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# How Young/Old Does One Look? Sales Personnel's and Laypersons' Estimation of Young People's Age

## 1. Introduction

Underage drinking is a serious societal problem in Europe. Several studies have found that the use of alcohol among minors both in Europe generally<sup>\*1</sup> and in Estonia<sup>\*2</sup> is relatively high. Although laws of various sorts have been passed as legislative attempts to restrict minors from buying alcohol, they still are able to do so. Therefore, one possible contributor to adolescents' use of alcohol can be seen in the ease of access.<sup>\*3</sup>

By Estonian law<sup>\*4</sup>, alcohol retailers have a responsibility of not selling alcoholic beverages to minors; however, in reality they frequently fail to fulfil that duty.<sup>\*5</sup> One factor influencing the issue is that salespersons' age estimations are often incorrect, contributing to sale of alcohol to people to whom these beverages should not be sold. It has been found that sales staff, especially older adults<sup>\*6</sup>, tend to systematically overestimate the age of young people who try to buy age-restricted goods such as alcohol and tobacco.<sup>\*7</sup> For

<sup>1</sup> J. Inchley et al. *Growing Up Unequal: Gender and Socioeconomic Differences in Young People's Health and Well-being*. Copenhagen: World Health Organization 2016 (an international report on the 2013–2014 survey from the Health Behaviour in School-aged Children study); ESPAD group. *The 2015 ESPAD report: Results from the European school survey project on alcohol and other drugs*. Lisbon: European Monitoring Centre for Drugs and Drug Addiction 2016.

<sup>2</sup> A. Markina, B. Žarkovski. *Laste hälbiv käitumine Eestis* [‘Deviant Behaviour of Children in Estonia’]. Tallinn: Justiitsministeerium 2014 (in Estonian).

<sup>3</sup> A.C. Wagenaar et al. (1993). Where and how adolescents obtain alcoholic beverages. – *Public Health Reports* 108 (1993) / 4, pp. 459–464; A.C. Wagenaar et al. Sources of alcohol for underage drinkers. – *Journal of Studies on Alcohol* 57 (1996) / 3, pp. 325–333. – DOI: <https://doi.org/10.15288/jsa.1996.57.325>.

<sup>4</sup> Alcohol Act (Alkoholiseadus). – RT I, 1.9.2015, 1 (in Estonian).

<sup>5</sup> M. Tael, L. Aaben. *Alkoholsete jookide üle-eestilise testostlemine. Uuringu kokkuvõte*. [‘Mystery Shopping for Alcoholic Beverages in Estonia: A Summary of the Research’]. Tallinn: National Institute of Health Development 2014 (in Estonian).

<sup>6</sup> P.A. George, G.J. Hole. Factors influencing the accuracy of age estimates of unfamiliar faces. – *Perception* 24 (1995) / 9, pp. 1059–1073. – DOI: <https://doi.org/10.1068/p241059>.

<sup>7</sup> L.A. Jason et al. Selling tobacco to minors: Can merchants accurately determine a customer's age? – *Journal of Human Behavior in the Social Environment* 8 (2003) / 4, pp. 67–73. – DOI: [https://doi.org/10.1300/j137v08n04\\_04](https://doi.org/10.1300/j137v08n04_04); R.M. Merrill et al. The relationship of perceived age and sales of tobacco and alcohol to underage customers. – *Journal of Community Health* 25 (2000) / 5, pp. 401–410; P. Willner et al. Alcohol sales to underage adolescents: An observational study and evaluation of a police intervention. – *Addiction* 95 (2000) / 9, pp. 1373–1388. – DOI: <https://doi.org/10.1046/j.1360->

example, in comparison of sales personnel and laypersons, the former overestimated the age of the target persons, though to a lesser extent than the control group (i.e., laypersons).<sup>\*8</sup> Although it has been found that human perception of adults' age is relatively accurate<sup>\*9</sup>, the reason for the inaccuracy by overestimation may be caused by a tendency to 'assimilate' – biasing age estimates toward one's own age in what is known as the 'own-anchor effect'.<sup>\*10</sup> It has been found also that age estimation can show regression towards the mean – for example, in eyewitnesses' attribution of a particular age to an offender, being biased toward an 'average' offender.<sup>\*11</sup> As for gender effects, there is some evidence that women tend to be more accurate in their estimates of age on the basis of images of faces when compared to men.<sup>\*12</sup>

Salespersons are instructed to ask for an identity document (ID) from young persons who are attempting to buy alcoholic beverages.<sup>\*13</sup> By asking for a valid document, the sales staff can receive constant feedback on their estimations, and, therefore, they should learn to make more accurate decisions about a person's age. In other words, they are in constant training with feedback on their age-estimation decisions, a process that should make them experts in estimating people's age. The literature shows that it is indeed possible to train people in honing their skills in making perceptual judgements<sup>\*14</sup>. For example, Sörqvist and Eriksson<sup>\*15</sup> have demonstrated that short training sessions had encouraging effects on age estimations. Interestingly, they found that the effects of training were more prominent for estimates of older people's age, a finding not in line specifically with the motivation to train people to estimate the age of younger persons accurately. The authors emphasised that it is important to give feedback on age estimations, as training that included this element was more effective than training without feedback.

