Centre for Ageing Better

Good Recruitment for Older Workers

Understanding and improving recruitment language, imagery and messaging

April 2021

In partnership with:

THE BEHAVIOURAL INSIGHTS TEAM

About us

Centre for Ageing Better

The UK's population is undergoing a massive age shift. In less than 20 years, one in four people will be over 65.

The fact that many of us are living longer is a great achievement. But unless radical action is taken by government, business and others in society, millions of us risk missing out on enjoying those extra years.

At the Centre for Ageing Better we want everyone to enjoy later life. We create change in policy and practice informed by evidence and work with partners across England to improve employment, housing, health and communities.

We are a charitable foundation, funded by The National Lottery Community Fund, and part of the government's What Works Network.

The Behavioural Insights Team

The Behavioural Insights Team (BIT) is one of the world's leading behavioural science organisations, working around the world to improve people's lives.

Through its teams in the UK, France, US, Canada, Australia, New Zealand and Singapore, BIT works in partnership with governments, local authorities, businesses and NGOs in over 30 countries, often using simple changes to tackle major policy problems and deliver improved public services and social outcomes.

BIT was established by the UK government in 2010 and in 2014 became an independent social purpose company, owned by the Cabinet Office, innovation charity Nesta, and BIT employees.

For more information on our work and our team visit www.bi.team

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1. Executive summary

Age-based discrimination and stereotyping is widespread in the workplace and recruitment.[1] Yet there is little robust evidence about what may attract or dissuade older workers from applying to particular job advertisements.[2]

Accordingly, the research described in this report explores how language in job advertisements affects the application behaviour of older jobseekers, using a combination of novel online experiments and text analysis of real-world job advertisements.

We first conducted a literature review to establish a set of words and phrases considered off-putting to older jobseekers. These included common older and younger-age stereotypes, how older people believe others perceive them to be ('metastereotypes'), and other factors such as diversity statements and company benefits. We identified that there is some robust evidence on how these features affect other groups of jobseekers – such as women[3] – but that these effects had not been rigorously tested with older jobseekers.

Using an online survey with UK adults (N = 193), we determined which of those words and phrases were perceived to be most stereotypical of older age. We then ran two online experimental trials testing the effect of the phrases considered most impactful and age-stereotypical on the behaviour of both older jobseekers (N = 3,500 45-74-year-olds) and younger jobseekers (N = 1,500 18-34-year-olds). Participants were shown mock job adverts in an online environment and were asked a few questions about their willingness to apply and other reactions. Finally, we analysed the text of 11 million job site adverts to identify how frequently the words and phrases we tested appeared in real-world job adverts. The findings listed below are, for the most part, novel and expand upon previous findings.

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1 Riach, P. A., & Rich, J. (2010). An experimental investigation of age discrimination in the English labor market. *Annals of Economics and Statistics/Annales d'Économie et de Statistique*, 169-185.
2 Lievens, F., Van Hoye, G., & Zacher, H. (2012). Recruiting/hiring of older workers. *The Oxford handbook of work and aging*, 380-391.
3 Gaucher, D., Friesen, J., & Kay, A. C. (2011). Evidence that gendered wording in job adverts exists and sustains gender inequality. Journal of personality and social psychology, 101(1), 109.

We found that **only a few of the tested phrases tended to influence older jobseekers' likelihood of applying, but a wider set of phrases tended to influence their perceptions of success.**

– For instance, the older-age stereotype "knowledgeable" was associated with a higher perceived likelihood of getting an offer.

– By contrast, the younger-age stereotypes "innovative" and "adaptable" were associated with a lower perceived likelihood of getting an interview and an offer, respectively. The word "innovative" also had a negative effect on older jobseekers' judgment of fit with the company's people and culture, and "technologically savvy" had a negative effect on the perceived likelihood of interview, offer and fit.

– References to work benefits and diversity statements tended to increase the likelihood to apply, but the younger-age stereotype reference "we are looking for a recent graduate" tended to significantly decrease the likelihood to apply.

We then tested some of the words found to influence older jobseekers' application behaviour on a younger sample. **None of the words and phrases that influenced older jobseekers' likelihood to apply had opposing effects on younger jobseekers.**

– The younger-age stereotype "dynamic" was associated with a higher perceived likelihood of getting an offer in the younger sample only. However, "technologically savvy" and "dynamic" were flagged as off-putting by around 25% and 10% of younger participants, respectively.

– In direct contrast to older jobseekers, the inclusion of a short statement about diversity seemed to make younger jobseekers less confident of their fit within the organisation – and this seemed to be the case for young men in particular.

When rating the appeal of individual words, younger-age stereotypes, such as "enthusiastic, "dynamic" and "ambitious", were viewed positively by nearly half of 45–74-year-olds, but negatively by just under a quarter.

– Words considered younger-age stereotypes were among the most contentious words in both the older and younger samples. These terms seem to repel some older applicants but attract others – which is perhaps why on average these terms did not seem to impact older workers' application behaviour in our experimental analysis.

In real-world job adverts, age-stereotypical terms and phrases were commonly used, but those describing benefits such as pension schemes and flexible working options were not.

– Frequently used terms included both those seen to have a positive effect on older applicants, such as "dedicated", and those seen to have negative effects, such as "innovative", "ambitious", and "dependable". The terms "recent graduate" and "technologically savvy" were less commonly used.

– While flexible working appeared in 5.5% of job ads, the other benefits we tested appeared in less than 2% of job ads, with a workplace pension scheme being mentioned in merely 0.3% of all ads.

The lack of consistent average effects of these words in our experiment does not mean that the tested words are unproblematic in real-world job adverts.

– **Several of the younger-age stereotypes shown here to be frequently used in job adverts were viewed as off-putting by many older participants in the experiment and negatively affected their perceived organisational fit and chance of success.** By contrast, terms describing benefits, which were positively associated with the likelihood of older applicants applying, were infrequently used.

– Avoiding potentially age-biased words may be important for particular subsets of the population, and generally employers could do a lot more to promote the benefits that they offer, and related aspects of the role that may attract older workers – such as flexible hours. BIT's work on gender equality shows that just listing flexible working options in adverts can considerably increase applications.[4]

We recommend numerous actions employers can take when writing job adverts to make them more suitable for older candidates:

– **Focus on the precise behaviours and skills required rather than the personality of the applicant.** This will create more room for diversity and attract applicants with better matched skills.

For example, replace younger-aged stereotypes describing inherent abilities, such as "innovative", with specific competencies, such as "programming skills" or "contributing new ideas".

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4 Behavioural Insights Team (2019). Encouraging employers to advertise jobs as flexible. Government Equalities Office.

– **Use inclusive rather than exclusive language.**

  For instance, age-signifiers such as "recent graduate", could be replaced with alternatives such as "suitability trained". So-called "graduate schemes" could be rebranded as "new joiner" or "transition" schemes.

– **Emphasise employer benefits,** in particular those around pension contributions, flexible working, and professional development.

  Such emphasis and transparency will attract applicants of all ages and in our research provided a clear boost to the likelihood of older applicants applying.

– **Consider including language that we found to be appealing to older applicants,** such as "knowledgeable", "dependable", and "experienced". Such terms are likely to increase the perception of fit for older applicants and may contribute to higher application rates in that cohort. However, be mindful to avoid reinforcing stereotypes which may not be true. Also be aware that, as we could not test all these words with the younger sample, we cannot say how they will impact younger applicants.

– **Consider including a diversity statement, particularly those that specifically emphasise age-inclusive hiring,** in job postings.

  This can increase perceived fit and likelihood of applying for older applicants. Nonetheless, younger men reacted negatively to these statements in our sample, and we do not know how members of various unrepresented groups might react to age-inclusive diversity messages. Hence, it is best to monitor the impact of diversity statements on an ongoing basis and review their efficacy.

2. Introduction

The Centre for Ageing Better (Ageing Better) has an aim for more people in their fifties and sixties to be in fulfilling work by 2022.[5]

Not only does being in quality work support individuals' financial security, but also their physical and mental wellbeing.[6] Despite clear advantages at both employer and societal level of employing older workers,[7] it is unfortunately the case that age-based discrimination is widespread in the UK labour market. For example, studies using mock job applications have demonstrated clear bias for younger applicants, including one experiment in London where the older candidate was discriminated against 64% of the time.[8] Yet, while there has been much similar research into the retention and recruitment of older workers from the perspective of an organisation (for example, Human Resources (HR) policies), very little research has examined what may attract or dissuade workers from applying to particular job advertisements.[9]

Job advertisements themselves can indicate a preference (intentional or unintentional) for applicants with specific demographic characteristics, signalling who belongs and who does not. For example, it has been demonstrated that language associated with male stereotypes in job adverts decreases the job appeal for women.[10] There is no equivalent literature that has examined how language in job adverts could negatively impact older applicants. However, it is likely that job adverts that suggest that a role would suit someone with attributes of a stereotypically younger individual (such as being a new graduate or someone with a lot of energy), would be off-putting to older workers.

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5   https://www.ageing-better.org.ukm/work
6   Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological bulletin*, 125(2), 276.
7   OECD. (2019). Working Better with Age. Retrieved from: http://www.oecd.org/els/emp/Brochure%20 OW%2028-08.pdf
8   Riach, P. A., & Rich, J. (2010). An experimental investigation of age discrimination in the English labor market. *Annals of Economics and Statistics/Annales d'Économie et de Statistique,* 169-185.
9   Lievens, F., Van Hoye, G., & Zacher, H. (2012). Recruiting/hiring of older workers. *The Oxford handbook of work and aging,* 380-391.
10 Gaucher, D., Friesen, J., & Kay, A. C. (2011). Evidence that gendered wording in job adverts exists and sustains gender inequality. Journal of personality and social psychology, 101(1), 109.

To develop evidence on this topic, Ageing Better engaged the Behavioural Insights Team to investigate how language used in job adverts may impact older job seekers.

This research involved three components:

1. **A literature review** to generate a catalogue of words and phrases that could be considered as relating to age stereotypes. This includes both positive and negative age stereotypes associated with older and younger cohorts.

2. **An online experiment** to test participants' responses to mock job adverts containing the language identified as relating to age stereotypes in the literature review.

3. **Text analysis** of real world job site data, to understand the prevalence of words and phrases that were identified as problematic for older workers in the literature review and online experiment.

This report summarises the findings of each of these research phases.

3. Literature review summary

The primary aim of the literature review was to identify words, phrases and imagery used in job adverts that may dissuade or encourage older people (aged 50 and over) in the UK from applying to jobs.

To achieve this aim, we conducted a search of available peer-reviewed and grey literature, using the following strategies:

1. Reviewing sources published and provided by the Centre for Ageing Better and expert academic contacts;

2. A search using Google Scholar and review of publications which cite, or are cited by, those studies – known as the 'pearl-growing technique'[11];

3. A search of the Web of Science database using pre-specified search terms.

The quality of evidence was assessed as being strong, promising, moderate or limited according to criteria outlined in Appendix A. In the two sections below, we summarise the findings of the literature review regarding the key features of job adverts that may be expected to decrease or increase applications from older jobseekers.

3.1 Features that may dissuade older workers

The evidence review identified numerous features in job adverts that would be expected to dissuade older workers from applying, mainly because these features signal a preference for a younger candidate (Table 1). These included:

– References to **positive young age stereotypes** (such as "energetic" or "fun") when describing the role, ideal candidate, team, or workplace. This is because,

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11 Papaioannou, D., Sutton, A., Carroll, C., Booth, A., & Wong, R. (2010). Literature searching for social science systematic reviews: consideration of a range of search techniques. Health Information & Libraries Journal, 27(2), 114-122.

deliberately or not, these words signal preference for a younger candidate;

– References to the candidate being in the **early stages of their career** (such as 'recent graduate');

– References to **negative old age stereotypes** (such as "inflexible" candidates being at a disadvantage);

– References to **postgraduate degrees,** as older jobseekers are less likely to hold these;

– Use of **imagery of younger individuals;**

– References to a **traditional CV application process,** as this may appear more vulnerable to bias;

– Use of **jargon or buzzwords.**

3.2 Features that may attract older workers

The evidence review also highlighted features of job adverts that are likely to attract or increase applications from older workers (Table 1). These features included:

– Reference to **positive old age stereotypes** when describing role, workplace, requirements;

– Imagery that includes older individuals as part of a **diverse workforce;**

– Advertising **inclusive employee policies and benefits;**

– **Proactive outreach;**

– **Diversity statements;**

– Reference to an **unbiased application procedure.**

Table 1 – summary of features in job adverts that are likely to dissuade or encourage applications from older jobseekers

Feature	Example	Evidence	Strength of evidence[12]	Suitability for testing in online experiment[13]
Using positive younger age stereotypes	"We are looking for an enthusiastic new member of the team". "This role will be dynamic and exciting". "If you can have fun and are passionate about customer service".	Stereotypes about young people, (e.g. "energetic") are often the opposite of what older people believe others' perceptions of older people are (so called 'metastereotypes')[14] Male metastereotypes in job adverts reduce job attraction for women.[15] In the same way, job adverts with 'younger' connotations may reduce job attraction for older individuals.[16]	*Promising* Indirectly relevant experimental study and descriptive research.	*Suitable* Positive young age stereotypes can be tested in an online setting. These are used in real-world job adverts and are likely to have a negative impact on older jobseekers.
Using terms associated with negative older age stereotypes	"Those who are not flexible will be at a disadvantage". "Those with poor communication skills will not be considered".	Negative stereotypes include being less physically able, less adaptable and having worse communication and technology skills. Employers show increased age discrimination when postings include these traits.[17] Older adults perform less well on tests when exposed to negative age stereotypes.[18] Negative metastereotypes have also been found to reduce minority application intentions and performance.[19]	*Moderate* Numerous indirectly related experimental studies.	*Unsuitable* Real-world job adverts do not tend to include negatively framed wording in their descriptions of candidates, roles, or aspects of the work environment. We instead conceptualise skills that are seen to be lacking in older workers, as positive stereotypes of younger workers.

12 Strength of evidence was assessed according to criteria set out in Appendix A.
13 Testability (the ability to test the impact of this concept in an online experiment) was assessed using the following criteria:
    1. Prevalence: in real-life job adverts (tested using job-site data provided by Jobfeed from Textkernel).
    2. Evidence of impact: features / concepts that are likely to have a stronger impact on applicants than others – based on the evidence review.
    3. Scientific / research interest: Some features/concepts have limited evidence regarding their impact, but may have particular interest or value.
14 Finkelstein, L. M., Ryan, K. M., & King, E. B. (2013). What do the young (old) people think of me? Content and accuracy of age-based metastereotypes. European Journal of Work and Organizational Psychology, 22(6), 633–657.
15 Wille, L., & Derous, E. (2018). When job ads turn you down: how requirements in job ads may stop instead of attract highly qualified women. Sex Roles, 79(7-8), 464-475.
16 Bennington, L. (2001). Age discrimination: Converging evidence from four Australian studies. *Employee Responsibilities and Rights Journal*, 13(3), 125-134.
17 Burn, I., Button, P., Corella, L. F. M., & Neumark, D. (2019). *Older Workers Need Not Apply? Ageist Language in Job Ads and Age Discrimination in Hiring* (No. w26552). National Bureau of Economic Research.
18 Hess, T. M., & Hinson, J. T. (2006). Age-related variation in the influences of aging stereotypes on memory in adulthood. *Psychology and aging*, 21(3), 621.
19 Linos, E., Reinhard, J., & Ruda, S. (2017). Levelling the playing field in police recruitment: Evidence from a field experiment on test performance. *Public Administration*, 95(4), 943-956; Wille, L., & Derous, E. (2017). Getting the words right: when wording of job ads affects ethnic minorities' application decisions. *Management Communication Quarterly*, 31(4), 533-558.

