorische Documentatie. 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 Museum for Schone Kunsten in Brussels. We would like to express our gratitude to Rudi Ekkart, Peter Voorloop, Sabine Craft-Giepmans of the RKD, and Sabine van Sprang of the MSK.

¹⁸ As we will explain, for a number of reasons we have not included this portrait in our database.

¹⁹ This is the average life expectancy at birth as reported by Van der Woude for 1840 in the Netherlands (A.M. van der Woude, *Het Noorderkwartier I*, 209). Considering the downward evolution of life expectancy that Voigtlander and Voth find for England, from the 16th to the 19th century, we do not necessarily need to assume that average life expectancy before the period studied by van der Woude needs to be much lower. Nico Voigtländer and Hans-Joachim Voth, *The Three Horsemen of Riches: Plague, War, and Urbanization in Early Modern Europe*. Unpublished paper, 2010.

CLAES CORVEN WAGENAER”, indicating that he was above one hundred 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 Claas 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.²⁰ Considering the explicit mention of Zierick’s master, 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, e.g. the portrait of Reynu Meynertsdr. Semeyns of 1595, which was part of a pair portrait (but that of her husband has been lost) in honour of her second marriage in that year to the famous merchant and explorer Jan Huygen van Linschoten.²¹ 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.²² 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 –²³ was supposed to convey a message of virtue and honour. It is unclear whether such additions to the portraits were usually the case for women who 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 (“Prijst eerbaerheit / Anno dni 1552”), suggest that painting such references could also have been used to increase the marriage chances of young women.²⁴ Several other pictorial references besides textual inscriptions were used to reflect unity of moral values, both for individuals and for couples.²⁵

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. 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. This supposition is not based on logic alone, but can be linked to the general idea behind indicating age on a painting. The *aetatis suae* inscriptions on

²⁰ G.N.M. Vis, *Oud en arm*, pp. 14-15.

²¹ 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. See D.R. Smith.

²² See R.E.O. Ekkart, “De portretten van de vrouw van Jan Huygen van Linschoten en van haar afstammelingen”, *Jaarb. CBG* 39 (1985), p.111-121; E. de Jongh, *Portretten van echt en trouw*, 1986, cat.15 met afb.; R.E.O. Ekkart, *Portret van Enkhuizen*, 1990, p.47 no.6 met kleuraafb. (met herk. en lit.); R.E.O. Ekkart, “De Enkhuizer schilder Jan Claesz.”, *Oud Holland* 104 (1990), p.189-190, p.188 afb.11.

²³ See *Portretten van echt en trouw*, p. 110

²⁴ See *Portretten van echt en trouw*, p. 112.

²⁵ See for example the coin (Dutch: “penning”) pictured on the portrait of Johan Kelfken, part of the pair portrait with his wife (see illustration elsewhere in this article) which can (see *Portretten van echt en trouw*, p. 116) be considered 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.

portraits are a north European and English custom that began in the fifteenth century and were associated 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. By the middle of the seventeenth century this custom of inscribing ages on portraits had become increasingly unfashionable and unsophisticated, as we will show from our database.²⁶

The inscription can still be found, however, on paintings by an early American (eighteenth century) painter often referred to as the "*Aetatis suae* Limner (of Albany),"²⁷ who added the expression to his paintings as a way to invoke an old European tradition that by that time had long passed.²⁸ 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.

Portrait 2: Portrait of Reynu Meynertsd. Semeys, in honour of her marriage to Jan Huygen van Linschoten (2-4-1595) at the age of 31. Portrait by Jan Claesz.



²⁶ Philippe Aries, *Centuries of Childhood. A Social History of Family Life*, Robert Baldick, tr. (New York Vintage Books, Random House, 1962), 15-18; and Keith Wrightson, *English Society 1580-1680* (New Brunswick, New Jersey: Rutgers University Press, 1982), Chs. 3 and 4.

²⁷ See Ruth, *Piwonka*, *Recovering the Lost Ark: The Dutch Graphic Tradition in the Hudson Valley*, Selected Rensselaerswijck seminar papers (see: <http://www.nnp.org/nnp/publications/ABAFB/1.3.pdf>), and Roderic H. Blackburn, entry on PARTRIDGE, NEHEMIAH (1683–c. 1737) in the *Encyclopedia of American Folk Art* (consulted online: <http://www.bookrags.com/tandf/partridge-nehemiah-tf/>). See also *American painting to 1776: a reappraisal*, Ian M. G. Quimby, Henry Francis du Pont Winterthur Museum, et al., p. 232.