Some contextualisation may be useful. In Estonia, there is a time-based restriction on retail sales of alcohol; namely, alcohol may be sold only from 10am to 10pm daily<sup>\*16</sup>. Another feature of the landscape is that there is no state monopoly in place as in some of the Nordic countries (Finland, Sweden, Norway, and Iceland).<sup>\*17</sup> The density of shops where alcohol can be bought is high in Estonia – the mean number of alcohol sales points per 1,000 inhabitants in 2015 was 5.6. With regard to the distance from one's place of residence to the nearest point at which alcohol is sold, for 85% of people in Estonia in 2015, it could be found either in the same building or in a neighbouring building within 10 minutes of reach, and 12% of people could reach it in 30 minutes at most.<sup>\*18</sup>

The age of young people in Estonia who have tried an alcoholic beverage at some point in life or within the last month has remained high in time. The results from the latest European School Survey Project on Alcohol and Other Drugs (ESPAD) survey, carried out in 2015, show a lifetime figure of 86% and 'within the last month' prevalence of 38% among 15- and 16-year-olds.<sup>\*19</sup> The ESPAD averages were 80% and 48%, respectively. According to the Health Behaviour in School-aged Children survey<sup>\*20</sup> in 2013–2014 in Estonia,

0443.2000.95913738.x; P. Willner, G. Rowe. Alcohol servers' estimates of young people's ages. – *Drugs: Education, Prevention and Policy* 8 (2001) / 4, pp. 375–383. – DOI: <https://doi.org/10.1080/09687630010019299>.

<sup>8</sup> J. Vestlund et al. Experts on age estimation. – *Scandinavian Journal of Psychology* 50 (2009) / 4, pp. 301–307. – DOI: <https://doi.org/10.1111/j.1467-9450.2009.00726.x>.

<sup>9</sup> R. Henss. Perceiving age and attractiveness in facial photographs. – *Journal of Applied Social Psychology* 21 (1991) / 11, pp. 933–946. – DOI: <https://doi.org/10.1111/j.1559-1816.1991.tb00451.x>.

<sup>10</sup> J. Vestlund et al. (see Note 8).

<sup>11</sup> I.A. Fahsing et al. The man behind the mask: Accuracy and predictors of eyewitness offender descriptions. – *Journal of Applied Psychology* 89 (2004) / 4, pp. 722–729. – DOI: <https://doi.org/10.1037/0021-9010.89.4.722>; R.H. Flin, J.W. Shepherd. Tall stories: Eyewitnesses' ability to estimate height and weight characteristics. – *Human Learning: Journal of Practical Research and Applications* 5 (1986) / 1, pp. 29–38.

<sup>12</sup> A. Nkengne et al. Influence of facial skin attributes on the perceived age of Caucasian women. – *Journal of the European Academy of Dermatology and Venereology* 22 (2008) / 8, pp. 982–991. – DOI: <https://doi.org/10.1111/j.1468-3083.2008.02698.x>.

<sup>13</sup> Estonian Alcohol Act (see Note 4).

<sup>14</sup> R.L. Goldstone. Perceptual learning. – *Annual Review of Psychology* 49 (1998) / 1, pp. 585–612. – DOI: <https://doi.org/10.1146/annurev.psych.49.1.585>.

<sup>15</sup> P. Sörqvist, M. Eriksson. Effects of training on age estimation. – *Applied Cognitive Psychology* 21 (2007) / 1, pp. 131–135. – DOI: <https://doi.org/10.1002/acp.1271>.

<sup>16</sup> Alcohol Act (see Note 4).

<sup>17</sup> E. Orro et al. *Alkoholi turg, tarbimine ja kahjud Eestis: Aastaraamat 2016* [The Alcohol Market, Consumption, and Harms in Estonia: 2016 Yearbook]. Tallinn: Estonian Institute of Economic Research 2016 (in Estonian).

<sup>18</sup> *Ibid.*

<sup>19</sup> ESPAD group (see Note 1).

<sup>20</sup> J. Inchley et al. (see Note 1).

3% of 11-year-old boys and 1% of girls of the same age reported drinking alcohol at least once a week, and these percentages rise to 12% and 7%, respectively, for 15-year-olds. The results of a third international survey with wide reach, the International Self-Report Study of Delinquency (ISRD), demonstrated a similar pattern.<sup>\*21</sup> In the ESPAD survey, children were asked about their perception of alcohol's availability, with 73% of 15- and 16-year-old reporting in 2015 that it is 'fairly easy' or 'very easy' to obtain alcoholic beverages.<sup>\*22</sup> The ESPAD average was 78%, with a range of 52% in Moldova to 96% in Denmark.