Feature	Example	Evidence	Strength of evidence	Suitability for testing in online experiment
Reference to **early stage in career**	"This role would be suited to a recent graduate". "Ideal first job".	80% of graduates are under 30 years old.[20] Discrimination can be direct or indirect.[21] In a Dutch vignette study, the presence of 'age demand' signals seemed to outweigh salary, travel, and type of contract in terms of deterring older applicants.[22]	*Moderate* Directly, relevant experimental study and exploratory analysis.	*Suitable* Implicit references to an individual being at an early stage in their career can be tested in an online setting, are used in real-world job adverts and are likely to have a negative impact on older jobseekers.
Advertising that a position requires a **post-graduate degree**	"Must have a relevant post graduate qualification." "Minimum bachelors' degree, post-graduate or professional degree a plus in public policy, communications, or related field".	As older people are less likely than their younger counterparts to hold post-graduate degrees, despite many years of experience, advertising that a postgraduate degree is required can be considered a form of 'indirect' discrimination.[23]	*Limited* Descriptive or exploratory research only.	*Unsuitable* Although likely an important barrier to applications from older jobseekers, requiring a postgraduate degree is of low prevalence in real-world job adverts.
Images of only younger workers		Mid-life workers were less likely to report an intent to pursue a career in an industry where they believed the majority of workers were younger than them.[24] Discrimination literature related to protected characteristics suggests that people from minority groups pay less attention to job sites that do not include images of people like them.[25]	*Promising* Indirectly relevant experimental study and directly relevant exploratory study.	*Unsuitable* Real-world job adverts do not tend to include images.

20 https://www.hesa.ac.uk/news/17-01-2019/sb252-higher-education-student-statistics/numbers

21 Swift, H. J. & Steeden, B. Exploring representations of old age and ageing. Centre for Ageing Better.

22 Fokkens, A. S., Beukeboom, C. J., & Maks, E. (2018). Leeftijdsdiscriminatie in vacatureteksten: Een geautomatiseerde inhoudsanalyse naar verboden leeftijd-gerelateerd taalgebruik in vacatureteksten: Rapport in opdracht van het College voor de Rechten van de Mens.

23 Swift, H. J. & Steeden, B. Exploring representations of old age and ageing. *Centre for Ageing Better*.

24 Slay Ferraro, H., Prussia, G., & Mehrotra, S. (2018). The impact of age norms on career transition intentions. Career Development International, 23(2), 212–229.

25 Walker, H. J., Feild, H. S., Bernerth, J. B., & Becton, J. B. (2012). Diversity cues on recruitment websites: investigating the effects on jobseekers' information processing. Journal of Applied Psychology, 97(1), 214.

Feature	Example	Evidence	Strength of evidence	Suitability for testing in online experiment
An application procedure that may be biased	"Please note that applications can only be considered if both a CV and supporting statement is submitted."	CVs often include implicit age cues which can introduce bias.[26] Anonymised CVs (and other de-biasing processes) might reduce bias and may send positive signals to candidates fearing discrimination – though these effects are unexplored with regards to age-bias.	*Promising* Indirectly relevant experimental studies with mixed results.	*Unsuitable* Details of the application process are not often apparent on job adverts. They tend to become apparent once you click to apply
Jargon and buzzwords	Industry specific language e.g. 'fulfilment service' or language knowledge only gained from employment contexts such as 'procurement'.	Use of jargon or business terminology is thought to discourage both younger workers and experienced workers, depending upon their career stage and circumstances.[27]	*Limited* Descriptive or exploratory research only.	*Unsuitable* Jargon is industry-specific and the mock job adverts for the experiment need to be generic. It is also unclear why such language affects older jobseekers particularly, and more than younger jobseekers.
Using language related to **positive stereotypes** of older workers	"We are currently looking for an experienced administrator".	One experimental study found that encouraging older adults to identify with their generational membership ('Baby Boomer') in contrast to their age positively influenced their perceptions of their ability to find a job.[28] Women are more likely than men to apply for jobs that include stereotypes of their gender in profile characterisations.[29]	*Moderate* Directly relevant experimental study and other exploratory studies.	*Suitable* Positive old age stereotypes can be tested in an online setting, are used in real-world job adverts and are likely to have a positive impact on older jobseekers.

26 Derous, E., & Decoster, J. (2017). Implicit age cues in resumes: subtle effects on hiring discrimination. *Frontiers in psychology*, 8, 1321.

27 Burn, I., Button, P., Corella, L. F. M., & Neumark, D. (2019). Older Workers Need Not Apply? Ageist Language in Job Ads and Age Discrimination in Hiring (No. w26552).

28 Weiss, D., & Perry, E. L. (2020). Implications of generational and age metastereotypes for older adults at work: The role of agency, stereotype threat, and job search self-efficacy. *Work, Aging and Retirement*, 6(1), 15-27.

29 Born, M. P., & Taris, T. W. (2010). The impact of the wording of employment advertisements on students' inclination to apply for a job. *The Journal of social psychology*, 150(5), 485-502.

Feature	Example	Evidence	Strength of evidence	Suitability for testing in online experiment
Advertising **flexible working**	"Flexible working options, as well as other accommodations to meet your needs, are available".	Flexible working can be important to older workers, who may be managing a health condition, have caring responsibilities, or seeking a phased retirement.[30] In a recent BIT trial, including flexible working in job adverts was effective in encouraging more female applicants.[31]	*Promising* Indirectly relevant experimental study and directly relevant exploratory studies.	*Suitable* Real-world job adverts include flexible working and doing so is likely to have a positive impact on older jobseekers.
Referring to **mid-career development opportunities**	"Opportunities for career development are available regardless of your age". "Opportunities for mid-career development are available".	Career development opportunities are associated with staying in the workforce for longer.[32] However, career development opportunities can be targeted specifically towards young people.[33]	*Limited* Descriptive or exploratory research only.	*Suitable* Real-world job adverts include training and development opportunities as a benefit, and is likely to have a neutral or positive impact on older jobseekers.
Advertising benefits	"Generous pension contributions". "Option to benefit from private medical and dental insurance".	Greater specificity of employment benefits in job adverts increases application intentions and perceived person-organisation fit,[34] and older workers may be more likely to consider pension schemes and retirement savings.[35]	*Promising* Indirectly related observational or exploratory studies.	*Suitable* Real-world job adverts include training and development opportunities as a benefit, and is likely to have a neutral or positive impact on older jobseekers.
Proactive outreach	"You may be looking to return after a career break or semi-retirement".	In other discrimination contexts, such as gender and ethnicity, specific diversity programmes c.an attract the minority groups into the organisation.[36]	*Promising* Indirectly related observational or exploratory studies.	*Suitable* Such statements can help remove barriers to re-entry and reduce discrimination but are rarely seen

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30 Centre for Ageing Better & The Prince's Responsible Business Network. (2018). Becoming an age-friendly employer.
31 Behavioural Insights Team (2019). Encouraging employers to advertise jobs as flexible. Government Equalities Office
32 Cleveland, J. N., & Maneotis, S. M. (2013). Recruitment and retention strategies for mature workers. In M. Wang (Ed.), Oxford library of psychology. The Oxford handbook of retirement (p. 431–448). Oxford University Press.
33 Harris, K., Krygsman, S., Waschenko, J., & Laliberte Rudman, D. (2017). Ageism and the Older Worker: A Scoping Review. The Gerontologist, gnw194.
34 Verwaeren, B., Van Hoye, G., & Baeten, X. (2017). Getting bang for your buck: The specificity of compensation and benefits information in job adverts. *The International Journal of Human Resource Management*, 28(19), 2811-2830.
35 Dychtwald, K., & Baxter, D. (2007). Capitalizing on the new mature workforce. *Public Personnel Management*, 36(4), 325-334.
36 Lievens, F., Van Hoye, G., & Zacher, H. (2012). Recruiting/hiring of older workers. The Oxford handbook of work and aging, 380-391.

Feature	Example	Evidence	Strength of evidence	Suitability for testing in online experiment
Diversity statements inclusive of older workers	"We are an equal employment opportunity employer/equal employment opportunity employer who values and aggressively strives to meet the needs of mature workers".	Diversity statements have been shown to work in some contexts[37] but backfire in others.[38] Since older people often do not self-identify as 'old', diversity statements may be less effective in this cohort.[39]	*Moderate* Directly and indirectly relevant experimental studies, but mixed findings.	*Suitable* Real-world job adverts include diversity statements and it is possible to test in the online environment.
An unbiased application procedure	"We use a platform called Applied in order to reduce bias in our process".	CVs often include implicit age cues which can introduce bias.[40] Anonymised CVs may reduce this bias and also send positive signals to candidates fearing discrimination. But evidence of their effectiveness is mixed.[41]	*Promising* Indirectly relevant experimental studies with mixed results.	*Unsuitable* Details of the application process are not often apparent on job adverts. It typically only becomes apparent once you click to apply.
Images of older people or a more diverse workforce		Discrimination literature from other areas suggests that including images of the minority group increases interest and recall on job sites.[42] However, many older people do not self-identify as 'old', meaning this may backfire in this cohort, if the images are only of older workers.[43]	*Promising* Indirectly relevant experimental study and directly relevant exploratory study.	*Unsuitable* Real-world job adverts do not tend to include images.
Socially conscious job framing and values	'Self-sacrifice,' 'commitment to public values,' 'compassion.'	The language and values used to describe the role, not just the candidate, also influences job attraction. Experiments have demonstrated this in the case of minorities and younger applicants.[44]	*Promising* Numerous indirectly relevant experimental studies.	*Suitable* The language related to the role can also be used to convey stereotypes and influence perceived organisational fit.

37 Flory, J.A., Leibbrandt, A., Rott, C. & Stoddard, O. (2018). Increasing workplace diversity: Evidence from a recruiting experiment at a Fortune 500 company (CESifo Working Paper 7025). Munich: CESifo

38 Wilton, L.S., Good, J.J., Moss-Racusin, C.A. & Sanchez, D.T. (2015). Communicating more than diversity: The effect of institutional diversity statements on expectations and performance as a function of race and gender. *Cultural Diversity & Ethnic Minority Psychology*, 21(3), 315-325.

39 Swift, H. J. & Steeden, B. Exploring representations of old age and ageing. *Centre for Ageing Better*

40 Derous, E., & Decoster, J. (2017). Implicit age cues in resumes: subtle effects on hiring discrimination. *Frontiers in psychology*, 8, 1321.

41 Foley, M., & Williamson, S. (2018). Does anonymising job applications reduce gender bias? *Gender in Management: An International Journal*.

42 Walker, H. J., Feild, H. S., Bernerth, J. B., & Becton, J. B. (2012). Diversity cues on recruitment websites: investigating the effects on job seekers' information processing. Journal of Applied Psychology, 97(1), 214.

43 Swift, H. J. & Steeden, B. Exploring representations of old age and ageing. *Centre for Ageing Better*.

44 Asseburg, J., Homberg, F., & Vogel, R. (2018). Recruitment messaging, environmental fit and public service motivation. International Journal of Public Sector Management; Linos, E. (2018). More than public service: A field experiment on job advertisements and diversity in the police. *Journal of Public Administration Research and Theory*, 28(1), 67-85.

4. Online experiments

4.1 Overview

The evidence review identified numerous features of job adverts that are likely to either increase or decrease applications from older workers. However, none of the evidence can be considered 'strong' in terms of research quality, since the impact of different features on applicant behaviour has rarely been experimentally tested for causal impact. In that sense, the experiments undertaken for this project are quite novel and also contribute substantially to the existing body of knowledge.

The purpose of the online experiments was to provide such evidence by uncovering which words and phrases may be off-putting or appealing to older job applicants, whilst not dissuading younger applicants. The online trial provided full control over the adverts displayed to participants, which allowed us to identify causality without the ethical issues associated with showing jobseekers differently worded adverts for the same role in the real world.

Using mock job adverts, we manipulated the inclusion of relevant features – such as particular words and phrasing – that were identified in the evidence review as influencing older applicant behaviour. We then observed the effect of these changes on participants' stated willingness to apply for the presented job.

4.2 Research questions and hypotheses

The main **research questions** underlying the online experiments were as follows:

1. What words or phrases in job adverts may attract or dissuade an older jobseeker to apply to the job?

2. Are there any words or phrases that have a differential impact on the application intentions of older or younger jobseekers?

Those research questions in turn led to the formulation of the following primary and secondary hypotheses, which were tested in the online experiments.

Primary hypotheses
1. Inclusion of positive younger-age stereotypes (such as "fun" or "ambitious") will decrease older participants' stated intent to apply for a presented role.

2. Inclusion of positive older-age stereotypes (such as "dependable" or "experienced") will increase older applicants' stated intent to apply.

Secondary hypotheses
1. Inclusion of positive younger-age stereotypes (such as "fun" or "ambitious") may increase younger participants' stated intent to apply for a presented role.

2. Inclusion of positive older-age stereotypes (such as "dependable" or "experienced") may decrease younger applicants' stated intent to apply.

4.3 Methods

4.3.1 Two sequential trials
To understand which words and phrases may be appealing or unappealing to older jobseekers, whilst checking the impact these words may have on a younger cohort, we ran two sequential trials:

1. **Older cohort trial:** The first trial involved 3,499 participants aged 45 and over to test the impact of specific words and phrases identified as potentially having a positive or negative impact on older applicants.

2. **Younger cohort trial:** The second trial involved 1,592 participants aged 18–34, primarily to check that specific words and phrases which were found to be appealing to older jobseekers are not off-putting to younger applicants.

A multi-dimensional factorial design was chosen, rather than a standard randomised controlled trial, to allow for a larger set of words to be tested given the lack of existing evidence. This design also allowed us to make statements about individual types of words or phrases in isolation, which was deemed important given the need to give specific guidance to employers. Each sample was recruited via the online panel platform, Predictiv (see Appendix C for details of demographic breakdown of the samples).

4.3.2 The intervention

In both trials, each participant was assigned to see one mock job advert. Most aspects of the job adverts were identical across participants, but there were seven fields with varying content (Figure 1 below). The words presented in these fields varied independently of each other, such that there was a large number of unique adverts that could be presented to the participants, as opposed to a small number of specific adverts, which might be tested against each other in a more typical randomised controlled trial. No two participants in the older cohort were shown exactly the same advert and only around a dozen participants in the younger cohort were shown the same unique advert. More detail for the experimental design is outlined in Appendix C.

Figure 1 – example of a mock job advert with seven fields (highlighted in green) which could be varied between participants

Information about the role
- The work is similar to the type of work you are lookingfor (but not exactly what you're looking for)
- The salary is slightly below your expectations
- You meet the essential qualifications for the role but none of the desirable criteria

JOB ADVERT

What we're looking for
- We are looking for someone with 3–5 years of relevant work experience
- You'll be someone who is energetic and adaptable
- You'll be joining a fun and dynamic team
- Available for immediate start, or after your current notice period ends

Benefits
- Generous pension contributions
- Paid annual leave entitlement
- Free snacks and drinks

We're actively building diverse teams and welcome applications from everyone

For each of the seven locations in the advert, three to four different words or phrases were randomly inserted in the older cohort trial. In the younger cohort trial, only two words or phrases were varied per location, due to statistical power limitations. One was always a control word and the remainder were test words or phrases. The control words acted as a baseline, and included either a blank space or, where a word was needed for the advert to make sense, words hypothesised as neutral to older or younger jobseekers – such as "hard-working" or "medium-sized". As a sense check, we used a highlighting exercise to identify the extent to which all of these words (including controls) were perceived as attractive or off-putting (exploratory analysis).

The candidate phrases and words (Table 2) were based on our review of the literature for age-based stereotypes. Given that job postings are unlikely to use negatively framed language (such as describing an ideal candidate as being "slow"), and the fact that negative older-age stereotypes are often the inverse of a positive young age stereotype (such as "dynamic"), our shortlist of candidate words only contained words that were positively framed.

Table 2 – words and phrases at each location in the job advert, in both the older and younger samples

Location	What the word describes the word	Control word	Test words and phrases	
			Older sample	**Younger sample**
1	The candidate	blank	1. We are looking for a recent graduate 2. We are looking for someone with 3–5 years of relevant work experience 3. We are looking for someone who is technologically savvy	1. someone who is technologically savvy
2	The candidate	blank	1. energetic and 2. dependable and 3. innovative and	1. innovative
3	The candidate	hard-working	1. patient 2. dedicated 3. adaptable	1. dependable
4	The team	blank	1. a fun 2. an experienced 3. an ambitious	1. an ambitious
5	The team	medium-sized	1. [an]/and enthusiastic 2. [a]/and knowledgeable 3. [a]/and dynamic	1. [a]/and dynamic
6	A job benefit	blank	1. Training and development opportunities at all career stages 2. Flexible working opportunities 3. Generous pension contributions	1. Generous pension contributions
7	A diversity statement	blank	1. We're actively building diverse teams and welcome applications from everyone. 2. We're actively building diverse teams and welcome applications from people of all backgrounds – men and women, people of all ages, sexual orientations, nationalities, religions, and beliefs.	1. We're actively building diverse teams and welcome applications from everyone.