²⁸ For the record: These paintings have not been added to the sample we use for this article.

III 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 needs to 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, which is a measure for age groups of 23-62 years to the extent persons whose ages end in a five or a zero are overrepresented in the population distribution.²⁹ 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 100.³⁰ 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 from 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), and because there is less age heaping among younger people, or is manifested in other ways (by e.g. heaping more on even numbers).³¹

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 1500³² or the self-portrait of Poussin from 1650.³³

²⁹ The United Nations give a more complete explanation about the Whipple Index and its application on http://unstats.un.org/unsd/demographic/products/dyb/DYBcensus/V1_Notes1c.pdf. See also the following publications for a more technical explanation of the possibilities of age heaping for historical research: A'Hearn, Crayen, Baten, *Quantifying Quantitative Literacy* and Dorothee Crayen, Joerg Baten, *Numeracy, Inequality, Age Heaping, and Economic Growth: New Estimation Strategies for Western Europe and the U.S. (17th-19th Centuries)*.

³⁰ 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).

³¹ 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, the 61 and 62 age groups will be smaller, but on balance the degree of distortion will be very small.

³² Methods have been developed to check the age categories with the most age heaping, such as the Myer's Blended Index. See A'Hearn, Crayen en Baten, *Quantifying quantitative literacy*, 789.

³³ Which notes: "Albertus Durerus Noricus ipsum 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.

³³ Poussin, Self-Portrait, 1649-50, (oil on canvas, 98 x 74 cm.), Musée du Louvre, Paris. Inscribed: EFFIGIES NICCOLAI POVSSINI ANDELYENSIS PICTORIS. ANNO AETATIS. 56. ROMAE ANNO IVBILEI 1650. See <http://www.mcah.columbia.edu/dbcourses/publicportfolio.cgi?view=508>. 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. See Rose-Marie & Rainer Hagen, *Les dessous des chefs-d'œuvre* TASCHEN 2000, Köln, pages 410 à 415 : Ingres cited in Walter PACH, *Ingres*, New York 1973. p.

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) it is more likely to occur 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).³⁴ 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.

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 it is a question whether age heaping analysis can 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 likely not to have been alive when the painting was done. There are several ways to identify such cases. 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 already 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.³⁵

Another example is the portrait of Elisabeth van Culemborg and her two husbands (see Portrait 3).³⁶ 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 on 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.³⁷ The age of 30 is probably based on the age of her first

158. Poussin, Self-Portrait, 1649-50, (oil on canvas, 98 x 74 cm.), Musee du Louvre, Paris. Inscribed: EFFIGIES NICCOLAI POVSSINI ANDELYENSIS PICTORIS. ANNO AETATIS. 56. ROMAE ANNO IVBILEI 1650.

³⁴ See Portretten van echt en trouw, p. 21.

³⁵ O. De Sloovere, Identificatie van portretten op een schilderij in de Potteriekerk te Brugge, Handelingen van het Genootschap “Société d’Emulation” te Brugge, deel XCVI, 1959.

³⁶ Several other paintings picture men or women with their long-deceased partners are known. E.g. In the 17th century Johan van Wassenaer van Duivenvoorde commissioned a painting of himself with his two deceased wives. ChECKillustration no. 29, portr. Van echt en trouw.

³⁷ See Truus van Bueren, *Leven na de dood. Gedenken in de late middeleeuwen* (Turnhout 1999) 253-254.

husband, Jan of Luxemburg, at the time of his death.³⁸ 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 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.

Portrait 3: Meester van Rot A (after 1530), "Memorietafel" for Elisabeth van Culemborg in the company of both her husbands, Johan van Luxemburg and Anthony van Lalaing, duke of Hoogstraten.



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 1661.³⁹ 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 (1718-1799) in 1793.⁴⁰ Or the portrait of Volcher Coiter, a well-known Dutch anatomist, painted by Johann Friedrich Leonart (1718-1799), who was portrayed as being 41, 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*

³⁸ 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 E. De Jongh, *Portretten van echt en trouw*, pp. 104-105.