One method of examining how freely adolescents are able to purchase alcohol is by using 'mystery shopping', which has been employed in several countries<sup>\*23</sup>. The highest compliance rates in off-premises sales have been reported in Sweden, by the state monopoly Systembolaget (20–24-year-old mystery shoppers): 94% in 2011, 95% in 2012, and 96% in 2013.<sup>\*24</sup> High rates have been reported also by Norwegian temperance association Juvente (12–17-year-old mystery shoppers; 76% in 2013, 70% in 2014, 77% in 2015 and 73%<sup>\*25</sup> in 2016) and by research organisation FERARIHS in Switzerland (14–17-year-old mystery shoppers; 70% in 2011, 71% in 2012, and 74% in 2013).<sup>\*26</sup> Compliance rates in off-premises sales in the Netherlands (14–15-year-old mystery shoppers) showed an increase, from 37% in 2011 to 57% in 2013.<sup>\*27</sup> At the far extreme of non-compliance is Romania (17-year-old mystery shoppers), where the compliance rate was 0% both in 2008 and in 2010.<sup>\*28</sup>

In 1998, Willner et al. conducted a comprehensive study in the United Kingdom to investigate the availability of alcohol to minors<sup>\*29</sup>. They found that 88% of 16-year-old girls were successful when trying to purchase alcohol, as compared to 77% of 16-year-old boys attempting the same task.<sup>\*30</sup> For prospective buyers of age 13, the corresponding numbers were 42% for girls and 4% for boys. In that study, alcohol-sellers were also asked to make judgements of the person's age on the basis of photographs, and indeed the participating sales staff tended to overestimate ages by more for girls (2.5 years) than for boys (6 months).<sup>\*31</sup>

The National Institute for Health Development in Estonia piloted mystery-shopping method in 2011 and since then has conducted three nation-wide surveys, in 2012, 2014, and 2016. The results of mystery shopping in Estonia have shown that the overall rate of compliance with the law has been rather low, at 30% in 2011<sup>\*32</sup>, 24% in 2012<sup>\*33</sup>, and 26% in 2014<sup>\*34</sup>, though results from 2016 indicate that compliance has increased somewhat, to 45%.<sup>\*35</sup> Latest results from 2016 show that the compliance rate was highest in supermarkets (65%) and lowest in small shops and gas stations, respectively 41% and 46%. In addition,

<sup>21</sup> See M. Steketee et al. *Alcohol Use among Adolescents in Europe: Environmental Research and Preventive Actions*. Utrecht, Netherlands: Verwey-Jonker Instituut 2013; A. Markina, B. Žarkovski (see Note 2).

<sup>22</sup> ESPAD group (see Note 1).

<sup>23</sup> J. Mulder, J. de Greeff. *Eyes on Ages: A Research [sic] on Alcohol Age Limit Policies in European Member States – Legislation, Enforcement and Research*. Utrecht, Netherlands: Dutch Institute of Alcohol Policy 2013.

<sup>24</sup> Systembolaget. *2013 Responsibility Report – Part 2: Financial Reports and In-depth Sustainability Report*. Stockholm: Systembolaget 2013.

<sup>25</sup> Skjenkekontrollen. *Kontrollrapport 2016* ['Control Report 2016']. Oslo: Juvente 2016 (in Norwegian).

<sup>26</sup> Eidgenössische Alkoholverwaltung. *Alkohol in Zahlen 2014* ['Alcohol in Numbers 2014']. Bern, Switzerland: FERARIHS 2014 (in German).

<sup>27</sup> J.J. Van Hoof et al. Alcohol sales to underage buyers in the Netherlands in 2011 and 2013. – *Journal of Adolescent Health* 56 (2015) / 4, pp. 468–470. – DOI: <https://doi.org/10.1016/j.jadohealth.2014.11.025>.

<sup>28</sup> J.J. Van Hoof et al. *Selling alcohol to underage adolescents in Romania: Compliance with age restrictions in Pitesti*. – *Revista de Cercetare si Interventie Sociala* 27 (2009), pp. 82–91.

<sup>29</sup> P. Willner. Alcohol sales to underage adolescents. Available at [http://alcoholresearchuk.org/downloads/finalReports/AERC\\_FinalReport\\_0001.pdf](http://alcoholresearchuk.org/downloads/finalReports/AERC_FinalReport_0001.pdf) (most recently accessed on 29.9.2016).

<sup>30</sup> P. Willner et al. (see Note 7).

<sup>31</sup> *Ibid.*

<sup>32</sup> M. Tael. *Alkoholsete jookide testostlemise pilootuurung* ['A Pilot Study of Mystery Shopping for Alcoholic Beverages']. Tallinn: Tervise Arengu Instituut 2011 (in Estonian).