Since the shortlist still contained significantly more words and phrases than we could test, we prioritised using the following criteria for the first trial (older cohort):

– To test words with the highest potential impact, we ran a short 'age stereotypicality survey' to order the list of candidate words by how 'stereotypical' people perceived them to be. For each of 40 candidate words, we asked respondents to judge whether an advert containing the word is more likely to be describing a candidate under 35 or over 50 (or equally likely to be describing both); see Appendix B for details.

– To exclude words that do not tend to appear in real job adverts, we performed a word prevalence check on the shortlisted words, using real job advert data obtained through Jobfeed from Textkernel, and a ten advert spot check[45] of real job adverts.

– Finally, we used a degree of judgment to de-prioritise and exclude certain words, such as those being very obviously discriminatory and therefore unlikely to be used, those with obvious alternative meanings, or those not deemed to be as high importance in previous qualitative work.

After running the trial with the older subsample and performing preliminary analysis, we prioritised a subset of these words in the **younger subsample**. Prioritisation was based upon the results of the first trial, the hypothesised importance of each word and existing evidence gaps. We tested a more limited set of words, given constraints imposed by the smaller sample. As before, the job ad locations either contained either the listed word or phrase or the control – a blank field or neutral word (such as "hard-working", and "medium-sized").

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45 This consisted of randomly selecting 10 adverts (sourced using the Jobfeed from Textkernel data) which contained the given word and making a judgment of whether that word is used as a descriptor of the candidate, the team, or neither. This helped us decide whether a given word should be used as a person or a team descriptor, and also whether it should be tested at all, as some words (such as 'responsible') were rarely used with our intended meaning.

4.3.3 Outcome measures

Table 3 below lists the outcome measures and covariates used in this trial. The second column explains how each variable was constructed; the third column details the coding for the regression analysis (if applicable).

Table 3 – outcome measures

Measure	Definition	Coding
PRIMARY		
Willingness to apply for job	"How likely would you be to apply for this job?"	Continuous: 1 → Not at all likely 2 → Unlikely 3 → Somewhat unlikely 4 → Somewhat likely 5 → Likely 6 → Extremely likely
SECONDARY		
Organisational fit	"How good a fit do you think you would be in this organisation (i.e. fitting in with the people and the culture)?"	Continuous: 1 → Very bad fit 2 → Bad fit 3 → Rather bad fit 4 → Rather good fit 5 → Good fit 6 → Very good fit
Perceived judgment of fit	"How good a fit do you think the employer would consider you to be (i.e. whether they would think that you fit in with the people and culture)?"	Continuous: 1 → Very bad fit 2 → Bad fit 3 → Rather bad fit 4 → Rather good fit 5 → Good fit 6 → Very good fit

Measure	Definition	Coding
Chance of getting an interview	"How likely do you think you'd be to get an interview?"	Continuous: 1 → Not at all likely 2→ Unlikely 3→ Somewhat unlikely 4→ Somewhat likely 5→ Likely 6→ Extremely likely
Chance of getting the job	"How likely do you think you'd be to get the job?"	Continuous: 1 → Not at all likely 2→ Unlikely 3→ Somewhat unlikely 4→ Somewhat likely 5→ Likely 6→ Extremely likely
EXPLORATORY		
Appealing language	"Please select any words or phrases in this job advert that you find appealing, and may encourage you to apply."	Binary: each word, or part of a phrase, either selected or not
Off-putting language	"Please select any words or phrases in this job advert that you find off-putting, or could dissuade you from applying."	Binary: each word, or part of a phrase, either selected or not

4.3.4 Pilot study

To test our assumptions for the experiment, we ran a short pilot study with 291 participants: 143 from the 45–64 age range and 148 from the 18–34 age range. This had the same overall structure as the full experiment, but only contained three specific adverts that participants were randomly assigned to see: one that contained predominantly older-age stereotypes, one that contained predominantly younger-age stereotypes, and one that contained predominantly younger-age stereotypes plus a strong reference to young age ("recent graduate").

The pilot had three main aims:

1. **Check whether there were floor or ceiling effects for the particular job adverts we designed.** There was a risk that participants (from either age group) would find the adverts presented to be generally very appealing/unappealing, in a way that would prevent us from observing effects of the varied words.

2. **Check whether we could observe an indication of a 'treatment effect':** By presenting participants with adverts that were constructed so as to generally be attractive/unattractive to them, we hoped to observe a difference in the main ratings between the two groups, despite the small size of the pilot.

3. **Check the residual standard deviation of the primary variable, after controlling for age and treatment assignment:** The residual standard deviation is what determined our power to detect the effects of individual words in this trial.

In our analysis, we found that:

1. **The advert was generally rated rather positively** (means score of 3.9 and 4.1 out of 6 for the older and younger cohorts, respectively), so we adjusted some of the fixed language of the advert (such as adding "you meet none of the desirable criteria") to shift the average rating closer to the midpoint of the 6-point rating scale.

2. **There was a mean difference of 1.0 point (p < .01) in the likelihood to apply** when contrasting older participants shown a youth-stereotypical advert with younger participants shown an older-age-stereotypical advert, which was reassuring for our ability to detect treatment effects in the full trial.

3. **The standard deviation of the residuals was in line with our expectations,** at 1.16 and 1.22 for the older and younger samples, respectively.

4.4 Results

4.4.1 Primary outcomes

Older sample
Our primary analysis found that inclusive benefits had a positive effect on **older jobseekers' likelihood of applying,** which is consistent with previous research. All results below are out of a 6-point scale and significance is at the 5% level unless stated otherwise.

– Adverts including the benefits "flexible working opportunities" and "generous pension contributions" were associated with significantly higher likelihoods of applying, by 0.17 (p = .008) and 0.19 points (p = .002), respectively.

– A short diversity statement was also associated with a 0.10 increase (p = 0.060) in the likelihood of applying, while a long one, which listed several categories of inclusion, was not.

– The "training and development opportunities at all career levels" benefit was associated with a 0.11 increase (p = .094), but only at the 10% significance level.

Looking at point estimates only, implicit **references to young age were associated with the greatest reductions in likelihood of applying,** consistent with our prior expectations.

– For adverts stating, "we are looking for a recent graduate", older participants were much less likely to apply – a large 0.39-point reduction (p < .0001).

Contrary to our experimental hypothesis however, **most age-stereotypical words and phrases did not tend to influence application intentions** in either sample.

– The younger-age stereotypes ("innovative", "dynamic", "enthusiastic", "ambitious", "adaptable", and "energetic") all had point estimates between -0.05 and +0.05 and were within the statistical confidence intervals, suggesting these if words do have average effects on the likelihood of applying for the advertised role, these effects are relatively small.

See figure 2a for the full results on the primary outcome variable and Table 5 for a summary of the statistically significant results (across all outcomes).

Younger sample

In the younger sample, none of the tested words tended to significantly influence the stated likelihood of applying for the job.
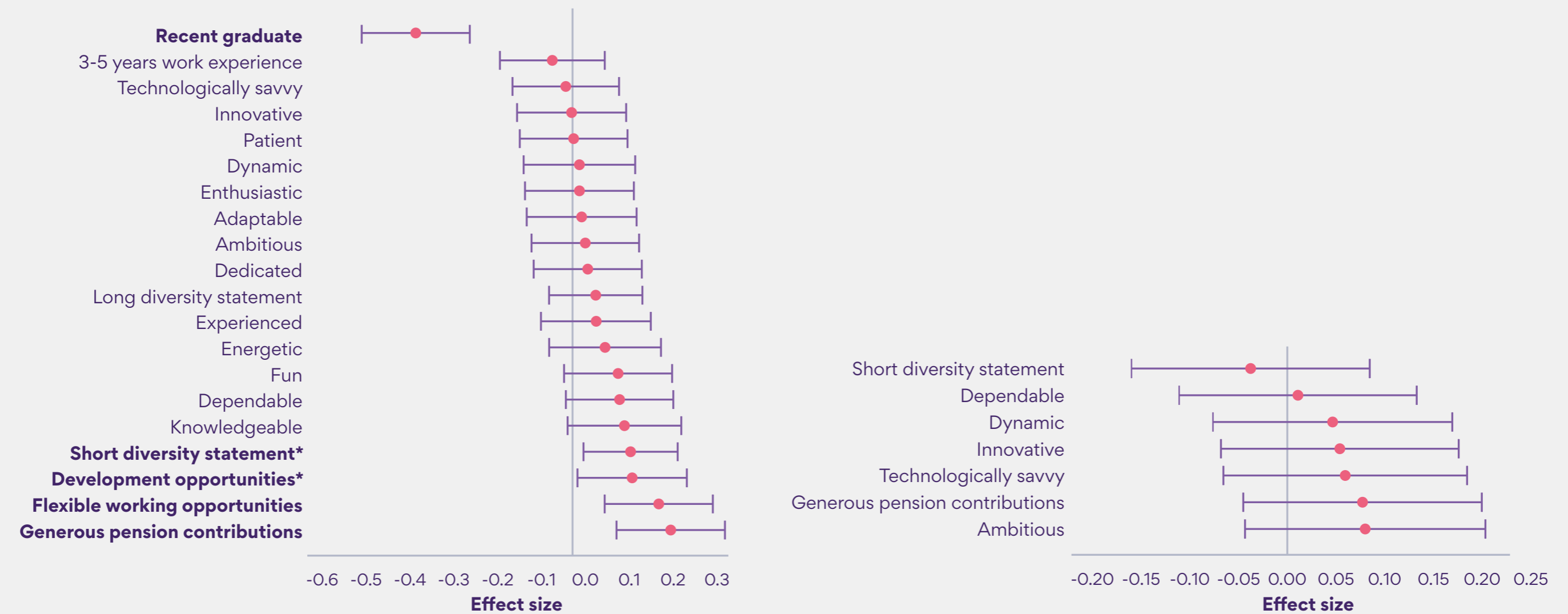
– Nonetheless, all point estimates, except that of the diversity statement, were positive, implying that any average effects are more likely to be positive than negative.

– Interestingly, although the offer of "generous pension contributions" had a positive effect on the older participants, it did not have a significant effect in the younger sample.

– This was also the case for the diversity statement, which for younger participants was associated with the lowest likelihood to apply.

Table 4: Summary of statistically significant results in the older sample

Word or phrase	Likelihood of applying	Likelihood of getting an interview	Likelihood of getting an offer	Perceived fit	Judgment of employer's perception of fit
Generous pension contributions	++				
Flexible working opportunities	++				
Development opportunities	+				
Short diversity statement	+			++	++
Knowledgeable		+			+
Adaptable			--		
3-5 years of work experience		-			-
Innovative		--	-		--
Technologically savvy		--	--	--	--
Recent graduate	--	--	--	--	--

Note: '++' and '--' indicate results significant at the 5% (positive and negative effects, respectively); '+' and '-' indicate results significant at the 10% level. Words with no significant effects are omitted.

Figures 2a and 2b: Each row shows the average effect size of the inclusion of a given word or phrase on the stated likelihood of applying for the advertised role (left = older sample, right = younger sample). Significant effects are highlighted in bold.

Note

The dots indicate best estimates of the average effect of the words or phrases and the whiskers indicate 95% confidence intervals. Where the whiskers do not overlap with zero (black vertical line), the effect was statistically significant at the 5% level.

*Phrases marked with an asterisk have been shortened in the figures.

Full wording:

– **Development opportunities:** "Training and development opportunities at all career stages".

– **Short diversity statement:** "We're actively building diverse teams and welcome applications from everyone".

– **Long diversity statement:** "We're actively building diverse teams and welcome applications from people of all backgrounds – men and women, people of all ages, sexual orientations, nationalities, religions and beliefs".

4.4.2 Secondary outcomes

We identified a number of age-stereotypical words and phrases which influenced jobseekers' perceptions of the organisation and their likelihood of success. Importantly, a number of these had opposite effects on older and younger jobseekers. In Table 5 below, we highlight the significant results and these differences. Note that more words and phrases were tested with the older sample than the younger sample. Hence, we emphasise where the significant results for the younger sample differ to those found for the older sample.

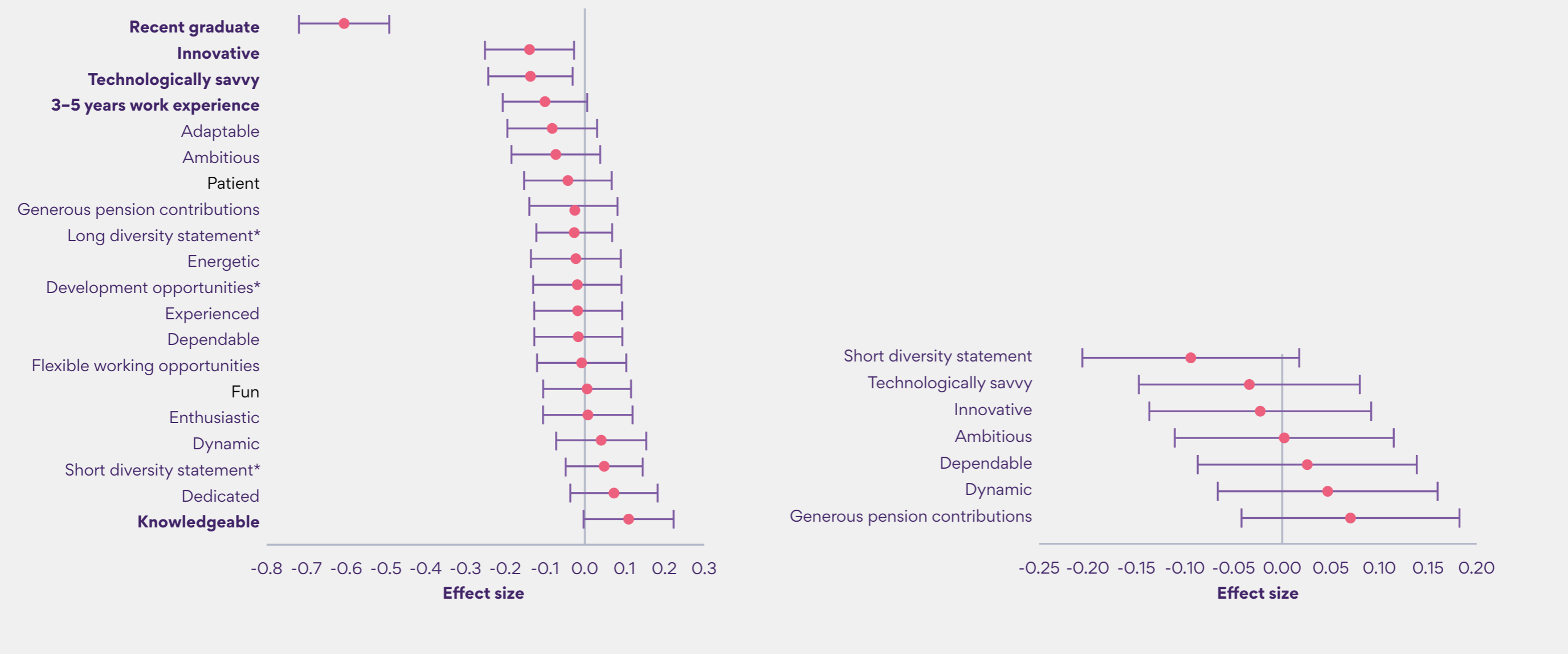**Table 5: Significant secondary outcome results split by older and younger sample.**

All described results are significant at the 5% level unless stated otherwise. Differences in effects between samples are highlighted with notes in italics.