³⁹ Inscription: R.P.F.V.M. / ÆTATIS . SVÆ . 54 / OBYT SVÆ . 16 DESEMBRIS / 1661 . DIE S. STEFANI; in the possession of the Teylers Museum in Haarlem; info from RKD.

⁴⁰ Currently in the Groninger Museum; see Ulrich [Thieme and Felix Becker](#), *Allgemeines Lexikon der bildenden Künstler : von der Antike bis zur Gegenwart*, 1907-1950, dl. 17 (1924), p. 549.

Praecipius Musculus 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 (1526-1589), published by Isaac Tirion 171 years after her death, but copied from an original of 1573, thus within the lifetime of Kenau.⁴¹ Copies of paintings have also been excluded from the dataset⁴² 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 Portrait 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.⁴³ 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 1574.⁴⁴ Whether painted from real life or mythological, all portraits containing more than one person have been excluded from the database.

One of the situations we can check for potential influence by others in reporting the name 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 Portrait 5, below).⁴⁵ 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 does consist of such 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.

⁴¹ On the life of Kenau Simonsdochter Hassealaer, see the extensive biography by Els Kloek on the “DigitaalVrouwenlexicon van Nederland”: <http://www.inghist.nl/Onderzoek/Projecten/DVN/lemmata/data/KenauSimonsdrHasselaer>; On the publisher Isaac Tirion, see: [http://www.rkd.nl/rkddb/\(i3qe21at5edrfo550dff0h55\)/dispatcher.aspx?action=search&database=ChoiceArtists&search=priref=419127](http://www.rkd.nl/rkddb/(i3qe21at5edrfo550dff0h55)/dispatcher.aspx?action=search&database=ChoiceArtists&search=priref=419127).

⁴² 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. The mention of an *aetatis* in ??% of the cases was exactly the same as before.

⁴³ **Voorbeeld toevoegen.**

⁴⁴ Museum Catharijneconvent, Utrecht; info from RKD.

⁴⁵ 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.

Portrait 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)



Portrait 5: (Separate) portraits of Johan Kelffken and his wife Suzanna Dorre, 1616 (unknown painter), aged 33 and 25, respectively.⁴⁶



⁴⁶ See also "Portretten van echt en trouw", p. 117 and the RKD portraits database (IB nos. 71943 and 71944)



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. There is also a difference in age preference in a census or when being portrayed. 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 Paulus, Augustinus and Honorius of Autun.⁴⁷ The 1630 portrait of a Catholic couple painted by Gerrit de Jongh includes the reference "*uterque aetatis 30*" (both 30) is a clear example of this.⁴⁸ 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 Jar/Anno Domii M.D.LXV.*⁴⁹ To a certain extent the paintings that indicate a symbolic age were made for commemorative reasons (see also the painting by Ebbo Emmius), but they have been excluded from the database because they were usually painted after the death of the sitter.

Although extra biographic information about the portrayed individuals gave us additional possibilities for analysis, we have not excluded portraits of anonymous men and women. We could provide a name for the sitter for nearly two-thirds of the portraits (678 out of 1807 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

⁴⁷ See E. De Jongh, *Portretten van echt en trouw*, p. 23, footnote 4.

⁴⁸ See O. Thiers, *'t Putje van Heiloo: bedevaarten naar O.L. Vrouw ter Nood*, Hilversum, Verloren, 2005, p. 16.

⁴⁹ E. De Jongh, *Portretten van echt en trouw. Huwelijk en gezin in de Nederlandse kunst van de zeventiende eeuw*, Waanders Publicshers, 1986, p. 22.

reconstruct the real age and compare it to the reported age, which is unique in numeracy studies. There is also 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 true for the portrait of Laurens Portman gen. van den Bergh (1562-1599). 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. Their doubtful inscriptions caused us to exclude such 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).

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

- portraits with more than one sitter
- copies of older portraits
- portraits that were clearly made after the death of the sitter
- 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
- portraits with sitters younger than 23 or older than 62.

Based on the criteria described, we composed a dataset of 1807 portraits, of which 648 were women and 1159 were men, all within the range of 23-62. 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 portraits.⁵⁰ 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.⁵¹ 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.

⁵⁰ However, we do not necessarily have both portraits of the couple in our database, as they may have not been preserved.

⁵¹ 85 of 249 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.