<sup>33</sup> E. Kaal, M. Tael. *Alkoholiseadusega alaealisele ja joobes isiku alkoholitarbimise tõkestamiseks seatud piirangute järgimine ning seda takistavad tegurid. Alkoholit tele- ja internetireklaam ning noored* ['Following the Limitations According to the Alcohol Act for Preventing Minors and Already Intoxicated Persons from Further Using Alcohol and the Factors Hindering It: The Youth and Alcohol Advertisements on Television and on the Internet']. Tallinn: TNS Emor and Tervise Arengu Instituut 2012 (in Estonian).

<sup>34</sup> M. Tael, L. Aaben (see Note 5).

<sup>35</sup> Tervise Arengu Instituut. *Alkoholi ostmisel on dokumenti küsimise tase paranenud* ['The level of asking for ID when someone is buying alcohol is getting better'] (in Estonian). Available at <http://www.tai.ee/et/instituut/pressile/uudised/3964-alkoholi-ostmisel-on-dokumendi-kusimise-tase-paranenud> (most recently accessed on 29.9.2016).

while mystery shoppers had to show the ID in 44% of light alcoholic beverage purchases, the rate was significantly higher for strong alcoholic beverages (64%).<sup>\*36</sup>

It can be concluded that a substantial proportion of alcohol sales to minors may well be made in good faith, following misjudgement of the customer's age, and this error is more prevalent with older service personnel.<sup>\*37</sup> It is understandable that those selling alcohol may be reluctant to challenge customers' age assertion, implicit or otherwise. This factor can be ameliorated somewhat by participation in training programmes instilling confidence to refuse sale or ask for an ID.<sup>\*38</sup>

Although minors are used as mystery shoppers in several countries, there are countries, Estonia among them<sup>\*39</sup>, where this is not permitted (even if limited to the purpose of mystery shopping alone).<sup>\*40</sup> Therefore, it is important to note that research in these countries often employs pseudo-underage buyers (people who have just turned 18) to perform the mystery-shopping task<sup>\*41</sup>, as some studies have recommended.<sup>\*42</sup>

After the pilot study in 2011, discussion was raised as to how old salespersons perceive young people to be and how accurate the salespersons' estimates of their age are. This information can serve as valuable input to selection of mystery shoppers. Studies have differed in their methods of examining age estimations. For instance, some have used children too as raters. As for the set-up, sometimes the rater has to categorise people in pictures into certain groups (such as young, middle-aged, or old<sup>\*43</sup>); the rater might have to place pictures in order from the one showing the apparently youngest to the seemingly oldest, or vice versa<sup>\*44</sup>; or the rater may be presented with two pictures at a time and have to decide which of the people shown is older<sup>\*45</sup> or younger.<sup>\*46</sup> It has been found that the expression of the persons is important when pictures are used. For example, if a picture shows someone with a happy face, then that person is judged to be younger than those with a neutral expression<sup>\*47</sup>. Therefore, pictures with both neutral and happy facial expressions were used in the study reported upon here.

## 2. The study conducted

Several studies have been carried out in relation to the prevalence of alcohol consumption among Estonian minors<sup>\*48</sup> and also the family factors<sup>\*49</sup> influencing it. In contrast, we have less knowledge of issues asso-

<sup>36</sup> *Ibid.*

<sup>37</sup> P. Willner, G. Rowe (see Note 7).

<sup>38</sup> A.C. Wagenaar et al. Communities mobilising for change on alcohol: Outcomes from a randomized community trial. – *Journal of Studies on Alcohol* 61 (2000) / 1, pp. 85–94. – DOI: <https://doi.org/10.15288/jsa.2000.61.85>.

<sup>39</sup> According to the new Alcohol Act that will go fully into effect on 01.01.2018, minors can be used for control purchases.

<sup>40</sup> Alcohol Act (see Note 4).

<sup>41</sup> M. Tael, L. Aaben (see Note 5).

<sup>42</sup> M. Wolfson et al. Alcohol outlet policies and practices concerning sales to underage people. – *Addiction* 91 (1996) / 4, pp. 598–602. – DOI: <https://doi.org/10.1046/j.1360-0443.1996.91458913.x>; H. Britt et al. Propensity for and correlates of alcohol sales to underage youth. – *Journal of Alcohol Drug Education* 50 (2006) / 2, pp. 25–42.

<sup>43</sup> J.S. Anastasi, M.G. Rhodes. An own-age bias in face recognition for children and older adults. – *Psychonomic Bulletin & Review* 12 (2005) / 6, pp. 1043–1047. – DOI: <https://doi.org/10.3758/bf03206441>; J.S. Anastasi, M.G. Rhodes. Evidence for an own-age bias in face recognition. – *North American Journal of Psychology* 8 (2006) / 2, pp. 237–253.

<sup>44</sup> F.V. Markey. Variations in judgement. – *Journal of Applied Psychology* 18 (1934) / 2, pp. 297–303. – DOI: <https://doi.org/10.1037/h0070716>; J.B. Pittenger, R.E. Shaw. Perception of relative and absolute age in facial photographs. – *Perception and Psychophysiology* 18 (1975) / 2, pp. 137–143. – DOI: <https://doi.org/10.3758/bf03204101>.