Secondary outcome	Older sample	Younger sample
Perceived likelihood of getting an offer	The older-age stereotype "knowledgeable" was significantly associated with a higher perceived likelihood of getting an offer in the older sample. The younger-age stereotype "adaptable" and the phrases "recent graduate" (strongest effect) and "technologically savvy" were significantly associated with lower perceived likelihoods.	The younger-age stereotype "dynamic" was associated with a significantly higher perceived likelihood of getting an offer in the younger sample. *(this effect was not found in the older sample)*
Perceived likelihood of getting an interview	The older-age stereotype "knowledgeable" was associated with higher perceived likelihood at the 10% significance level. Younger-age stereotypes and "innovative" and "technologically savvy", and young-age signal "recent graduate" (strongest effect), were associated with a significantly lower perceived likelihood.	

Secondary outcome	Older sample	Younger sample
Perceived fit	The (short) diversity statement was associated with significantly higher perceived fit. "Recent graduate" and "technologically savvy" were associated with significantly lower perceived fit.	
Judgment of employer's perception of fit	The (short) diversity statement was associated with significantly higher judgement of employer's perceived fit. "Knowledgeable" also has a positive association at 10% significance level. "Innovative", "recent graduate" and "technologically savvy" were associated with a significant lower judgement of employer's perceived fit. "3-5 years of work experience" and "ambitious" had negative associations at the 10% level.	"Generous pension contributions" was associated with a significantly higher perception of employer's judgment of fit. *(this effect was not found in the older sample)* The (short) diversity statement was association with a lower perception of employer's judgment of fit at the 10% level. *(this effect was opposite to that found in the older sample)*

See figures 3–6 for a graphical summary of our results for the secondary outcomes.

Figures 3a and 3b – summary of the effects of the tested words and phrases on the judged likelihood of getting an interview (left = older sample, right = younger sample). Significant effects are highlighted in bold.

Note

The dots indicate best estimates of the average effect of the words or phrases and the whiskers indicate 95% confidence intervals. Where the whiskers do not overlap with zero (black vertical line), the effect was statistically significant at the 5% level.

*Phrases marked with an asterisk have been shortened in the figures.

Full wording:

– **Development opportunities:** "Training and development opportunities at all career stages".

– **Short diversity statement:** "We're actively building diverse teams and welcome applications from everyone".

– **Long diversity statement:** "We're actively building diverse teams and welcome applications from people of all backgrounds – men and women, people of all ages, sexual orientations, nationalities, religions and beliefs."

Figures 4a and 4b – summary of the effects of the tested words and phrases on the judged likelihood of getting an offer
(left = older sample, right = younger sample). Significant effects are highlighted in bold.
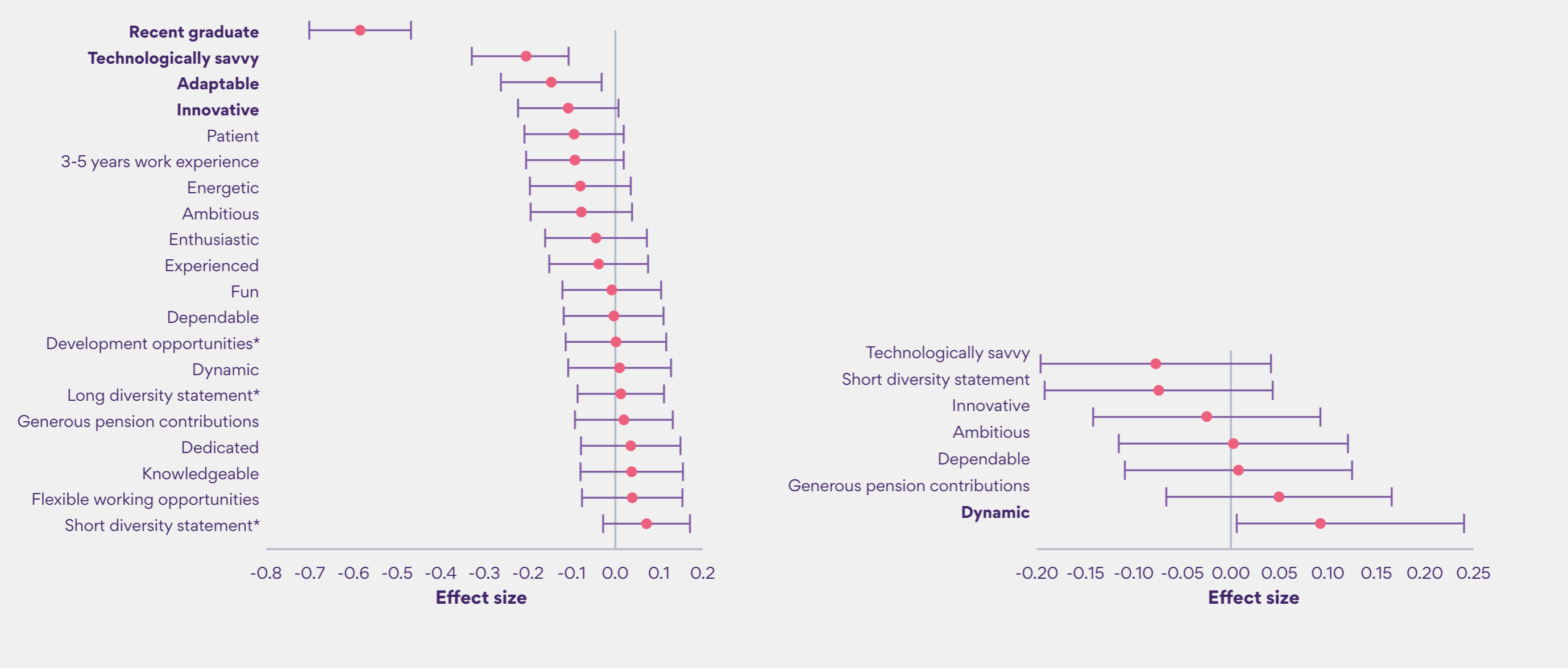

Note

The dots indicate best estimates of the average effect of the words or phrases and the whiskers indicate 95% confidence intervals. Where the whiskers do not overlap with zero (black vertical line), the effect was statistically significant at the 5% level.

*Phrases marked with an asterisk have been shortened in the figures.

Full wording:

– **Development opportunities:** "Training and development opportunities at all career stages".

– **Short diversity statement:** "We're actively building diverse teams and welcome applications from everyone".

– **Long diversity statement:** "We're actively building diverse teams and welcome applications from people of all backgrounds – men and women, people of all ages, sexual orientations, nationalities, religions and beliefs."

Figures 5a and 5b – summary of the effects of the tested words and phrases on the perceived fit with the organisation (left = older sample, right = younger sample). Significant effects are highlighted in bold.
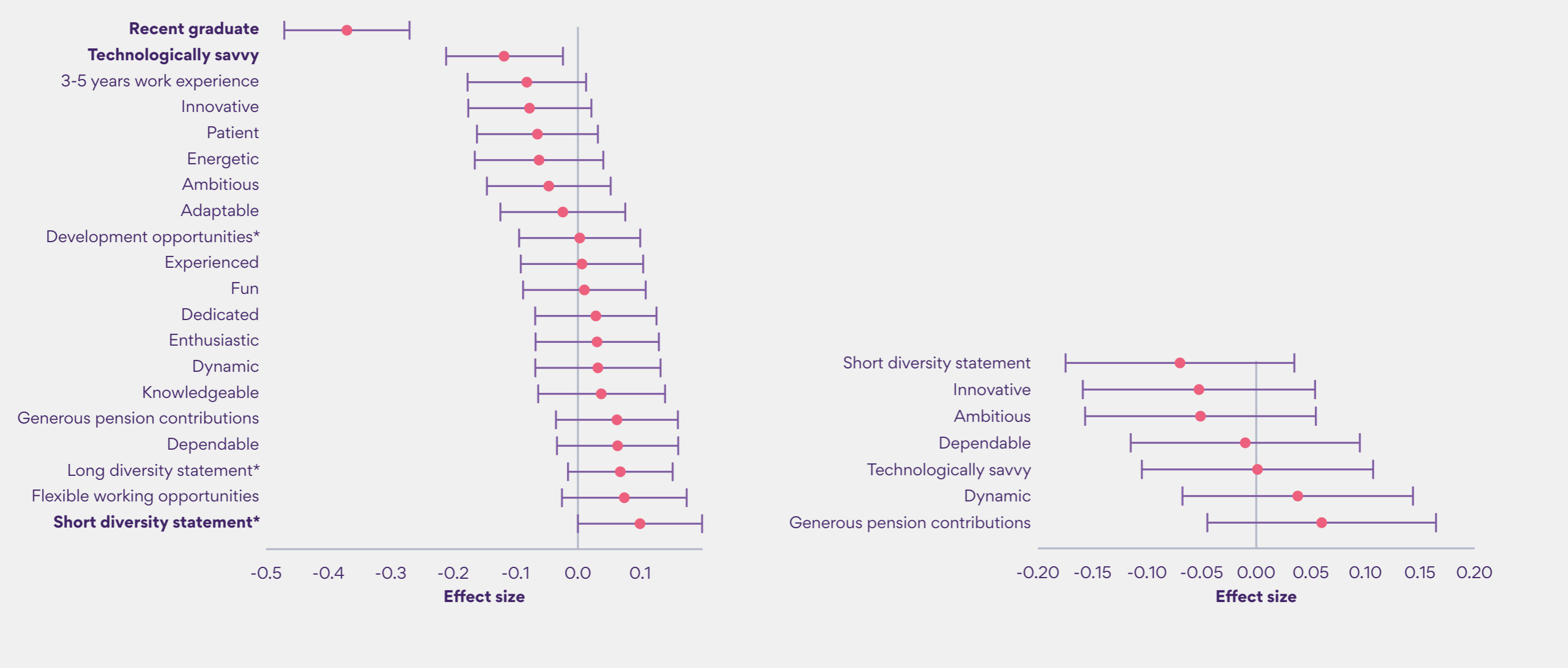

Note

The dots indicate best estimates of the average effect of the words or phrases and the whiskers indicate 95% confidence intervals. Where the whiskers do not overlap with zero (black vertical line), the effect was statistically significant at the 5% level.

*Phrases marked with an asterisk have been shortened in the figures.

Full wording:

– **Development opportunities:** "Training and development opportunities at all career stages".

– **Short diversity statement:** "We're actively building diverse teams and welcome applications from everyone".

– **Long diversity statement:** "We're actively building diverse teams and welcome applications from people of all backgrounds – men and women, people of all ages, sexual orientations, nationalities, religions and beliefs."

Figures 6a and 6b – summary of the effects of the tested words and phrases on judgment of the employer's perception of the person's fit (left = older sample, right = younger sample). Significant effects are highlighted in bold.
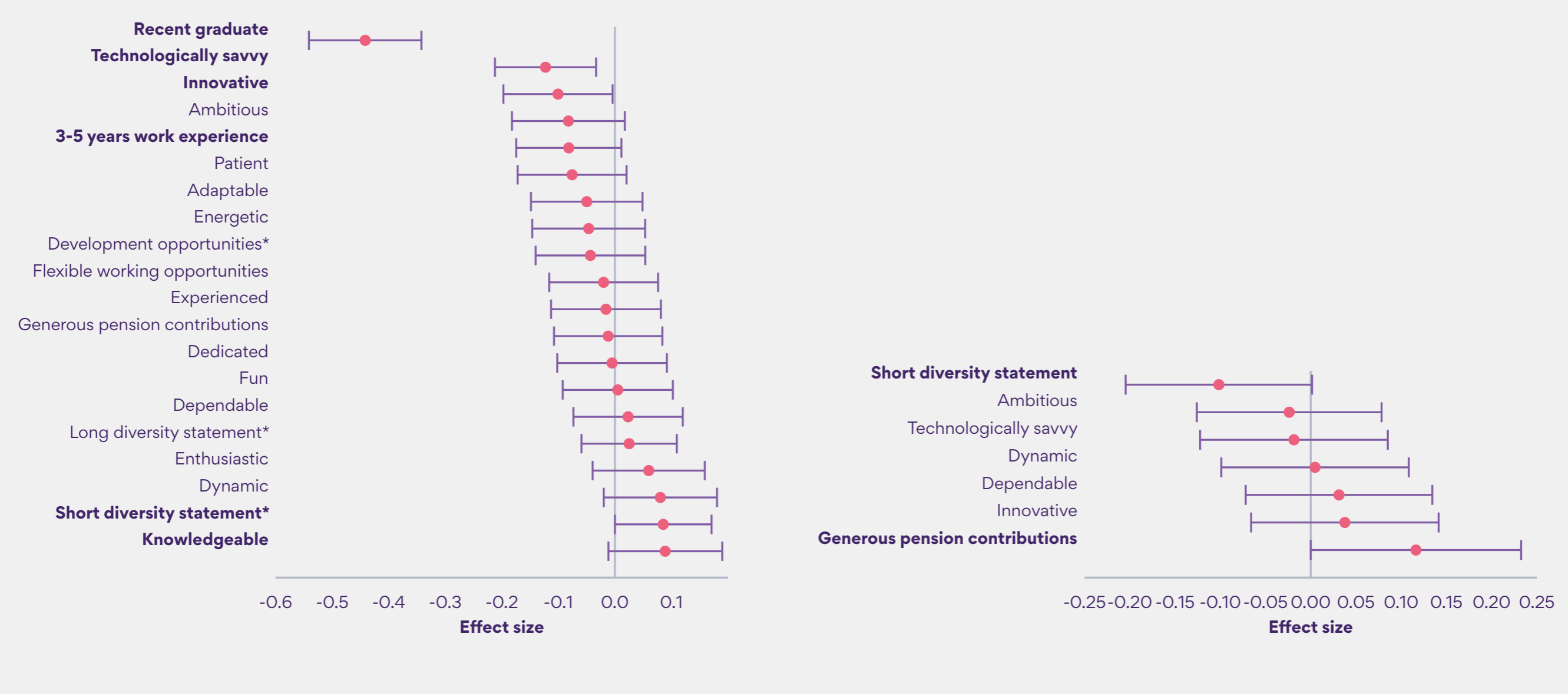

Note

The dots indicate best estimates of the average effect of the words or phrases and the whiskers indicate 95% confidence intervals. Where the whiskers do not overlap with zero (black vertical line), the effect was statistically significant at the 5% level.

*Phrases marked with an asterisk have been shortened in the figures.

Full wording:

– **Development opportunities:** "Training and development opportunities at all career stages".

– **Short diversity statement:** "We're actively building diverse teams and welcome applications from everyone".

– **Long diversity statement:** "We're actively building diverse teams and welcome applications from people of all backgrounds – men and women, people of all ages, sexual orientations, nationalities, religions and beliefs".

4.4.3 Exploratory analysis

Highlighting exercise

We also asked participants to separately highlight words in the advert that they found either appealing or off-putting and captured how often participants from each cohort highlighted different words or phrases.

– Consistent with the main analysis, the phrases flagged the most often as appealing by older participants were from the benefits section of the advert, with around 50% of participants selecting the phrase "paid annual leave entitlement" and over 60% selecting the phrases "training and development opportunities at all career levels", "generous pension contributions" and "flexible working opportunities".

– Consistent with the secondary analysis, the word "knowledgeable" was also rated as appealing by a large fraction of older participants.

– As hypothesised, the younger-age stereotypical words, such as "technologically savvy", "enthusiastic", "fun", "dynamic", "ambitious", "adaptable", "energetic" and "innovative" were often highlighted as off-putting by older participants. Interestingly, a number of these words were similarly, or even more, off-putting than meeting "none of the desirable criteria."

– However, surprisingly, those same words were much more often highlighted as *appealing* by (other) older participants. In fact, fewer than 15% of older participants flagged these words as off-putting but over 30% flagged them as appealing.

In the younger sample, we observed a similar pattern of words generally being more often labelled appealing rather than off-putting.

– Benefits were similarly flagged as appealing most often.

– In line with our experimental hypothesis, the younger-age stereotypes, "ambitious", "dynamic" and "innovative" were highlighted as appealing by many (over 30%) participants, and the older-age stereotype "dependable" was among the most commonly highlighted off-putting words (with around 10% of younger participants marking it).

– Contrary to our hypothesis, the implicit younger-age reference "technologically savvy" (in the phrase "we're looking for someone who is technologically savvy") and the younger-age stereotype "dynamic" (in the phrase "you'll be joining a dynamic team") were also commonly flagged as off-putting, by around 25% of older and 10% of younger participants, respectively. This indicates that these two phrases are universally perceived as rather off-putting, irrespective of the age of the applicant.