Table 1: Distribution of the data according to category of (reported) age and sex

Reported age (<i>aetatis</i>)	% Women	% Men	% Total	N Women	N Men	N 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	1159	1807

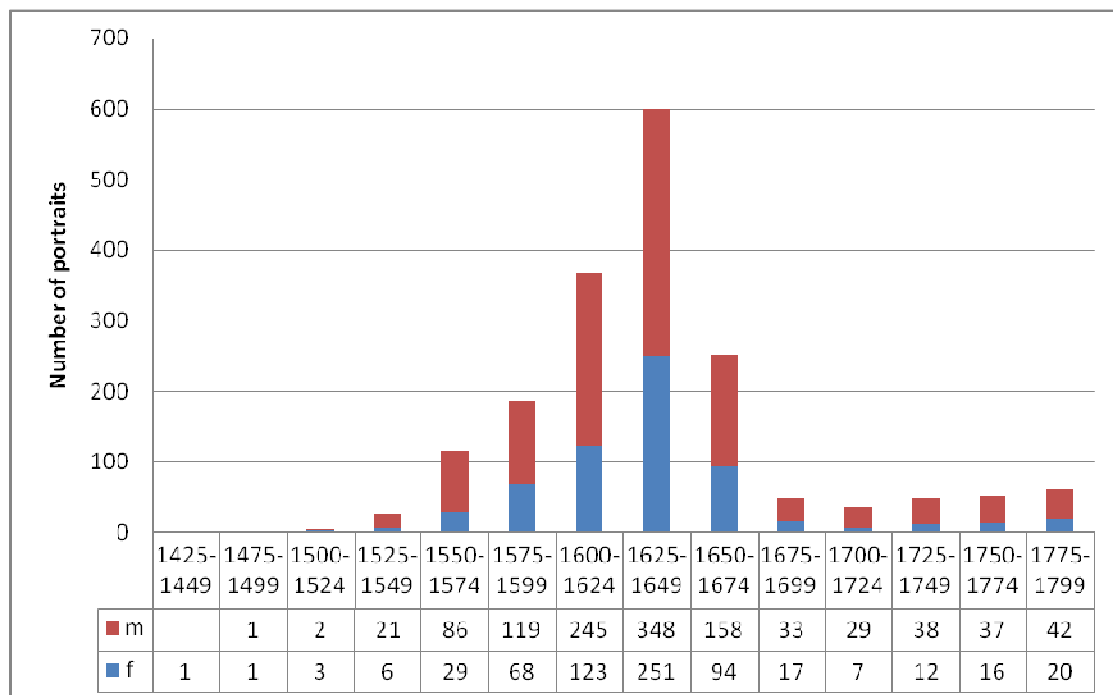
The dataset consisted of data for the period 1439-1799, of which very few actually date from the fifteenth century. We have an exact year of painting in 95% of the cases (N=1730), but in order to include the other paintings, each of the portraits has been attributed to a specific quarter of a century 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, the graph below shows a clear increase in the popularity of *aetatis suae* references, especially from the mid-sixteenth century onwards. Soon after the middle of the seventeenth century the reference appears significantly less often; possibly it had been so widely used by that time that it had gone out of fashion, as the popularity of an inscription is often related to the popularity of the portrait as a preferred genre of art in an increasingly commercial art market. In the genre of regent portraits, the *aetatis* reference was especially popular.⁵² 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 Lairesse in 1707, claimed that portrait painting was just a menial type of art.⁵³ Some portrait painters even became wealthy, and in any case portrait painting guaranteed a steady income.⁵⁴ Others stressed the changes on the demand side, with burgers wanting to present themselves as important individuals, and able to pay for it.

⁵² Personal communication of Ann Jensen Adams.

⁵³ K. van Mander, *Het schilder-boeck* (Haarlem 1604) 280v-281v; A. Jensen Adams, *Public faces and private identities in seventeenth-century Holland. Portraiture and the production of community* (Cambridge 2009), 13.

⁵⁴ Jensen Adams, *Public Faces*, 12.

Graph 1: Distribution of portraits with *aetatis suae* references, over time (periods of 25 years), including the number of cases per sex, per period.