<sup>45</sup> P.A. George et al. Factors influencing young children's ability to discriminate unfamiliar faces by age. – *International Journal of Behavioral Development* 24 (2000) / 4, pp. 480–491. – DOI: <https://doi.org/10.1080/016502500750038035>; W.R. Looft. Children's judgments of age. – *Child Development* 42 (1971) / 4, pp. 1282–1284. – DOI: <https://doi.org/10.2307/1127812>.

<sup>46</sup> T.F. Gross. Children's perceptions of and beliefs about facial maturity. – *Journal of Genetic Psychology* 165 (2004) / 1, pp. 81–97. – DOI: <https://doi.org/10.3200/gntp.165.1.81-98>.

<sup>47</sup> M.C. Voelkle et al. Let me guess how old you are: Effects of age, gender, and facial expression on perceptions of age. – *Psychology and Aging* 27 (2012) / 2, pp. 265–277. – DOI: <https://doi.org/10.1037/a0025065>.

<sup>48</sup> J. Inchley (see Note 1); ESPAD group (see Note 1); A. Markina, B. Žarkovski (see Note 2).

<sup>49</sup> K. Kask, A. Markina. With whom did you drink last time? An analysis of adolescents' alcohol use. – *Annual Review & Research in Biology* 4 (2014) / 1, pp. 174–187. – DOI: <https://doi.org/10.9734/arrb/2014/5556>; K. Kask et al. The effect of family factors on intense alcohol use among European adolescents: A multilevel analysis. – *Psychiatry Journal* (2013), 12 pages. – DOI: <https://doi.org/10.1155/2013/250215>; A. Markina, K. Kask. The effects of family factors on alcohol consumption in three East-European countries. – *Journal of Contemporary Criminal Justice* 29 (2013) / 1, pp. 53–69. – DOI: <https://doi.org/10.1177/1043986212470886>.

ciated with age estimations in this field. Hence, a study was undertaken to examine how accurate salespersons in Estonia are in estimating the age of young people and, in addition, to assess whether the sales personnel are better at making accurate age judgements than are laypersons (i.e., people not working in shops that sell food and alcohol).<sup>\*50</sup>

## 2.1. The method

### 2.1.1. Participants

Forty people participated in the experiment on age estimation. Half of the participants were salespersons (18 females, 2 males, with the mean age  $M = 32.2$ ;  $SD = 12.5$ ; range 19 to 64), and the other half were Open University laypersons (11 females, 9 males, with the mean age  $M = 31.7$ ;  $SD = 6.6$ ; range 19 to 40) who had no experience of work involving alcohol sales. At the time of the study, all of the salespersons had a valid work contract as shop clerks or waiters/waitresses in bars or cafés, with 14 of them being 35 or younger and 6 above age 35. The salesperson group covered a wide range of ages for purposes of measuring whether the age of a salesperson could be expected to affect his or her estimation of the age of people in pictures, since it has been found that age estimations are more accurate when there is a small difference in age between the rater and the person whose age is being estimated.<sup>\*51</sup>

### 2.1.2. Procedure

The salespersons were to judge pictures presented one at a time on a laptop screen in their places of work, either during a lunch break or after the end of their shift. The aim of the experiment as presented to them was to estimate how accurate they would be in assessing the age of the people shown on the basis of looks; however, they were not told the purpose of the study. The laypersons, in contrast, were shown the pictures while gathered as a group, and the images were displayed on the wall as MS PowerPoint slides with a data projector. They wrote down their estimates with pencil and paper (as did the salespersons group). The rating procedure took 15 to 25 minutes.

The salespersons and the laypersons were shown pictures of faces one after another, and each participant had to decide for each of the pictures how old the person shown was. There were 64 pictures, in total, of 16 males and 16 females, with each person being shown in two pictures: once with a neutral expression and once with a 'happy face'.

### 2.1.3. The people in the pictures

The 32 people in the images (as mentioned above, balanced between males and females) were between the ages of 17 and 29. For the study, they were divided into two groups, of equal size, by age: 1) the younger group, composed of 17–19-year-olds, and 2) the older group, of 19–29-year-olds. The former group was further divided into three smaller groups: 1) 17-year-olds (3 persons), 2) 18-year-olds (7 persons), and 3) 19-year-olds (6 persons).<sup>\*52</sup>

## 2.2. Results

In the first stage of analysis, correctness in estimation of the ages that matched the faces (for the full set of 64 images) was examined via two-way analysis of variance (ANOVA).<sup>\*53</sup> The salespersons were more correct in their estimates of the ages of the people pictured, overall. The following figures emerged for correctly

<sup>50</sup> The research reported upon here was supported in part by the Government Office of the Republic of Estonia and the country's Ministry of Social Affairs via European Union Social Fund support to the National Institute for Health Development (L1223).

<sup>51</sup> M.C. Voelkle et al. (see Note 47).