As expected, some of the fixed parts of the advert (such as not meeting the desirable criteria of the salary being below expectations) were also often flagged as off-putting to a similar degree in both samples.

Figures 7a and 7b – percentage of participants who highlighted each word or phrase in the advert as appealing (in green) or off-putting (in pink)
(left = older sample, right = younger sample)

Contentiousness score

To distinguish between universally appealing/off-putting words and those that prompted diverging responses, we defined a "contentiousness score". We ordered words by their frequency of being highlighted as either appealing or off-putting, then assigned them a 'rank'. We added their 'appealing rank' and their 'off-putting rank' to obtain a 'rank-sum' score, with the most contentious words obtaining the lowest rank sum score (Appendix D).

We found that:

– words considered younger-age stereotypes were among the most contentious words in both the older and younger samples while the older-age stereotypes and diversity statements were among the least contentious words or phrases for both groups;

– the words "dynamic", "fun", "ambitious", "enthusiastic", "technologically savvy" and "adaptable" were the highest-scoring tested words in the older sample in terms of contentiousness. In the younger sample, "technologically savvy", "dynamic" and "ambitious" were among the most contentious;

– some benefits, such as "free snack and drinks", "paid annual leave entitlement", and "training opportunities at all career stages" were highly contentious.

Subgroup analysis

Due to sample size limitations we only performed subgroup analysis by gender and age subgroup. Subgroup analysis by ethnicity was not feasible since over 90% of our (older) sample were White; similarly, analysis by industry was not feasible as there were too many subcategories.

Gender

– Older men's likelihood of applying was more positively affected by "generous pension contributions" than older women's.

– Older men were more encouraged to apply for a role whose advert said "you'll be someone who is dependable" than older women.

– Older men were more strongly put off by younger-age references like "recent graduate" or "3–5 years of work experience" than older women.

– In the younger sample, the short diversity statement had a negative effect in the male subgroup (significant at the 0.10 level) but not in the female subgroup.

Age

– In the **45–54 age subgroup**, flexible working opportunities and generous pension contributions had a significant positive effect, in line with the main analysis. However, additionally, the word "knowledgeable" and the word "fun" had positive effects in this subgroup as well. As before, only the phrase "recent graduate" had a negative effect.

– In the **55–64 age subgroup,** we did not observe any significant effects, with the only large negative effect for "recent graduate".

– In the younger subsample, we did not observe any significant effects in either of the age subgroups.

Combinations and pairs of words

We also tested combinations of the words and phrases to see if those combinations had more pronounced effects than the individual words and phrases previously tested. We did not find robust support for the hypothesis that the more older-age stereotypical words (or fewer younger-age stereotypical words) there were in the experimental advert, the more likely older applicants were to want to apply for that role.

Although testing the effects of pairs of words together (pair-wise modelling) produced some potentially interesting results, our overall assessment is that, due to the generally small effect sizes and the relatively small sample size, there is a large risk that many of the observed effects were the result of sample-specific random noise and that they would not generalise.

4.5 Discussion

This experiment is one of the first to provide quantitative evidence on the effects of potentially ageist language in job adverts on applicants – on their likelihood of applying, their judgment of their chances of success if they do apply, and their perception of the culture of the organisation advertising the role. Due to the scarcity of pre-existing evidence and the breadth of research interest within this topic, we took a more exploratory, rather than confirmatory, approach to the research question.

In a sample of 3,500 45–74 year-olds, we tested the effects of 15 potentially ageist words or phrases, together with three work benefits and two different diversity statements. Then, in a sample of 1,500 18–34 year-olds, we tested the effects of a subset of five ageist words or phrases, one work benefit, and one diversity statement. Due to the lack of existing experimental research in this area (which would be required to narrow down our focus) we tested a large number of words and hypotheses. When testing such numbers of hypotheses simultaneously, there is an increased risk of both false positives and false negatives with so many comparisons. However, as we have identified multiple broad patterns of results, we are confident that our insights are both generalisable and strong.

Our primary goal with these two trials was to identify which words or phrases in a job advert may attract to, or dissuade an older jobseeker from, applying for the job. Instead of identifying such words, we did not observe any consistent effects of the tested words on older jobseekers' likelihood to apply (except the clear younger-age reference "we are looking for a recent graduate"). There are several pieces of evidence affirming the robustness of the experiment and these results:

1. We tested words that were rated as highly age-stereotypical in a survey we had run prior to the experiments with representative UK adults. Therefore, we have a good reason to believe that, if ageist words do have a large effect on the likelihood of applying, the words that we tested should have had some of the strongest effects.

2. We did observe significant effects of some other sections of the advert, including the work benefits and the diversity statement. These results, which were consistent with earlier BIT work[46] demonstrated that the trial was well-powered to detect the effects of ageist language – assuming these effects have comparable effect sizes.

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46 Publication forthcoming

3. In the highlighting exercise, where participants were explicitly prompted to indicate which words were appealing and which ones were off-putting, many participants in the 45–74 year-old sample marked the younger-age stereotypical words as appealing. In fact, more than twice as many older-sample participants highlighted these words as appealing than as off-putting, on average. This indicates that, when presented as part of a job advert, people perceive these words not simply as negative stereotypes biased against older applicants but also as positive indicators of what the job and the company are like (for instance, a "fun" workplace with many "ambitious" colleagues).

4. The fact that these younger-age stereotypes were viewed positively by some and negatively by others may explain why, when looking at the average statistical effects of these words, we observed near-zero associations.

Our secondary goal was to identify which potentially age-stereotypical words may attract or dissuade *younger* jobseekers from, applying to the advertised job, especially if these effects go in the opposite direction to the effects on older applicants. As in our trial with older participants, our trial with younger participants did not identify any age-stereotypical words that had a significant effect on the likelihood of applying. Therefore, there were no words that we identified as having an opposite effect on younger and older applicants' likelihood of applying.

Although we did not observe significant effects of ageist language on our primary outcome, we did observe several such effects on our secondary outcomes. Among the older participants, the older-age stereotype "knowledgeable" was associated with a higher perceived likelihood of getting an offer, and the younger-age stereotypes "innovative" and "adaptable" with a lower perceived likelihood of getting an interview and getting an offer. The word "innovative" also had a negative effect on these participants' judgment of fit with the company's people and culture. In the younger sample, the younger-age stereotype "dynamic" was associated with a higher perceived likelihood of getting an offer. This was in line with our hypothesis that some ageist words would make applicants feel more or less welcome in the company advertising the role, and that some words would affect their perceived chance of success in the application process. However, these effects did not seem to translate into an impact on the likelihood of going ahead with applying for the advertised job.

The relationship between ageist language and application behaviour is complicated. Rather than (some) words universally encouraging or discouraging people to apply, these words may have multiple impacts, such as affecting the applicant's perception of similarity between themselves and the company, their perception of the company's inclusivity, or the sense of challenge they feel from the advertised role. How these affect the applicant's decisions will depend not just on their age but also on other characteristics, such as their personality (including their openness to experiences or conscientiousness), their level of ambition, or their preferences for certain types of work environments, such as a preference for colleagues of a similar age or for younger colleagues.

Finally, although we did not observe significant effects of ageist language on people's likelihood of applying, the tested words may still be problematic in real-world contexts. Several of the younger-age stereotypes were viewed as off-putting by a sizable minority of older participants (despite being appealing to others). A number of these phrases also negatively affected these applicants' perceived fit with the organisation and chances of success. These are both negative effects that should be minimised to make the job market a more welcoming environment for older jobseekers.

Similarly, we found evidence that perceptions towards non-age stereotypical words and phrases also seemed mixed, which may be for varying important reasons. For example, the inclusion of some benefits (such as "paid annual leave entitlement") may have been particularly contentious in the highlighting exercise because, while some participants saw these positively, others may have seen them as either standard or unimpressive. Moreover, although our subgroup analysis was less well-powered (due to smaller sample sizes), we also found important differences among subgroups. For instance, it appears that young men were uniquely put off by the inclusion of a diversity statement in a job advert. Together, these additional results suggest that adding or removing age-related or benefit-related phrases from job adverts may have a joint effect of increasing the job's appeal for some applicants while decreasing it for others.

5. Text analysis

The objective of the text analysis was to take real world job site data and identity prevalence of the key words and phrases which were identified as referring to young and old stereotypes in the literature review and the experiment.

Specifically, we were interested in the percentage of job adverts in which these words appear and to determine whether there are any differences in how prevalent positive younger-age stereotypes are as opposed to positive older-age stereotypes. This entailed:

1. building a predictive model that finds associations between words based on web-scraped UK job ads;

2. applying the predictive model to the words we have previously identified, and determine the ten most associated/similar words;

3. reviewing the ten most associated/similar words using sense checking;

4. computing the prevalence of all phrases (including associated words) in the entire data set.

5.1 Methods

5.1.1 Job advert data
Using Jobfeed from Textkernel (a text mining company), we obtained a dataset of all job adverts (11 million) published between 1 March 2019 and 1 March 2020 on major online UK job platforms (excluding, among others, Indeed and LinkedIn).[47]

–   All duplicates were removed prior to the data being sent to BIT. We then excluded 597,441 job adverts (5.4%) which had no job description. We were left with a sample of 10,546,829 job adverts for our analysis. In addition to the job description, the data included other variables specifying further information about the job, such as the location, organisation, and industry (see Appendix E for the breakdown by these categories).

–   Nearly 45% of all job adverts had been posted by staffing or employment agencies. Unfortunately, it is impossible to tell to which industry these

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47 This date range was picked in order to precede COVID-19-related restrictions in the UK.

advertised jobs belong, as staffing/employment agencies post jobs for both their internal recruitment as well as their clients. Apart from staffing/ employment, business services, trade/retail and healthcare/welfare were the industries with the largest number of open positions. Industries with the fewest number of open positions were administration/call centres and agriculture/ fishing.
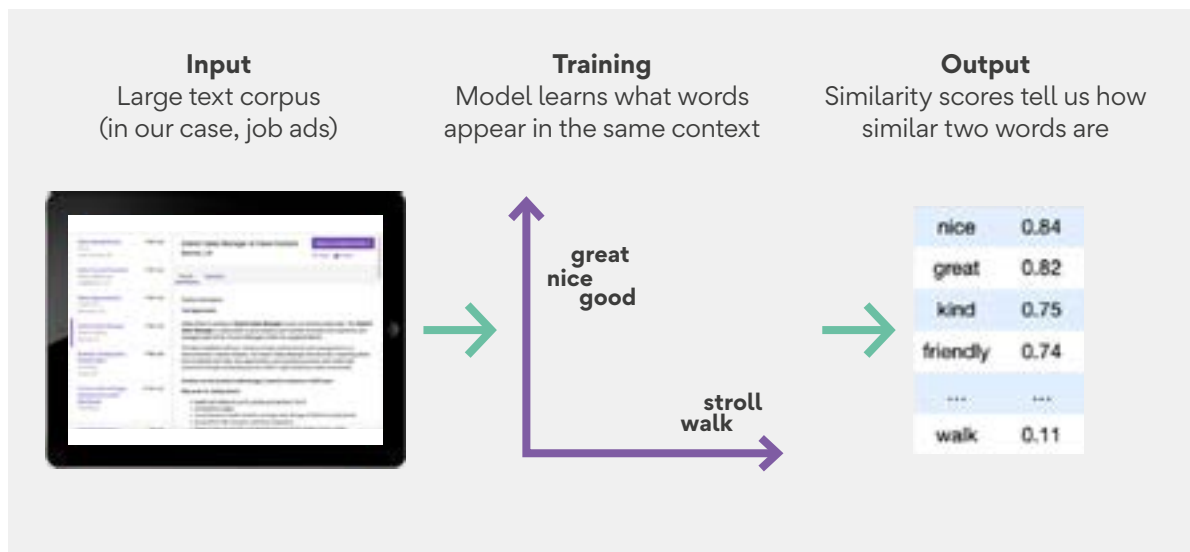
5.1.2 The model

In order to identify associated words and phrases, we used a Word2Vec model, an algorithm that learns to predict words given a context by taking a large corpus of words as input.

Firstly, we fed the model a large corpus of text (in our case, 10.5 million job adverts from UK job boards). Based on this, word2vec learns which words tend to co-occur or occur in similar contexts. Specifically, it represents words in a multidimensional space, where similar words huddle closely together and dissimilar words are further away from each other. In our example, 'good' and 'great' are very close to each other, but 'good' and 'walk' are far away. By the end of the training process, word2vec had learned how each text corpus word related to another word.

To speed up the learning process, we strategically trained the model not just on words that are associated with each other (such as 'good' and 'great'), but also words that have nothing to do with each other (such as 'good' and 'walk'). This 'negative sampling' helped to make sure the model did not cheat its way through the testing process by classifying all words as being strongly associated.

Once trained, Word2Vec can quantify word association using a similarity score, whereby 1 means the words are identical (such as the relation between 'good' and 'good') and 0 means no association at all. The higher the similarity score, the more similar are the words. We applied Word2Vec to the list of words that were identified through our literature review as referring to negative or positive stereotypes of younger or older people. We then obtained a list of the ten most similar words for each input word. A word list suggested by the model was accepted if it did not systematically capture an unintended meaning of the word (such as patient in a health context rather displaying patience). Further details of the inclusion and prevalence assessment process are outlined in Appendix E.

Figure 8 – the Word2Vec training process

Input	**Training**	**Output**
Large text corpus (in our case, job ads)	Model learns what words appear in the same context	Similarity scores tell us how similar two words are

nice	0.84
great	0.82
kind	0.75
friendly	0.74
...	...
walk	0.11

5.2 Results

5.2.1 Associations

Our analysis found that desired qualities of prospective applicants, specifically those that allude to younger or older age stereotypes, tend to be mentioned most frequently.

– The most prevalent word was "dedicated", a positive stereotype for older applicants (appearing in 36.6% of ads).

– However, most other positive older-age stereotypes, such as "dependable", "patient" and "knowledgeable" appeared less frequently than most positive younger-age stereotypes, such as "enthusiastic", "ambitious" and "energetic".

– While certain words had many synonyms, such as 'enthusiastic', others appear to have hardly any synonyms that are used in this context, for example, "patient".

In general, benefits were rarely mentioned and none of them appeared in more than 6% of job ads, although we observed some differences between benefits.

– While flexible working appeared in 5.5% of job ads, all of the other benefits we tested appeared in less than 2% of job ads, with a workplace pension scheme being mentioned in merely 0.3% of all ads.