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,⁵⁵ as suggested by historians of art and material culture and by contemporaries, such as the Italian Vincenzo Giustiniani,⁵⁶ 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 gulden . . . had their portraits painted, usually along with their spouses”.⁵⁷ 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.⁵⁸ For the wealthiest classes she was able to demonstrate the availability of a substantial number of portraits (for instance, an average of 12 in 1706-1730), in contrast to far less evidence

⁵⁵ A. Schuurman, *Materiële cultuur en levensstijl. Een onderzoek naar de taal der dingen op het Nederlandse platteland in de 19^{de} eeuw: de Zaanstreek, Oost-Groningen, Oost-Brabant* (Utrecht 1989) 87-89. Jensen Adams, *Public Faces*, 12.

⁵⁶ M.J. Bok, *Vraag en aanbod op de Nederlandse kunstmarkt, 1580-1700* (Utrecht 1994) 53-54.

⁵⁷ J.M. Montias, *Artists and Artisans in Delft. A Socio-Economic Study of the Seventeenth Century* (Princeton 1982) 193.

⁵⁸ Montias’ claims about the dominance of paintings to commemorate couples, usually on the occasion of their wedding will be confirmed later on in the paper.

for the availability of portraits among lower classes.⁵⁹ 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 "commercial classes".⁶⁰

The general price level of portraits in the fifteenth-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.⁶¹ 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.⁶² Bearing in mind that prices depended on the cost of materials, the time needed to execute the painting, and the artist's reputation,⁶³ it seems reasonable to assume a price in the range of 10-100 guilders. This would have amounted to 11-111 days' wages for an unskilled labourer and 7-71 days' wages for a master.⁶⁴ 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.⁶⁵

Another way to estimate of the wealth of the sitters is to check the names in our dataset with the 1631 20th penny tax of Amsterdam and its surroundings. This property tax was levied on everyone worth more than 1000 guilders.⁶⁶ To ensure that the taxation source would provide representative results, we sampled the sitters of those portraits painted between 1627 and 1634. This yielded 58 sitters; the people depicted on the remaining 56 portraits have not been identified. Seven could be traced to the 200th penny registers of Amsterdam, a somewhat low figure, but nonetheless a realistic

⁵⁹ Th, Wijsenbeek, *Achter de gevels van Delft. Bezit en bestaan van rijk en arm in een periode van achteruitgang (1700-1800)* (Hilversum 1987) 455.

⁶⁰ F. Vermeylen, *Painting for the market. Commercialization of art in Antwerp's Golden Age* (Turnhout 2003) 149.

⁶¹ J.M. Montias, *Artists and Artisans in Delft. A Socio-Economic Study of the Seventeenth Century* (Princeton 1982) 193.

⁶² A. van der Woude, 'De schilderijenproductie in Holland tijdens de Republiek. Een poging tot kwantificatie', in: A. Schuurman, J. de Vries and A. van der Woude (eds.) *Aards geluk. De Nederlanders en hun spullen 1550-1850* (Amsterdam 1997) 223-258, pp. 248.

⁶³ Cf. M. Boer-Goossens, 'Prices of Northern Netherlandish Paintings in the Seventeenth Century', in: A. Golahny, M.M. Mochizuki and L. Vergara (eds.) *In his milieu. Essays on Netherlandish Art in memory of John Michael Montias* (Amsterdam 2006) 59-71, pp. 60. Cf. a recent survey of research into the art market of the Dutch Republic: E.J. Sluijter, 'Determining value on the art market in the Golden Age: an introduction', in: A. Tummers and K. Jonckheere (eds.) *Art market and connoisseurship. A closer look at paintings by Rembrandt, Rubens and their contemporaries* (Amsterdam 2008) 7-28.

⁶⁴ The wage of an unskilled labourer was c. 18 st. and that of a master c. 28 st. (J. de Vries and A. van der Woude, *Nederland 1500-1815. De eerste ronde van de moderne economische groei* (Amsterdam 1995) 705.

⁶⁵ This is particularly so because in the course of the 16th century, apart from the relatively expensive panel painting, cheaper canvas painting also became available (M.P.J. Martens and N. Peeters, 'Paintings in Antwerp houses (1532-1567)' in: N. De Marchi and H.J. van Miegroet (eds.) *Mapping markets for paintings in Europe, 1450-1750* (Turnhout 2006) 35-54, pp. 46-47.