<sup>52</sup> Because this study was part of a mystery-shopping research project, an additional aim was to select the youngest-looking people in the group of eight 17–19-year-olds. The second group (the 19–29-year-olds) was added to the photograph sample to increase the variation in the material presented, and this group included one 19-year-old person whose picture was included because he was not interested in participating in the mystery shopping.

<sup>53</sup> The analysis of variance is a statistical method to analyse differences between groups.

evaluated faces: among salespersons,  $M = 7.05$ ,  $SD = 2.72$ ; among laypersons,  $M = 4.50$ ,  $SD = 2.37$ , where  $F(1,39) = 9.97$ ,  $p = .003$ , and  $\eta^2 = .21$ ). When the neutral and happy faces were considered separately, the salespersons were found to be better at estimating age from the neutral faces than the laypersons were ( $M = 3.30$ ,  $SD = 1.53$  and  $M = 2.10$ ,  $SD = 1.59$ , respectively, with  $F(1,39) = 5.95$ ,  $p = .02$ , and  $\eta^2 = .135$ ). Similar effects were seen for the happy faces; the salespersons' age estimates were more correct than the laypersons' ( $M = 3.75$ ,  $SD = 2.22$  and  $M = 2.40$ ,  $SD = 1.27$ , respectively, with  $F(1,39) = 5.56$ ,  $p = .024$ , and  $\eta^2 = .128$ ).

Next, comparison was conducted to determine whether the estimates for the happy faces were more correct than those for the neutral faces. For the salespersons, there were no statistically significant effects present (neutral expressions:  $M = 3.30$ ,  $SD = 1.53$ ; happy ones:  $M = 3.75$ ,  $SD = 2.22$ ), and the same was true for the group of laypersons – no statistically significant effects were found (neutral faces:  $M = 2.10$ ,  $SD = 1.59$ ; happy faces:  $M = 2.40$ ,  $SD = 1.27$ ).

For further analysis, the faces were divided into the two equal-sized groups mentioned above, faces of younger people (ages 17 to 19,  $n = 16$ ) and those of older people (ages 19 to 29,  $n = 16$ ). When age estimations were compared between the salespersons and the laypersons, the latter's age estimates were found to be higher than the salespersons' for the younger people's faces (laypersons:  $M = 23.16$ ,  $SD = 2.11$ ; salespersons:  $M = 21.46$ ,  $SD = 2.78$ , with  $F(1,79) = 9.44$ ,  $p = .003$ , and  $\eta^2 = .21$ ) and also for the older people's faces (laypersons:  $M = 26.96$ ,  $SD = 1.62$ ; salespersons:  $M = 24.89$ ,  $SD = 2.53$ , with  $F(1,79) = 18.85$ ,  $p = .001$ , and  $\eta^2 = .20$ ).

Significant differences were present for the neutral-expression faces of younger people (salespersons:  $M = 20.17$ ,  $SD = 2.22$ ; laypersons:  $M = 21.75$ ,  $SD = 1.51$ ), with  $F(1,39) = 6.95$ ,  $p = .012$ , and  $\eta^2 = .155$ ; for the younger people's happy faces (salespersons:  $M = 22.94$ ,  $SD = 2.82$ ; laypersons:  $M = 24.78$ ,  $SD = 1.67$ ), with  $F(1,39) = 6.28$ ,  $p = .017$ , and  $\eta^2 = .142$ ; for the neutral-looking faces of older people (salespersons:  $M = 24.33$ ,  $SD = 2.32$ ; laypersons:  $M = 26.38$ ,  $SD = 1.69$ ), with  $F(1,39) = 10.24$ ,  $p = .003$ , and  $\eta^2 = .212$ ; and for the older people's happy faces (salespersons:  $M = 24.84$ ,  $SD = 2.69$ ; laypersons:  $M = 26.85$ ,  $SD = 1.49$ ), with  $F(1,39) = 8.54$ ,  $p = .006$ , and  $\eta^2 = .184$ .

When the faces of younger people (aged 17 to 19) were examined more closely (see Table 1), the age of 17-year-olds with neutral expressions was overestimated more by the laypersons than by the salespersons:  $F(1,39) = 9.15$ ,  $p = .004$ ,  $\eta^2 = .194$ . However, no significant differences were evident for the pictures of happy faces of 17-year-olds. The age associated with 18-year-olds' neutral faces was overestimated more by the laypersons than by the salespersons:  $F(1,39) = 6.58$ ,  $p = .014$ ,  $\eta^2 = .148$ . This effect was seen also for happy faces of 18-year-olds, with  $F(1,39) = 5.29$ ,  $p = .027$ , and  $\eta^2 = .122$ . Finally, the age of 19-year-olds shown with neutral expressions in the images was not overestimated more by the laypersons than by the salespersons, while the age of happy-looking 19-year-olds, by facial judgement, was overestimated more by laypersons than by salespersons:  $F(1,39) = 5.44$ ,  $p = .025$ ,  $\eta^2 = .125$ .