Table 6 – associated words and prevalence

Input Word	Associated Word	Stereotype	Total mentions	% of job adverts mentioned in
dedicated, dedication	supportive, committed, hard-working, commitment, determination, passion	older	7,008,389	36.8
enthusiastic, enthusiasm	energetic, hard-working, passionate, motivated, passion, positivity, eagerness	younger	6,930,156	32.8
ambitious, ambition	energetic, enterprising, enthusiastic, dynamic, hungry, tenacious, aspiration, determination, hunger, appetite	younger	3,512,025	23.1
energetic	enthusiastic, hardworking, passionate, upbeat	younger	2,720,433	19.4
experienced	/	older	2,345,194	18.5
Innovative	inventive, creative, unconventional, imaginative	younger	1,914,956	12.3
Fun	Easy-going, lively, sociable, humorous, convivial, friendly, relaxed	younger	1,974,861	11.7
Dynamic	dynamic, entrepreneurial, energetic	younger	1,306,892	9.6
Dependable	trustworthy, reliable, conscientious, hard-working, punctual, diligent	older	995,639	7.1
flexible work	/	/	658,031	5.5
Patient, patience	Resilience	older	1,228,946	5.4
knowledgeable	versed, familiar, grasp, familiarity, good understanding	older	673,843	4.4
Adaptable	versatile, resourceful, resilient	younger	417,554	3.6
progression opportunities	/	/	166,850	1.5
training opportunities	/	/	84,474	0.8
workplace pension	/	/	32,836	0.3
tech-savvy	techsavvy, techsavy, tech whiz, tech whizz, tech savy	younger	7,089	0.1
recent graduate	recent grad, internship, recent gradate	younger	93,853	0.1

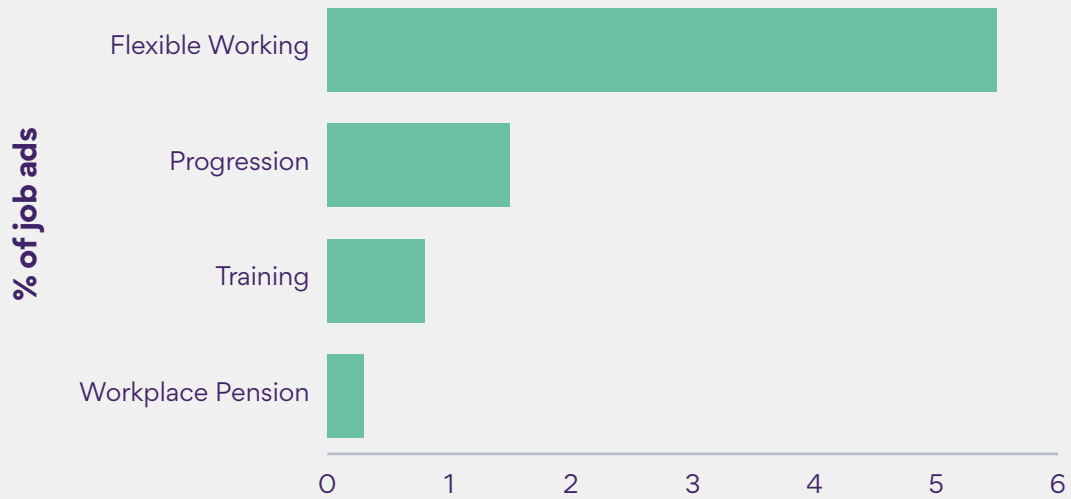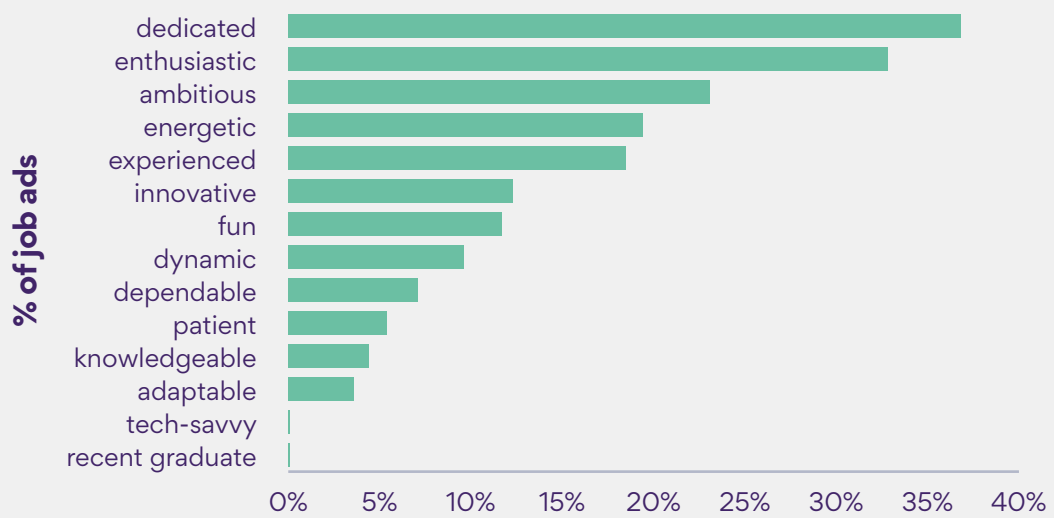**Figure 9 – percentage of job adverts mentioning different benefits**

Figure 10 – percentage of job adverts containing language relating to hypothesised young- or older-age stereotypes

5.3 Discussion

As described above, in this last phase of the study, we conducted a text analysis of 11 million real-world job site adverts and estimated the prevalence of the key words and phrases which were identified as referring to young/old stereotypes in the literature review and the experiment.

We found that the use of terms to describe benefits such as pension contributions and flexible working, which were positively associated with the likelihood of older applicants applying, were not frequently used. One possible explanation for this could be that many benefits (such as workplace pension schemes) are mandatory and are thus not considered a perk worth mentioning.[48] However, employers can choose to top up more than the minimum required amount, which we suggest they could do if they want to attract more older workers by making the benefit seem 'generous'. Other perks, such as training and progression opportunities and flexible working might also not be commonly mentioned as they are only offered for certain white-collar jobs.

We also found that stereotypical terms and phrases, on the other hand, were commonly used. Frequently used terms included both those that were seen to have a positive effect on older applicants, such as "dedicated", and those that were seen to have a negative effect, such as "innovative", "ambitious", and "dependable". It seems that "recent graduate" and "technologically savvy" are less commonly used. This is important, as the lack of consistent average effects of these words in our experiment does not mean that the tested words are unproblematic in real-world job adverts.

Our methodology has some limitations that should be taken into account when interpreting the results, although we think that the validity of these findings holds. For instance, there is no proven way to validate a Word2Vec model and quantify uncertainty or error. We have tried to counter this by using the common validation method of sense-checking suggested words and have used consistent rules to do so, but it is impossible to precisely quantify how well the model is performing using an objective metric. In addition to ambiguous performance metrics, there is also no established way to improve model predictions. We have resorted to a sensible and often used method for this by performing vector calculations, such as subtractions, to improve predictions and done this in a systematic way. However, we cannot say with certainty that this was the best way to improve predictions. Finally, we cannot exclude that unintended meanings of certain words (such as patient) were not captured when counting the number of word mentions or the percentage of adverts in which a word appears.

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48 https://www.gov.uk/workplace-pensions/joining-a-workplace-pension

Lastly, this research has identified a number of useful research questions for further analysis:

– Does potentially age-biased language appear more or less frequently in different industries?

– Does potentially age-biased language appear more or less frequently in different geographical locations (or even on different platforms online)?

– Is there any difference in how often benefits are mentioned between locations and industries?

– Do any potentially age-biased words tend to appear together in job advertisements?

  - What proportion of adverts include only younger or older-age stereotype language, and what proportion include both?

  - Do any particular words appear more frequently with each other?

6. Conclusions and recommendations

The aim of the research described in this report was to assess whether the inclusion of certain words and phrases in job advertisements would either increase or decrease the likelihood of older workers applying for the job.

Using online experiments, we explored the effect of a set of words and phrases that we had previously tested for both their perceived stereotypicality and their prevalence in job adverts. Somewhat unsurprisingly, the experiments showed that the phrase "recent graduate" was off-putting to older applicants in a statistically significant way. At the same time, the mention of certain benefits, pension, and flexible working in particular, increased the likelihood of applying. These latter references were not off-putting to the younger cohort. What was more surprising however, was that we did not find large negative effects of the younger-age stereotypes on the application intentions of older workers that we hypothesised.

However, several of the younger-age stereotypes were viewed as off-putting by many older participants in the experiment and negatively affected other (secondary) outcomes, such as their perceived organisational fit and chance of success. In particular, in this secondary analysis, "recent graduate" had a detrimental effect on the perceived likelihood of getting an interview or an offer. Other phrases typical of certain age stereotypes also had measurable effects:

– the term "knowledgeable" was associated with a higher perceived likelihood of getting an interview;

– while being "technologically-savvy" or "innovative" decreased that perceived likelihood;

– furthermore, "adaptable" and "technologically savvy" also decreased the perceived likelihood of getting an offer;

– meanwhile, the short diversity statement increased the perceived fit with the (fictional) organisation as well as the judgement of the employers' perception of fit with the organisation;

– while "technologically savvy" and "recent graduate" decreased both, and "innovative" decreased just the latter.

These results are novel in that we are not aware of similar experimental studies testing their effects among older jobseekers. However, the negative effects of younger-age stereotypes are consistent with our hypotheses, and exploratory research in the literature. For example, in a recent Dutch vignette study, the presence of younger age signals outweighed salary, travel, and type of contract in terms of deterring older applicants. The phrases with the biggest negative effect on older applicants included "You just/recently graduated", "Make some pocket money during your studies/while you're studying" and "We are looking for someone between 25 and 35 years old".[49]

Due to sample size limitations we only performed subgroup analysis by gender and age subgroup. Nonetheless, we found some important findings:

– The likelihood of older men applying was more positively affected by the phrases "generous pension contributions" and "you'll be someone who is dependable" than for older women.

– Older men were more strongly put off by younger-age references like "recent graduate" or "3–5 years of work experience" than older women.

– The short diversity statement seems to have had a negative effect for young men but not young women.

These results should be interrogated further, but contribute to a well-established body of literature demonstrating how the phrasing of job adverts impacts gender bias in the hiring process.[50] We do not know how members of various unrepresented groups might react to particular phrases and (such as age-inclusive diversity messages), hence it is best to monitor the impact of diversity statements on an ongoing basis and review their efficacy.

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49 Fokkens, A. S., Beukeboom, C. J., & Maks, E. (2018). Leeftijdsdiscriminatie in vacatureteksten: Een geautomatiseerde inhoudsanalyse naar verboden leeftijd-gerelateerd taalgebruik in vacatureteksten: Rapport in opdracht van het College voor de Rechten van de Mens. Retreived from: https://research.vu.nl/en/publications/age-discrimination-in-job-vacancy-texts-an-automated-content-anal

50 For example, Gaucher, D., Friesen, J., & Kay, A. C. (2011). Evidence that gendered wording in job adverts exists and sustains gender inequality. Journal of personality and social psychology, 101(1), 109.

Lastly, we conducted a data science analysis of the frequency of use of the terms and phrases analysed in the online tests. We found that the use of terms to describe benefits such as pension contributions and flexible working, which were positively associated with likelihood of older applicants applying, were not frequently used. On the other hand, we found that stereotypical terms and phrases were commonly used – including those that were seen to have a positive effect on older applicants, such as "dedicated", and those that were seen to have a negative effect, such as "innovative".

This is important, as the lack of consistent average effects of these words in our experiment does not mean that the tested words are unproblematic in real-world job adverts. In fact, several of the younger-age stereotypes shown here to be frequently used in job adverts were viewed as off-putting by many older participants in the experiment and negatively affected their perceived organisational fit and chance of success. By contrast, terms describing benefits, which were positively associated with likelihood of older applicants applying, were not frequently used. This suggests that avoiding potentially age-biased words may be important for particular subsets of the population, and that generally employers could do a lot more to promote the benefits that they offer, and the related aspects of the role that may attract older workers – such as flexible hours. BIT's work on gender equality shows that just listing flexible working options in adverts can considerably increase applications.[51]

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51 Behavioural Insights Team (2019). Encouraging employers to advertise jobs as flexible. Government Equalities Office

Recommendations for employers

Below, we have drawn out concrete recommendations for employers to ensure that job adverts are not needlessly off-putting for older applicants while increasing the appeal to such applicants:

– Focus on the precise behaviours and skills required, rather than the personality of the applicant. This will create more room for diversity and attract applicants with better matched skills.

  - For example, replace younger-aged stereotypes describing inherent abilities, such as "innovative", with specific competencies, such as "programming skills" or "contributing new ideas".

– Use inclusive rather than exclusive language.

  - For instance, age-signifiers such as "recent graduate", could be replaced with alternatives such as "suitably trained". So-called "graduate schemes" could be rebranded as "new joiner" or "transition" schemes.

– Emphasise employer benefits, in particular those around pension contributions, flexible working, and professional development.

  - Such emphasis and transparency will attract applicants of all ages and, in our research, provided a clear boost to the likelihood of older applicants applying.

– Consider including language that we found to be appealing to older applicants, such as "knowledgeable", "dependable", and "experienced". Such terms are likely to increase perception of fit for older applicants and may contribute to higher application rates in that cohort. However, be mindful to avoid reinforcing stereotypes which may not be true. Also be aware that, as we could not test all these words with the younger sample, we cannot say how they will impact younger applicants.

– Consider including a diversity statement, particularly those that specifically emphasise age-inclusive hiring in job postings.

  - This can increase perceived fit and likelihood of applying for older applicants. Nonetheless, younger men reacted negatively to these statements in our sample, and we do not know how members of various unrepresented groups might react (to age-inclusive diversity messages) and hence, it is best to monitor the impact of diversity statements on an ongoing basis and review their efficacy.

Appendix A: Evidence strength criteria for Literature Review

Table A1 – evidence strength criteria for Literature Review

Level of Evidence	Explainer Statement	Nature of Underlying Evidence
Strong	We are confident that the intervention will have a significant effect. The evidence is high-quality, and contextually relevant, and results are consistent.	Multiple well designed experimental or quasi-experimental studies, including (at least) one randomized controlled trial and (at least) one highly contextually relevant study. Results are consistent (i.e., studies do not show impacts in different directions).
Moderate	The intervention is likely to have the anticipated effect. The evidence is high quality but may lack sufficient diversity, consistency, or contextual relevance to be considered "Strong."	At least one well-designed and highly contextually relevant experimental study, or multiple well-designed studies with potential limitations (i.e., limited relevance or consistency), at least one of which is experimental and at least one of which is contextually relevant.

Appendix A: Evidence strength criteria for Literature Review

Level of Evidence	Explainer Statement	Nature of Underlying Evidence
Promising	The intervention may or may not have the anticipated effect. The evidence is not fully reliable given insufficient relevance, consistency and/or diversity limitations.	At least one well-designed experimental study which may lack contextual relevance, or multiple well-designed studies with consistency, diversity, and/or relevance limitations.
Limited	The body of evidence is not sufficient to make a confident recommendation as to the direction or size of the effect. It is more akin to "food for thought." The evidence may have significant design limitations, and/or may not be relevant, diverse, or consistent.	Studies with design, consistency, relevance, and/or diversity limitations, or studies that do not estimate causal or correlational impact (e.g., descriptive or exploratory research).

Appendix B: Age stereotypicality survey

For this online survey, we recruited a sample of 200 participants representative of the UK population in terms of gender, age, income, and location. We asked the participants to rate to what extent they perceived a word (if they saw it in a job advert) to be typical of someone younger than 35 or older than 50, on a 5-point scale (the central point of the scale being that the word is perceived to be equally typical of both age groups).

We transformed the scores to a linear scale, with "much more likely to be under 35" being 1 and "much more likely to be above 50" being 5. We then computed the mean scores assigned to each word. Figure A2 below presents the results, which were use to narrow down our selection of: (a) words that we thought may be off-putting to older workers (low-scoring words); (b) words that we could treat as "neutral" in the trial (those scoring around 3.0); and (c) words that we thought may attract older workers (high-scoring words).

Figure A1 – screenshot of the age stereotypicality survey (page 1 of 4)

Figure A2 – unadjusted results from the age stereotypicality survey

Trait	Value
ambitious	2.12
energetic	2.12
go getter	2.17
quick learner	2.2
fun	2.2
interest in learning	2.27
bubbly	2.32
dynamic	2.34
extroverted	2.47
switched on	2.49
enthusiastic	2.52
on the ball	2.54
sharp	2.58
forward thinking	2.6
adaptable	2.62
flexible	2.7
hardworking	2.95
good natured	2.99
amicable	3.02
committed	3.03
warm	3.06
dedicated	3.08
trustworthy	3.16
careful	3.19
reliable	3.19
humble	3.2
unflappable	3.2
dependable	3.21
loyal	3.26
responsible	3.27
stable	3.31
patient	3.36
knowledgeable	3.37
experienced	3.6
mature	3.94
senior	4.04

Appendix C: Experimental design

This experiment was conducted entirely online using BIT's Predictiv platform. Participants in the study could select to participate in this experiment through the panel survey website on which they were registered. They were then taken through several stages:

- **Welcome page:** Participants were given a brief description of the experiment so that they knew what to expect.

- **Assignment to an advert:** This was a hidden stage that the participant did not experience. Each new participant was assigned to see an advert consisting of a specific combination of words. These combinations were constructed upfront.

- **Material stage:** An advert was constructed from the words assigned to a participant and the advert was presented to them. Below the advert, the participant was asked how likely they would be to apply for the presented job.

- **Additional questions:** The participant was asked a set of additional questions (for instance, their perceived fit with the organisation), which were treated as secondary outcomes.

- **Selecting off-putting language:** After the primary and secondary outcomes are recorded, the same advert was presented to the participant again who indicated whether any parts of it (if any) – by clicking on specific words or phrases – were off-putting to them.