⁶⁶ J.G. Frederiks and P.J. Frederiks, *Kohier van den tweehonderdsten penning voor Amsterdam en onderhoorige plaatsen 1631* (Amsterdam 1890).

one, since many sitters are likely to have lived outside Amsterdam.⁶⁷ Although these people were all quite wealthy, tax-assessments ranged from 5 to 1000, which indicates that portraits could be purchased by a relatively large group of people (table 2). In fact, even Pieter Seijen, who was in the lower tax strata, was able to commission a portrait to be painted by Rembrandt.

Table 2: Tax assessments of sitters 1631

Sitter	Painter	Year	Tax
Loncke, Hendrik Cornelisz.	Hondius, Willem	1630	60
Pauw, Reinier	Vliet, Willem van der	1631	1000
Baeck, Laurens Joosten	Pickenoy, Nicolaes Eliasz.	1629	500
Teylingen, Maria van	Hals, Frans (I)	1628	25
Boelens, Pieter	-	1627	150
Seijen, Pieter	Rembrandt	1633	5
Limborch, Frans van	Keyser, Thomas de	1632	250

Apart from their ability to invest in portraits, we also need to 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 1530.⁶⁸ 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.⁶⁹ 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.⁷⁰

⁶⁷ At the time, Amsterdam had c. 115.000 inhabitants (Frederiks and Fredriks, *Kohier*, v) whereas the total population of the Dutch Republic was c. 1.500.000 (J. de Vries and A. van der Woude, *The first modern economy. Success, failure and perseverance of the Dutch economy, 1500-1815* (Cambridge 1997) 50.

⁶⁸ J.H. Moran, *The Growth of English Schooling, 1340-1548* (Princeton 1985).

⁶⁹ A. Janse, ‘The education of the noble Wassenaar family’, in: K. Goudriaan, J. van Moolenbroek and A. Tervoort (eds.) *Education and Learning in the Netherlands, 1400-1600. Essays in Honour of Hilde de Ridder-Symoens* (Leiden, Boston 2004) 33-50, pp. 37.

⁷⁰ Council and *Chambre des comptes* based on M. Damen, *De staat van dienst. De gewestelijke ambtenaren van Holland en Zeeland in de Bourgondische periode (1425-1482)* (Hilversum 2000) 201, and calculation based on S. ter Braake, *Met recht en rekenschap. De ambtenaren bij het Hof van Holland en de Haagse Rekenkamer in de Habsburgse Tijd (1483-1558)* (Hilversum 2007) 141.

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”.⁷¹ 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.⁷² 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.⁷³ 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.⁷⁴ Because of their role in selling commodities and as wage labourers, 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.⁷⁵

IV 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 in 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.⁷⁶ 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 in 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

⁷¹ N. Orme, *From Childhood to Chivalry. The Education of the English Kings and Aristocracy 1066-1530* (London, New York 1984) 113 and *Medieval Schools: From Roman Britain to Tudor England*, New Haven, Yale University Press (2006).

⁷² M. Kool, ‘die conste vanden getale’. *Een studie over Nederlandstalige rekenboeken uit de vijftiende en zestiende eeuw, met een glossarium van rekenkundige termen* (Hilversum 1999) 43-45; R.R. Post, *Scholen en onderwijs in Nederland gedurende de middeleeuwen* (Utrecht, Antwerpen 1954) 97. In commercial centres such as London, children were taught in school how to count and to keep accounts (B.A. Hanawalt, *Growing up in medieval London. The experience of childhood in history* (Oxford 1993) 82-83).

⁷³ Kool, ‘die conste vanden getale’, 45-52. Cf. B. Roberts, *Through the keyhole. Dutch child-rearing practices in the 17th and 18th centuries* (Hilversum 1988) 108.

⁷⁴ De Moor and Van Zanden, *Every woman counts*, p. 182.

⁷⁵ Van de Heuvel, Danielle, *Women and entrepreneurship. Female traders in the Northern Netherlands c. 1580-1815* (Amsterdam Aksant Academic Publishers).