**Table 1: The estimation differences between neutral and happy faces of 17-to-19-year-olds**

Age	MSc	Salespersons	Laypersons
		<i>M (SD)</i>	<i>M (SD)</i>
17	neutral	3.38 (2.85)	6.13 (2.90)
	happy	3.83 (3.75)	5.68 (2.67)
18	neutral	2.84 (2.42)	4.47 (1.49)
	happy	3.42 (2.80)	5.12 (1.76)
19	neutral	0.49 (1.98)	1.37 (1.54)
	happy	0.87 (2.75)	2.76 (2.22)

Note: '*M*' denotes the mean and '*SD*' the standard deviation.

Next, the differences for pictures of only younger people's faces between salespersons and laypersons were examined with *t*-tests for paired samples<sup>54</sup> (see Table 1). For the salesperson group, the following results emerged. The age connected with images of 17-year-olds with a neutral expression was overestimated more than that for 19-year-olds with neutral expressions:  $t(19) = 8.24$ ,  $p = .001$ . Similar effects were present for

<sup>54</sup> The *t*-test for paired samples is a statistical method for comparing the means of two related groups so as to examine whether the means differ statistically significantly.

happy faces:  $t(19) = 6.25, p = .001$ . The age of 18-year-olds with a neutral expression too was overestimated more than that of 19-year-olds with a neutral expression:  $t(19) = 6.72, p = .001$ . There were similar effects for happy faces:  $t(19) = 8.33, p = .001$ . However, the age estimates for 17-year-olds' faces did not show a difference from the estimates for 18-year-olds' (either neutral or happy).

For the laypersons, the following results emerged. Age was overestimated more for faces of 17-year-olds with neutral expressions than for those of 19-year-olds with neutral expressions:  $t(19) = 7.86, p = .001$ . Similar effects were present for happy faces:  $t(19) = 4.43, p = .001$ . The age for 18-year-olds with neutral expressions too was overestimated more than that of 19-year-olds with neutral expressions –  $t(19) = 11.38, p = .001$  – and also happy ones:  $t(19) = 6.11, p = .001$ . However, in comparison of age judgements between faces of 17-year-olds and faces of 18-year-olds, significant differences then emerged for images with neutral expressions ( $t(19) = 2.83, p = .01$ ) but not for happy faces.

The difference between the age estimates given by participants and the real ages (i.e., estimate minus real age) for the faces shown was examined with paired-sample  $t$ -testing (see Table 2). The neutral faces were estimated to be older by the laypersons ( $M = 1.39, SD = 3.14$ ) to a greater extent than by the salespersons ( $M = .83, SD = 3.11$ ), at  $t(31) = -6.54, p = .001$ . Similar results emerged for the happy faces (laypersons:  $M = 3.29, SD = 3.47$ ; salespersons:  $M = 2.66, SD = 3.59$ ), with  $t(31) = -6.14$  and  $p = .001$ . When within-group age-estimation differences among salespersons were examined, the age for the happy faces was overestimated by more than that for those faces with neutral expressions:  $t(31) = -2.13, p = .041$ . Similar effects were seen for the laypersons:  $t(31) = -2.10, p = .044$ .

**Table 2: The estimation differences for younger and older people's neutral and happy faces**

Group	Expression	Younger	Older
		<i>M (SD)</i>	<i>M (SD)</i>
Salespersons	neutral	2.00 (2.63)	-0.34 (3.19)
Laypersons	neutral	3.59 (3.93)	1.73 (3.05)
Salespersons	happy	2.61 (2.56)	0.18 (3.26)
Laypersons	happy	4.38 (3.84)	2.21 (2.77)

Note: '*M*' denotes the mean and '*SD*' the standard deviation.

The faces of younger people (i.e., those ages 17 to 19) with neutral expressions were subject to greater age overestimation by salespersons than the faces of older people (ages 19 to 29), with  $F(1,31) = 5.17, p = .03$ , and  $\eta^2 = .147$  (see Table 2). Similar effects were visible for the happy faces, with  $F(1,31) = 5.50, p = .026$ , and  $\eta^2 = .155$ . Among the laypersons, there were no effects with regard to the faces of younger vs. older people, for either neutral or happy expressions.

When the gender associated with the face (male or female; see Table 3) was examined, significant effects emerged only for the laypersons with regard to happy faces:  $F(1,31) = 5.08, p = .032, \eta^2 = .145$ . Namely, the age was estimated to be higher for the females' faces ( $M = 26.32, SD = 3.67$ ) than for the males' ( $M = 23.13, SD = 4.32$ ).