- **Demographic questions:** A short section containing demographic questions of interest (in addition to those collected via partner panel websites) was then presented.

- **Closing screen:** The participant was thanked for their participation and given an opportunity to share feedback on the trial. Upon submitting this page, the experiment ended.

**Figure A3 –
participant journey**

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           ┌─────────────────────┐
           │     Participants     │
           │    recruited from    │
           │    Predictiv panel   │
           │   (N_old = 3500,     │
           │   N_young = 1500     │
           └─────────────────────┘
                      │
                      ▼
     ┌──────────────────────────────────┐
     │  Welcome page with task instructions │
     └──────────────────────────────────┘
                      │
                      ▼
              ◇ Assignment to ◇
              ◇   an advert   ◇
                      │
                      ▼
     ┌──────────────────────────────────┐
     │ Participant views job advert and indicates interest │
     └──────────────────────────────────┘
                      │
                      ▼
     ┌──────────────────────────────────┐
     │  Additional questions about the job advert │
     └──────────────────────────────────┘
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     ┌──────────────────────────────────┐
     │   Selection of off-putting languages │
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     │      Demographic questions       │
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     ┌──────────────────────────────────┐
     │         Closing screen           │
     └──────────────────────────────────┘
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Samples

In both age samples, there was an equal split between genders, with under 1% reporting "other" and between those having above- and below-median incomes. There were similar distributions over industry types, employment types, and geographical locations. 90% of the older sample was White, compared to 79% for the younger sample. There was 50/50 split between the 18–24 and 25–34 age groups in the younger sample, and we recruited 1916, 1394 and 189 participants from the 45–54, 54–64, and 65–74 subgroups, due to a difficulty of recruiting jobseekers at pension age.

Table A2 – participant characteristics*

Participants are automatically profiled on standard demographic characteristics (age, gender, location, income) prior to the experiment.   All categorical variables were converted to a series of dummy variables in regression analysis

	Older sample (n = 3,499)	Older sample (%)	Younger sample (n = 1,592)	Younger sample (%)
Gender – "Are you... [Male/Female/Other]"*				
Male	1733	50%	778	49%
Female	1753	50%	804	51%
Other	13	<1%	10	1%
Age – "What is your age?"*				
18–24	-	-	790	50%
25–34	-	-	802	50%
45–54	1,916	55%	-	-
54–64	1,394	40%	-	-
65–74	189	5%	-	-
Income – "What is your current annual household income before taxes?"*				
Less than £30,000	1,688	48%	860	54%
£30,000 and over	1,811	52%	732	46%
Location – "In which region do you live?"*				
London	429	12%	235	15%
South and East of England	1,125	32%	486	31%
Wales, Scotland, NI	537	15%	220	14%

	Older sample (n = 3,499)	Older sample (%)	Younger sample (n = 1,592)	Younger sample (%)
Midlands	561	16%	270	17%
North of England	847	24%	381	24%
Education – "What is the highest level of education you have completed?"				
Below O-level / GCSE	161	5%	44	3%
O-levels / GCSEs or equivalent	841	24%	210	13%
A-levels or equivalent	570	16%	345	22%
Further qualifications	490	14%	315	20%
Completed some university, but no degree	263	8%	343	22%
University degree	773	22%	147	9%
Master's or professional degree	339	10%	171	11%
Postgraduate: PhD	62	2%	17	1%
Ethnicity – "What is your ethnic group?"				
Asian	129	4%	146	9%
Black	99	3%	101	6%
Other	111	3%	84	5%
White	3,160	90%	1,261	79%
Employment type – "Which best describes your employment?"				
Higher managerial / administrative / professional	324	9%	134	8%

	Older sample (n = 3,499)	Older sample (%)	Younger sample (n = 1,592)	Younger sample (%)
Middle managerial / administrative / professional	862	25%	280	18%
Junior managerial / administrative / professional	804	23%	370	23%
Skilled manual worker	423	12%	240	15%
Semi-skilled manual worker	312	9%	146	9%
Unskilled manual worker	127	4%	60	4%
Casual worker	63	2%	75	5%
Unemployed	377	11%	228	14%
Pensioner	82	2%	2	0%
Other	125	4%	57	4%
Industry – "Which of the following categories best describes your organisation's primary industry?"				
Government, knowledge work	1,016	29%	356	22%
Work concerning intangible goods	1,284	37%	708	44%
Work concerning tangible goods	519	15%	212	13%
Other	194	6%	80	5%
Not employed	486	14%	236	15%

	Older sample (n = 3,499)	Older sample (%)	Younger sample (n = 1,592)	Younger sample (%)
Years of work experience – "How many years of work experience do you have?"				
Less than 1 year	40	1%	180	11%
1–3 years	93	3%	392	25%
3–5 years	130	4%	392	25%
5–10 years	274	8%	382	24%
10–20 years	612	17%	233	15%
20–40 years	1,962	56%	11	1%
More than 40 years	388	11%	2	0%

Appendix D: Additional results

Primary outcomes

Table A3 shows the mean stated likelihood of applying associated with adverts containing each of the tested words or phrases (including the baseline categories); it also shows how many participants were shown each word or phrase. With a few exceptions, the mean likelihood was around 3.7 or 3.8 out of 6 in the older sample, slightly below the "somewhat likely" option. In the younger sample, scores were generally around 4.0, indicating "somewhat likely". The lack of variation in the descriptive results is unsurprising, given that these are uncontrolled averages over diverse sets of adverts – unless the effect of a word is very strong, it is not expected to stand out without controlling for other words.

Table A3 – mean stated likelihood of applying for adverts containing a given word or phrase

Advert containing a given word or phrase	Mean stated likelihood of applying (standard deviation), older sample	Number of participants shown an advert with the word or phrase, older sample	Mean stated likelihood of applying (standard deviation), younger sample	Number of participants shown an advert with the word or phrase, younger sample
[blank location 1]	3.87 (1.27)	878	4.00 (1.21)	807
Looking for a recent graduate	3.47 (1.41)	936	-	-
Looking for someone with 3-5 years of relevant work experience	3.81 (1.29)	844	-	-
Looking for someone who is technologically savvy	3.81 (1.32)	841	4.02 (1.27)	785
[blank location 2]	3.71 (1.35)	860	3.98 (1.24)	779
Energetic	3.76 (1.34)	840	-	-
Dependable	3.79 (1.28)	896	4.02 (1.24)	792
Innovative	3.67 (1.36)	903	4.03 (1.24)	813
Hard-working	3.74 (1.35)	884	4.00 (1.25)	800
Patient	3.71 (1.33)	896	-	-
Dedicated	3.76 (1.32)	878	-	-
Adaptable	3.73 (1.34)	841	-	-
[blank location 4]	3.71 (1.34)	879	3.98 (1.27)	801
Fun	3.78 (1.33)	876	-	-
Experienced	3.73 (1.35)	874	-	-
Ambitious	3.71 (1.33)	870	4.04 (1.22)	791
Medium-sized	3.72 (1.35)	798	3.98 (1.26)	792
Enthusiastic	3.69 (1.31)	959	-	-
Knowledgeable	3.81 (1.37)	871	-	-

Advert containing a given word or phrase	Mean stated likelihood of applying (standard deviation), older sample	Number of participants shown an advert with the word or phrase, older sample	Mean stated likelihood of applying (standard deviation), younger sample	Number of participants shown an advert with the word or phrase, younger sample
Dynamic	3.72 (1.30)	871	4.03 (1.23)	800
[blank location 6]	3.61 (1.34)	859	3.97 (1.27)	802
Training and development opportunities at all career levels	3.73 (1.36)	898	-	-
Flexible working opportunities	3.78 (1.31)	866	-	-
Generous pension contributions	3.80 (1.32)	876	4.05 (1.21)	790
[blank 7]	3.69 (1.34)	1,197	4.01 (1.28)	796
Short diversity statement	3.80 (1.33)	1,120	4.00 (1.20)	796
Long diversity statement	3.71 (1.33)	1,182	-	-

Exploratory outcomes

Table A4 – contentiousness scores of all the words and phrases presented in the adverts. The table is ordered by the older samples' contentiousness score, from the most to the least "contentious" words. Experimentally tested words are bolded, and the roughly third most "contentious" words in each sample are highlighted.

Word / phrase	Appealing rank – older	Off-putting rank – older	Rank sum score – older	Appealing rank – younger	Off-putting rank – younger	Rank sum score – younger
free snacks and drinks	10	5	15	2	7	9
dynamic	9	8	17	5	10	15
fun	8	9	17	-	-	-
ambitious	12	7	19	4	12	16
enthusiastic	6	18	24	-	-	-
paid annual leave entitlement	4	20	24	3	5	8
technologically savvy	23	2	25	9	2	11
adaptable	11	15	26	-	-	-

Word / phrase	Appealing rank – older	Off-putting rank – older	Rank sum score – older	Appealing rank – younger	Off-putting rank – younger	Rank sum score – younger
training and development opportunities at all career stages	3	23	26	-	-	-
generous pension contributions	2	26	28	1	11	12
recent graduate	28	1	29	-	-	-
someone with 3–5 years' experience	25	4	29	-	-	-
innovative	21	10	31	7	14	21
patient	20	11	31	-	-	-
energetic	19	12	31	-	-	-
actively building diverse teams	17	14	31	13	17	30
flexible working opportunities	1	30	31	-	-	-
salary slightly below expectations	30	3	33	17	1	18
knowledgeable	5	28	33	-	-	-
dependable	7	27	34	10	8	18
medium-sized	22	13	35	11	3	14
immediate start	18	17	35	6	9	15
work is similar to the type you're looking for	16	19	35	12	15	27
none of the desirable criteria	31	6	37	18	4	22

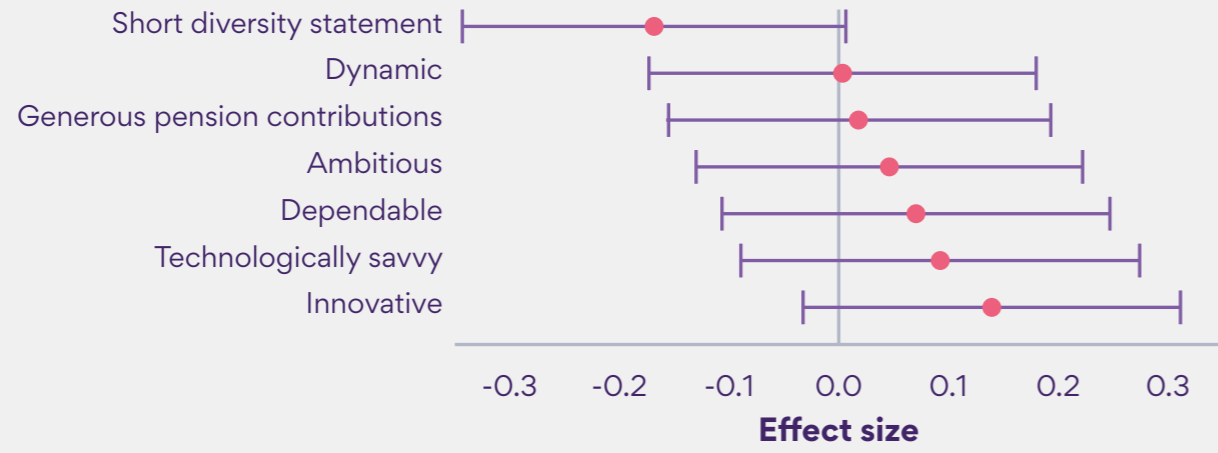| Word / phrase	Appealing rank – older	Off-putting rank – older	Rank sum score – older	Appealing rank – younger	Off-putting rank – younger	Rank sum score – younger
dedicated	15	22	37	-	-	-
experienced	13	24	37	-	-	-
hard-working	14	25	39	8	13	21
[long diversity statement]	24	21	45	-	-	-
not exactly what you're looking for	32	16	48	19	6	25
welcome applications from everyone	26	29	55	15	18	33
meet essential qualifications	27	32	59	14	19	33
after your notice period ends	29	31	60	16	16	32

Subgroup analysis

Gender
– For **older male** participants (N = 1733), we observed a significant positive effect of the "generous pension contributions" benefit (as in the main analysis) but also additionally observed a significant positive effect of the older-age stereotypical word "dependable" and the short diversity statement. "Flexible working opportunities" was only significant at the .10 level but the short diversity statement was significant at the .05 level. In the negative direction, the phrase "3-5 years of work experience" was significant, together with the phrase "recent graduate".