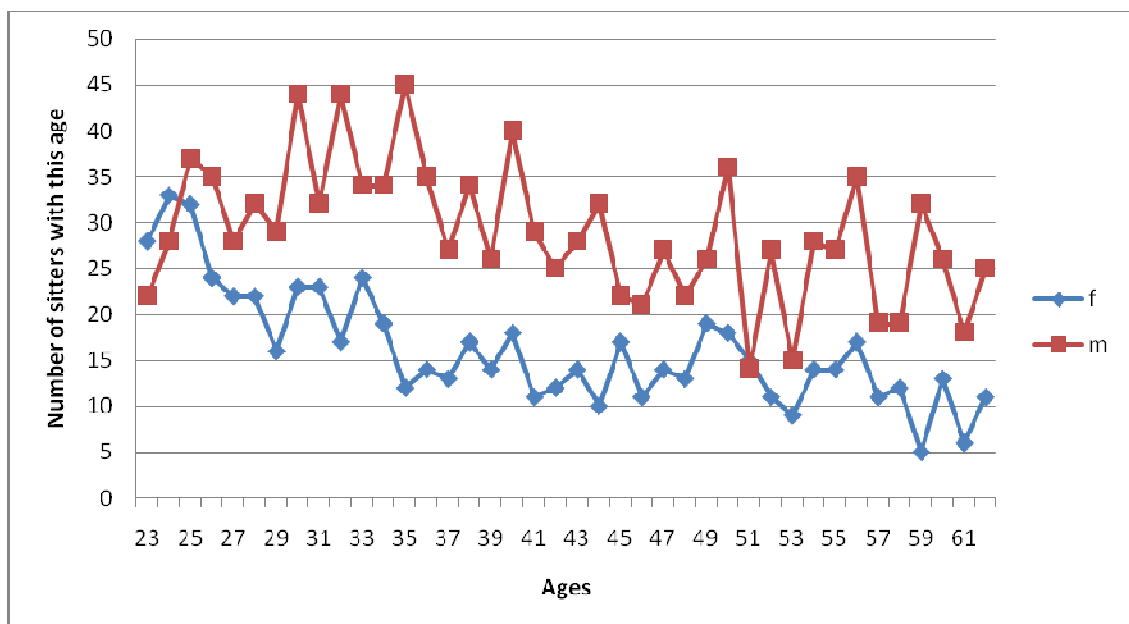
⁷⁶ P. Földvári, B. van Leeuwen and J. van Leeuwen-Li, ‘How did women count? A note on gender-specific age heaping differences in the sixteenth to nineteenth centuries’ *Economic History Review* (2011).

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”.⁷⁷

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 1600-1800 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 onwards.⁷⁸

Apart from the previously mentioned *Informacie*,⁷⁹ 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% was innumerate (Whipple index of 302).⁸⁰

Graph 2: ages mentioned in portraits in portrait database, sorted by sex.



⁷⁷ P. Földvári, B. van Leeuwen and J. van Leeuwen-Li, ‘How did women count? A note on gender-specific age heaping differences in the sixteenth to nineteenth centuries’ *Economic History Review* (2011)

⁷⁸ Kuijpers, ‘Lezen en schrijven’, p. 11.

⁷⁹ See footnote no. 10.

⁸⁰ De Moor and Van Zanden, Van fouten kan je leren.

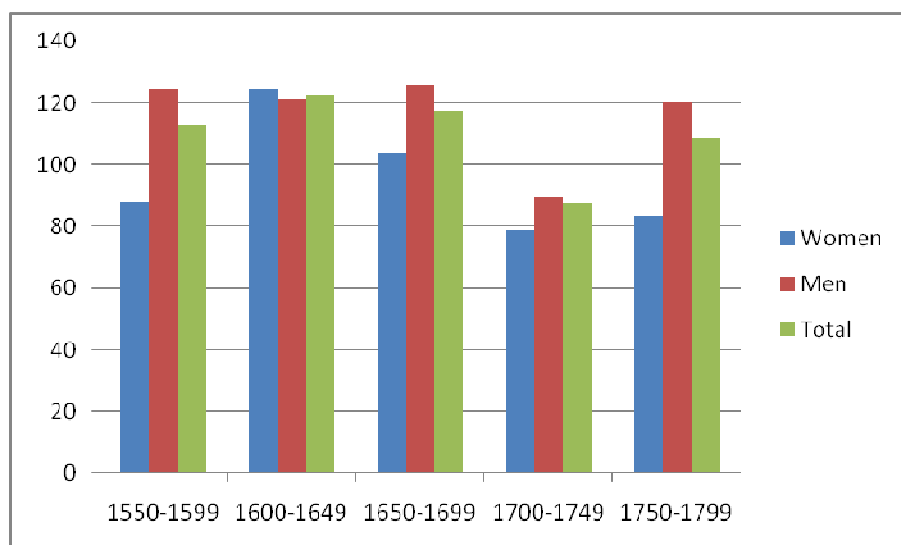
As the above graph based on ages reported in the portraits database suggests, age heaping was very low in the population studied. The Whipple index calculated for our portrait dataset amounts to a level of 117.3, which indicates that the collection of sitters in this group was extremely numerate.⁸¹ The 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 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.⁸² 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 studies⁸³ – where men usually score much better than women – 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 the above graph, 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.