**Table 3: Details of the age estimations for younger and older people's faces, by gender**

Group and expression	Rater's gender	Younger people's faces	Older people's faces	Total
		<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Salespersons, neutral	male	18.87 (1.47)	24.71 (3.99)	21.79 (4.19)
	female	21.53 (2.38)	23.98 (3.45)	22.75 (3.13)
Laypersons, neutral	male	19.46 (2.50)	26.04 (4.45)	22.75 (4.86)
	female	24.10 (3.09)	26.79 (4.07)	25.44 (3.75)
Salespersons, happy	male	19.55 (1.50)	24.99 (4.43)	22.27 (4.25)
	female	22.04 (2.37)	24.74 (2.55)	23.39 (2.76)
Laypersons, happy	male	20.33 (2.08)	25.94 (4.20)	23.13 (4.31)
	female	24.80 (3.63)	27.85 (3.23)	26.32 (3.67)

Note: '*M*' denotes the mean and '*SD*' the standard deviation.

When the younger and older people's faces were considered separately, several differences emerged. For the faces of younger people (aged 17 to 19), the females were estimated to be older than the males by the salespersons. This was true for the neutral expressions, with  $F(1,15) = 7.23$ ,  $p = .018$ , and  $\eta^2 = .341$ , and also for the happy ones, with  $F(1,15) = 6.28$ ,  $p = .025$ , and  $\eta^2 = .310$ . Similarly, laypersons estimated the females whose faces were presented to be older than the males for both the faces with neutral expressions, with  $F(1,15) = 10.89$ ,  $p = .005$ , and  $\eta^2 = .438$ , and the happy faces, with  $F(1,15) = 9.16$ ,  $p = .009$ , and  $\eta^2 = .395$ . In contrast, there were no differences present for the faces of older people (aged 19 to 29).

### 3. Discussion

The aim for the study was to examine the accuracy of age estimations from faces of young people, especially with regard to differences between sales staff and laypersons. We can now discuss the results in light of previous research.

The results demonstrate that, in general, the salespersons were more accurate in estimating the age from pictures of faces of 32 people aged 17–29 than were laypersons. For both younger and older people's faces, the laypersons estimated the person shown to be older than the salespersons did, which is consistent with the results of some previous research.<sup>\*55</sup> When the faces were divided into two groups – those of younger and somewhat older people – the laypersons, when compared to salespersons, tended to overestimate the age irrespective of the facial expression. There were larger differences in both groups' age estimates between images of 17- and 19- or 18- and 19-year-olds but not between 17- and 18-year-olds. This indicates that it is difficult to perform accurate age estimation for younger people by using facial cues alone.

Previous research has pointed out that when a person in a picture has a happy look, the person is judged to be younger in comparison to those with a neutral expression.<sup>\*56</sup> When the faces in the research reported upon here were divided into two categories by facial expression – neutral and happy – the salespersons were more accurate in estimating the ages than the laypersons were. However, the estimates for happy faces in general were not more accurate than those for neutral faces. The ages of younger people (i.e., people aged 17 to 19) were overestimated more by the salespersons than those of the older people pictured (who were 19 to 29), for neutral and happy expressions both, but the same was not true among the laypersons.

Overall, there were no great differences by gender for the images of young people, although salespersons and laypersons both estimated the 17–19-year-old females (with neutral and happy expressions alike) to be older than males of the same age, a finding that supports some previous results.<sup>\*57</sup> A similar effect was not found for faces of the older individuals (of ages 19–29). Salespersons perceiving girls as older can lead to increased availability of alcohol to them, which can, in turn, encourage alcohol consumption among girls.

### 4. Limitations and avenues for further study

Several limitations of the study can be pointed out. Firstly, the categories of the faces were not evenly balanced – for example, in that only three persons were 17-year-olds. This may have had an effect on the results, and in future research of this nature, the groups of faces should contain similar numbers of images across age categories. As only pictures of a person's head were shown to the participants, then in real life other factors have an influence on the recognition of a person's age (e.g., voice, height, and posture). Another factor that may have had an effect on the results is that the salespersons were shown the photos of the faces in a one-on-one setting, with the images displayed on a laptop screen, while the laypersons were tested together, in a group, with the faces presented on the wall via MS PowerPoint. Although the participants were seated

<sup>55</sup> J. Vestlund et al. (see Note 8).

<sup>56</sup> M.C. Voelke et al. (see Note 47).

<sup>57</sup> P. Willner et al. (see Note 7).

separately and instructed not to comment or otherwise communicate to each other, there may still have been an influence on the results. Thus, it is important to point out that the salesperson and layperson samples were not balanced in terms of gender, so in future the testing situation should take this into account. Finally, it is important to note that another confounding factor could be whether the girls wore a make-up when their pictures were taken as wearing make-up could have an effect on the age estimations.

It can be concluded that salespersons make more accurate estimates of the ages of young persons from images of faces than laypersons do. However, both groups tended to overestimate the ages for the faces, which is especially relevant when the difference between minors of age 17 and young adults of age 18 or 19 is the subject of attention. Accordingly, in the future, more focus should be put on emphasising that it is difficult to estimate the age of a 17–18-year-old accurately. Thus, asking a person younger than certain age for a document of identification can be recommended. Although many shops have pursued this approach on a voluntary basis in Estonia, there are no legal implications behind it.