– Interestingly, for **older female** participants (N = 1753), we generally observed weaker effects across the tested words. The only phrase that had a statistically significant effect at the .05 level in this subgroup was "recent graduate" (in the negative direction) but, notably, the point estimate of the effect was less than half of the effect observed in the male subgroup. The only phrase significant at the .10 level (in the positive direction) was "flexible working opportunities".
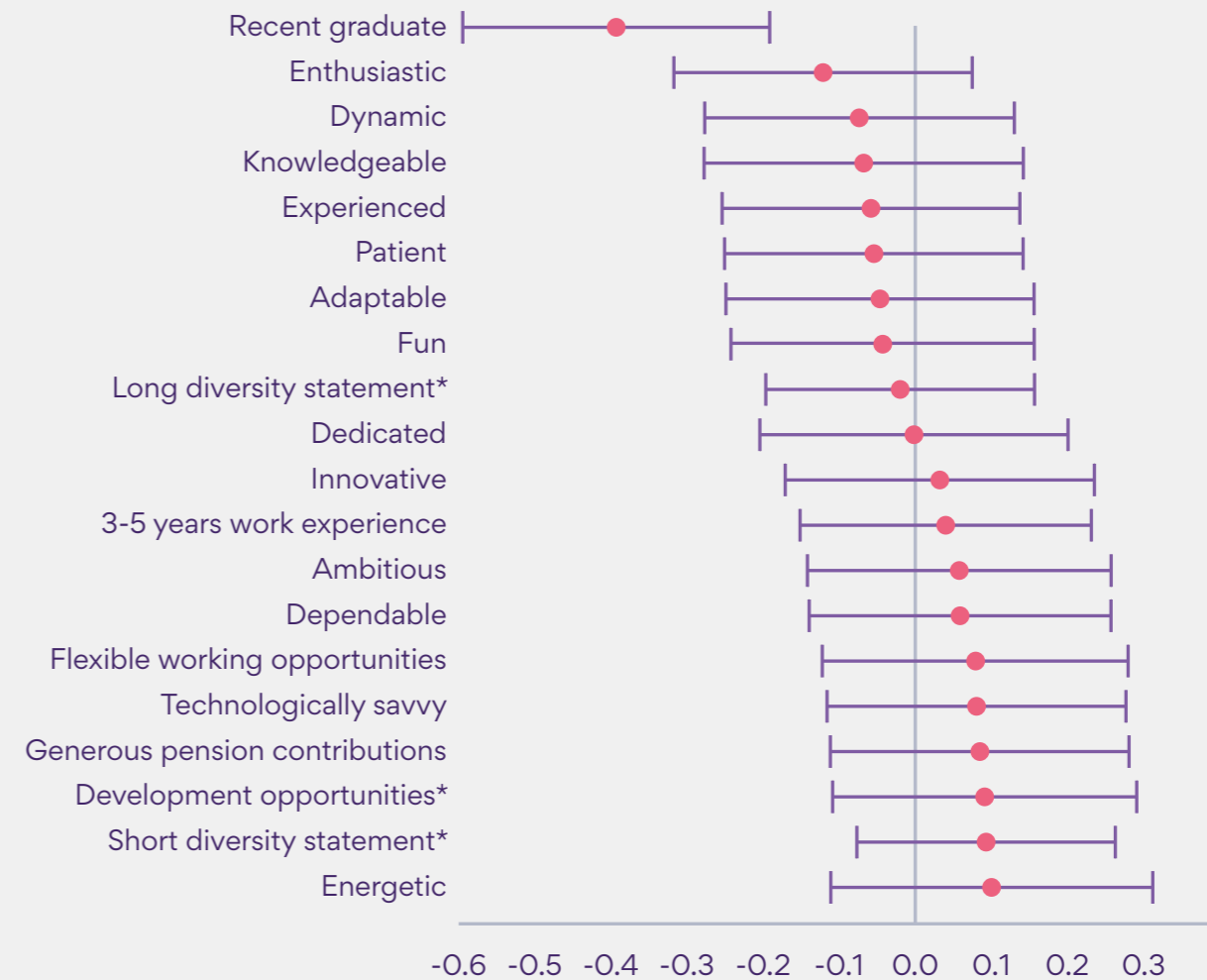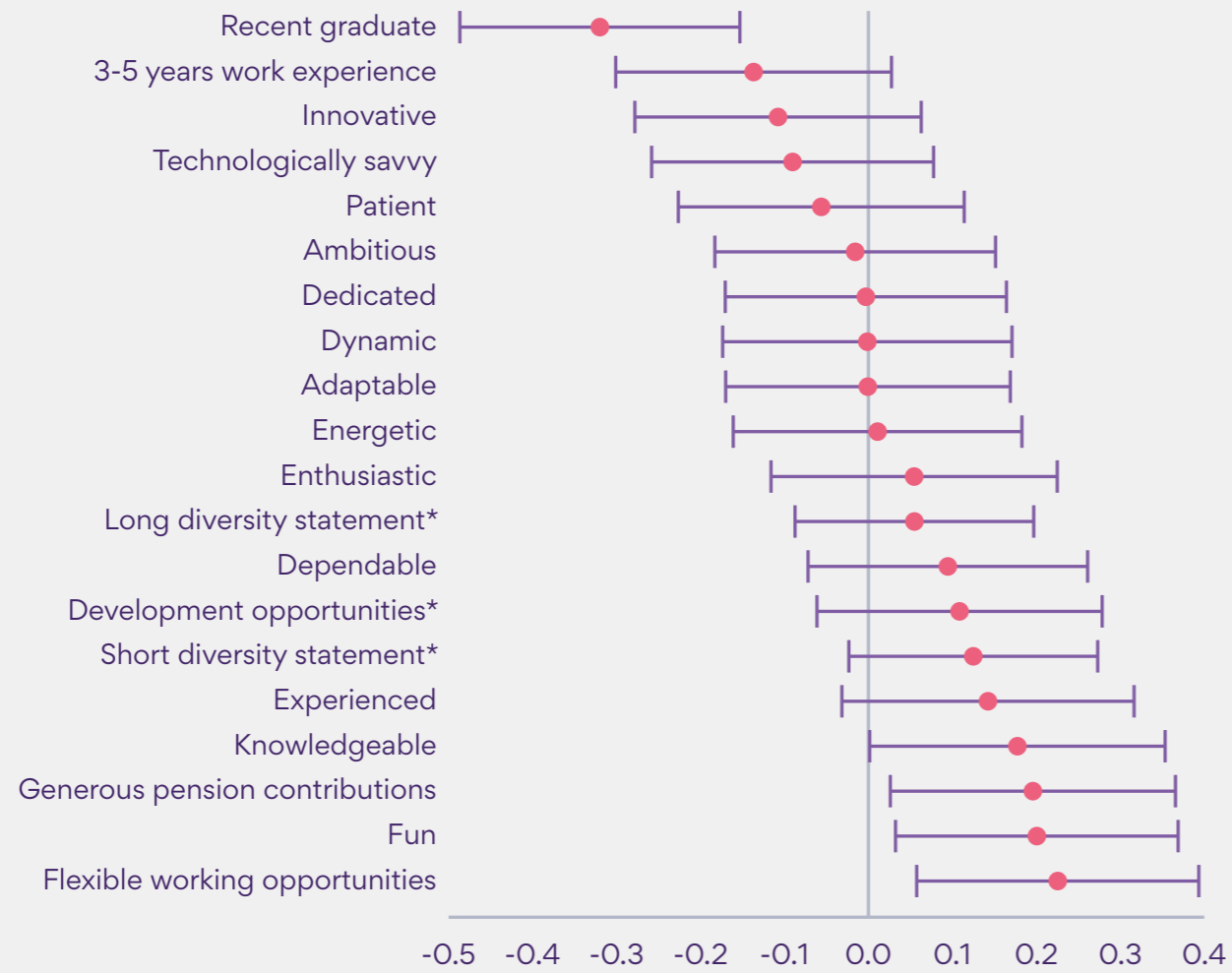
Figures A4a and A4b: Effects of the tested words on perceived likelihood of applying in the older sample, split by gender
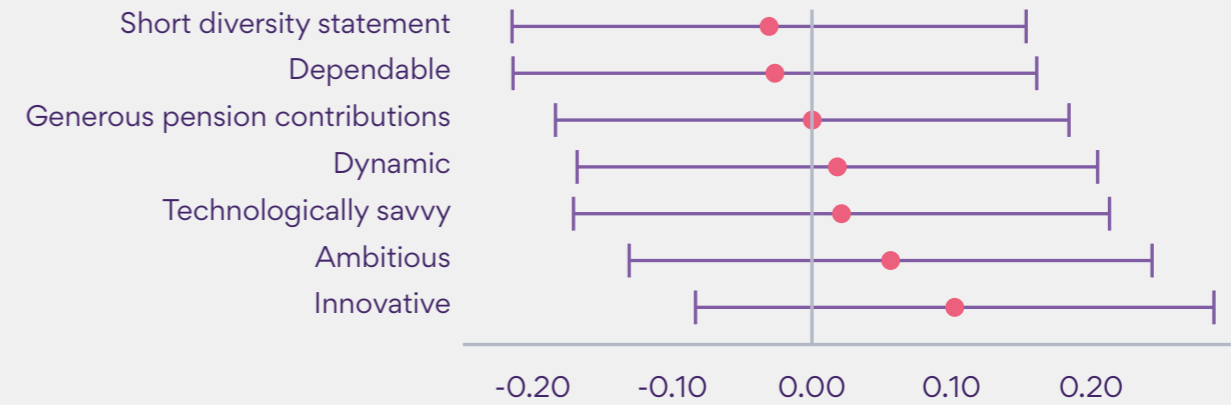(left = men, right = women)

Figures A5a and A5b: Effects of the tested words on perceived likelihood of applying in the younger sample, split by sex
(left = men, right = women)

Figures A6a and A6b: Effects of the tested words on perceived likelihood of applying in the older sample, split by age subgroup
(left = 45–54, right = 55–64)

Figures A7a and A7b: Effects of the tested words on perceived likelihood of applying in the younger sample, split by age subgroup
(left = 18-24, right = 25-34)

Combinations of words

We explored whether stronger effects would be observed with the combined effects of multiple potentially ageist words.

To test this, we counted the number of younger-age stereotypes and older-age stereotypes in each advert. In the first version of this analysis, we included the implicit younger-age references in the count of younger-age stereotypes; however, as a robustness check, we also ran this analysis without counting these words, since (1) arguably, they are not true "stereotypes" and (2) our primary analysis indicated that they may have had an overpowering effect on the likelihood of applying.

Specifically, these were the words and phrases whose occurrences we counted:

– **Younger-age stereotypes (definition 1):** "We are looking for a recent graduate", "We are looking for someone with 3-5 years of relevant work experience", "We are looking for someone who is technologically savvy", "energetic", "dependable", "adaptable", "fun", "ambitious", "enthusiastic", "dynamic";

– **Younger-age stereotypes (definition 2):** "energetic", "dependable", "adaptable", "fun", "ambitious", "enthusiastic", "dynamic";

– **Older-age stereotypes:** "dependable", "dedicated", "experienced", "knowledgeable", "patient".

In order to obtain a single *'advert stereotypicality score'*, we subtracted the count of older-age stereotypes from the count of younger-age stereotypes.

We found that, with Definition 1, there was a weak but statistically significant negative relationship between the advert stereotypicality score and the stated likelihood to apply: for every extra younger-age stereotype (or one less older-age stereotype), the stated likelihood to apply decreased by 0.026 points. Comparing the extremes of the stereotypicality scale (i.e. -4 vs +5), this translated into a difference of 0.234 points.

However, using Definition 2, this relationship was roughly halved in magnitude (to 0.016-point decrease per word) and was no longer statistically significant. This suggests that the association observed using Definition 1 was largely driven by the implicit younger-age references.

Effects of pairs of words

Secondly, we modelled the effects of all pairs of words that could co-occur in the adverts. Since there were more than 300 pairwise combinations of words, we fitted a LASSO model instead of an ordinary linear regression. Although the modelling produced some potentially interesting results, our overall assessment is that, due to the generally small effect sizes and the relatively small sample size, there is a large risk that many of the observed effects were the result of sample-specific random noise and that they would not generalise. There is therefore a large risk of overinterpreting the results, hence we do not report them here.

Table A4 – relationship between advert stereotypicality and the stated likelihood to apply

	Definition 1		Definition 2	
	Coefficient (SD)	p-value	Coefficient (SD)	p-value
Advert stereotypicality	-0.026 (0.013)	.040*	-0.016 (0.013)	.229
Covariates	Yes			
Observations	3,499			

Appendix E: Text analysis

We found that most companies in the sample posted one job ad in 12 months, with 88.2% of all companies posting less than 10 ads. This was realistic, as 99% of UK companies are small companies with a workforce of less than 50 employees.

As one would expect, the location with the most open positions was London (where 17.1% of all open jobs were based). Other major UK cities such as Manchester, Birmingham and Bristol comprise the rest of the list. Nearly a third (29.4%) of all advertised jobs are in these top ten locations, while for the rest the location is either unknown (14.7%) or elsewhere (55.8%).

Data preparation
To facilitate text analysis, we cleaned the text data prior to conducting any analyses. Below we outline the steps we took in order to prepare the web scraped data for the analysis.

We removed the following:

– html code (sometimes accidentally included in the text of the job ad as a result of the web scraping process)

– Common non-ascii characters

– White space

– Numbers

– Names of the 100 companies with the most advertised jobs

– Names of the 100 locations with the most advertised jobs

Only one hundred company and location names were removed for two reasons: removing all location/company names would have been extremely inefficient and would not have been consequential, as the most likely words to be picked up as spurious correlations are frequently occurring words (in this case, locations, and company names). To identify companies and locations with the most job ads, we first counted how many adverts appeared in our data set per company/ location and then extracted the one hundred companies/locations with the most occurrences. As a final step, their names were then removed from the job ad text.

Furthermore, we did the following:

– Lemmatized words with some exceptions. Lemmatization is the process of replacing the inflected forms of a word with its dictionary form (or so-called lemma) so they can be analysed as a single item. For example, 'running' and 'ran' share the common lemma 'run', which will replace them both after lemmatization. We made an exception for the word 'experienced' as this was one of the words we were interested in associating so that we could keep the distinction between 'experience' and 'experienced'. For similar reasons we did not lemmatize 'dedicated', 'motivated' and 'relaxed'.

– Converted all text to lower case

– Concatenated phrases into single words ("recent graduate" and "tech savvy")

– Removed stopwords using the dictionary from R's stopwords package

– Tokenized words. Word tokenization is a way of separating a text corpus into smaller units called tokens (in our case, individual words using space and symbols delimiters).

Inclusion and prevalent assessment

If the word list was rejected, we tried creating (semantically sensible) subtractions, additions, or averages of word vectors to create a new word embedding and feed it into the model. This would entail trial and error until the word list looked reasonable; all rejected word lists would be discarded.

Once a word list had been accepted, we reviewed individual words and accepted or rejected these according to the following principles: A word suggested by the model was accepted if it:

– ... was a synonym for the input word and did not capture any unintended meaning. This means we excluded synonyms that cannot be applied to a person, for example 'groundbreaking'.

– ... was an alternative (or wrong) spelling method for the input word (e.g. 'gradate' for 'graduate').

This led us to make three adjustments to the word embeddings:

1. We subtracted 'cancer' from 'patient'.

2. We took the average of 'knowledge' and 'knowledgeable'.

3. We took the average of 'fun' and 'easygoing'.

We computed prevalence by using word groups. The word group contained the original input word(s), for example 'patient' and 'patience' as well as their accepted associated words.

We defined two metrics:

1. The percentage of job adverts that mentioned any of the words in the word group.

2. The (cumulative) number of times the words in the word group were mentioned in the job ads.

Note that for the word group 'patient', which also refers to a medical patient, we excluded job adverts from health and pharmaceutical industries to avoid counting ambiguous meanings.
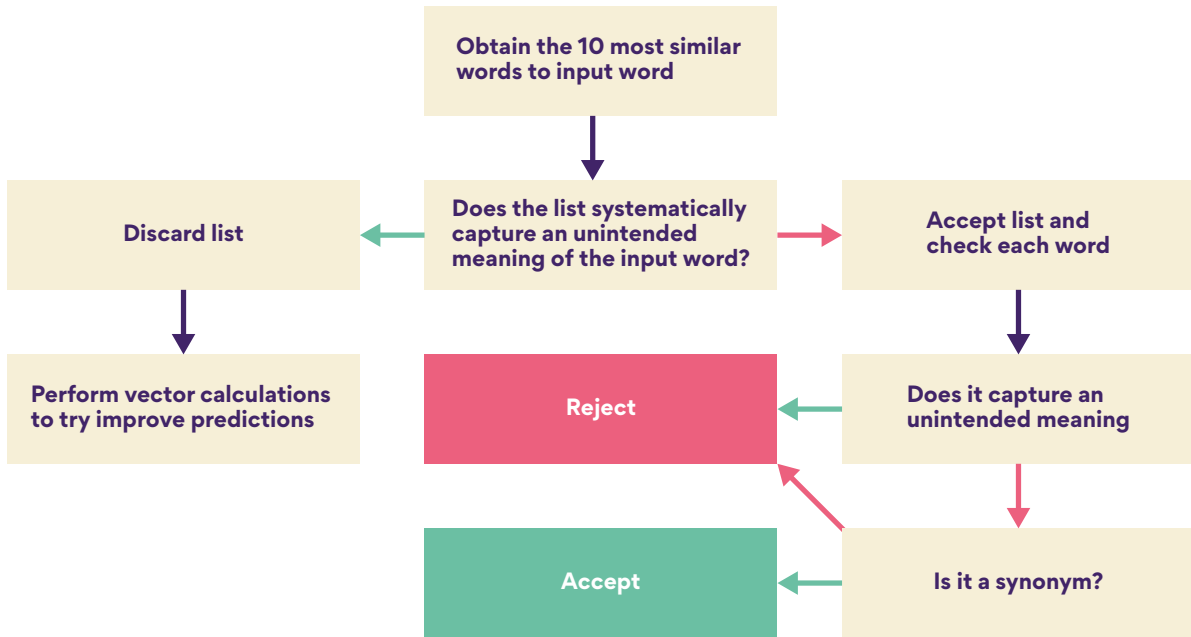
Figure A8 – process for reviewing associated words

Table A5 – number of job adverts posted per company (breakdown)

	N	%
Less than 10	399,050	88.2
11-20	18,848	4.2
21-30	7,790	1.7
31-40	4,416	1.0
41-50	3,077	0.7
More than 50	19,047	4.2

Figure A9 – number of job adverts posted per company (distribution)

Table A6 – Top 10 UK locations with the most open positions in 2019

	N	%
London	1,902,486	17.1
Manchester	291,565	2.6
Birmingham	250,297	2.2
Bristol	189,526	1.7
Leeds	178,783	1.6
Cambridge	108,777	1.0
Edinburgh	105,418	0.9
Nottingham	91,671	0.8
Glasgow	88,309	0.79
Sheffield	81,120	0.73

Table A7 – breakdown of open positions by industry

	N	%
Staffing / Employment Agencies	4,702,549	44.6
Other / Unknown	1,231,744	11.7
Business services	783,306	7.4
Trade / Retail	731,054	6.9
Healthcare / Welfare	679,370	6.4
Education / Research	382,968	3.6
Manufacturing / Industrial Facilities	348,876	3.3
Accommodation / Food services	324,985	3.1
IT	231,686	2.2
Public services / Non-profit	220,942	2.1
Finance / Insurance	198,490	1.9
Construction	157,659	1.5
Media / Communication	129,671	1.2
Logistics	108,358	1.0
Culture / Recreation	90,244	0.9
Utilities	43,539	0.4
Pharmacy / Chemicals	42,857	0.4
Facility / Cleaning	40,814	0.4

	N	%
Personal services	39,880	0.4
Security / Fire / Police	31,135	0.3
Agriculture / Fishing	22,087	0.2
Administration / Call centre	4,616	0.04

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