⁸¹ A Whipple index of 200 shows that the ages that are multiples of 5 occur twice as often as expected. Because this group is normally one-fifth of the population, a value of 200 means that 20 percent does not know his or her age correctly. Similarly, a Whipple index of 300 means that this percentage is 40 percent, etc.

⁸² 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.

⁸³ See L. van Nierop, 'De bruidegoms van Amsterdam van 1578 tot 1601', *Tijdschrift voor geschiedenis* 49 (1934) 136-160; 329-344, and also Erika Kuijpers, 'Lezen en schrijven. Onderzoek naar het alfabetiseringsniveau in zeventiende-eeuws Amsterdam', *Tijdschrift voor sociale geschiedenis* 23 (1997), pp. 490-523.

Graph 3: evolution of the Whipple index per half century for women (F), men (M) and total (T).⁸⁴



Source: portrait database

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 et al. leads us to turn to the information we have about the “pendant” of a portrait. As Montias and Smith suggest, a large portion of the portraits made in the sixteenth-seventeenth century 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 towards one another (see above).⁸⁵ 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

⁸⁴ Table: Whipple indices per half century, per sex

	1550-1599	1600-1649	1650-1699	1700-1749	1750-1799
Women	87.63	124.33	103.60	78.95	83.00
Men	124.39	121.42	125.65	89.55	120.25

It has to 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.

⁸⁵ J.M. Montias, *Artists and Artisans in Delft. A Socio-Economic Study of the Seventeenth Century* (Princeton 1982) 193.

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 et al. By using sources that include the entire taxable community, they were able to confirm two hypotheses: 1) "gender difference in age heaping is smaller for married individuals than for the rest of the population", and 2) "marriage significantly improves the age heaping of women but not of men". Using our sources to test these hypotheses, we find both hypotheses to be in error.

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
N	249	399	648	448	711	1159	1807
H _w	110.4417671	115.3	113.43	126.1160714	115.3	119.5	117.32153

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 arithmetics.

If we leave out all those portraits that were "pendants" to another painting, both for men and women,⁸⁶ the H_w 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 socio-economic classes of the sitters.

V Conclusions

The purpose of this article was to contribute to the study of numeracy and the methodology of age heaping. First, we show for the first time that numeracy levels among the Dutch well-to-do in the early modern period were very low. This in itself is not surprising but the article provides conclusive proof of this for as early as the end of the fifteenth century. 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 classes in society. In addition, in the sample of pendant portraits (where the portraits of womn were paired with another portrait usually made for the occasion of the couple's

⁸⁶ This is true considering that even for men there is a difference between age heaping on portraits that are "pedant" and those "not pendant".

wedding), the age reported for the wife was usually younger. 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.

Second, the analyses are based on source material that has never been used before in this field of study, and it offers 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. This article provides a large number of conditions to enable sensible sampling of portraits. Apart from 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.

Overview of portraits, tables, graphs, and figures in paper:

Portrait 1: zoom-in on the <i>aetatis</i> reference “ <i>aetatis</i> 34 1622” on the painting of Grietje Adriaendr. Groote, painted by Jacob Waben (?) (1622) (Collection Westfries Museum inv. No. 00238).....	3
Portrait 2: Portrait of Reynu Meynertsdr. Semeyns, in honour of her marriage to Jan Huygen van Linschoten (2-4-1595) at the age of 31. Portrait by Jan Claesz.....	6
Portrait 3: Meester van Rot A (after 1530), “Memorietafel” for Elisabeth van Culemborg in the company of both her husbands, Johan van Luxemburg and Anthony van Lalaing, duke of Hoogstraten.....	9
Portrait 4: Portrait of a family, 1620. Attributed to Jacob Lambrechtsz. Loncke, showing <i>Aetati</i> 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).....	11
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