Title: Identifying alternative occupations for truck drivers displaced due to autonomous vehicles by leveraging the O*NET database.

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Abstract

Automation continues to be a disruptive force in the workforce. In particular, new automated technologies are projected to replace many mid-skill jobs, potentially displacing millions of workers. Career planning agencies and other organizations can help support workers if they are able to effectively identify optimal transition occupations for displaced workers. We drew upon the 24.2 Occupational Information Network (O*NET) Database to conduct two related studies that identify alternate occupations for truck drivers, who are at risk of job loss due to the adoption of autonomous vehicles. In Study 1, we statistically compared the jobs that we identified based on different search methods using O*NET classifications based on their similarity to the knowledge, skills, values, and interests held by truck drivers. In Study 2 we conducted a survey of truck drivers to evaluate their perceptions of the occupations identified as objectively similar to their occupation. Results indicate that optimal transition occupations may be identified by searching for occupations that share skills as well as the same work activities/industry as a given occupation. These findings hold further implications for career planning organizations and policymakers to ease workforce disruption due to automation.

Keywords: Automation, Job displacement, O*NET, Career transition, Trucking

Rapid technological development continues to impact many aspects of work. Historically, machines have replaced people when they are able to perform tasks more efficiently, safely, and cheaply than human labor. More recent work on computerization and the workforce has highlighted the polarization of the labor market into high-wage, high skill and low-wage, low-skill jobs (Goos & Manning, 2003; Autor, 2010). This polarization is explained by routine-biased technological change, which asserts that computers have different impacts on the workforce based on whether work is routine or non-routine (Autor et al., 2003). Specifically, computers may replace mid-skill workers performing routine manual and cognitive tasks, but not low- and high-skill workers who perform non-routine manual and cognitive tasks (Autor et al., 2003; Autor et al., 2006) in occupations that require interpersonal skills and/or environmental adaptability (Autor, 2007).

At present, the research and policy community is investigating the potential impacts of a new wave of artificial intelligence (AI) technologies on the workforce (Frey & Osborne, 2017; Acemoglu & Restrepo, 2020; Zahidi et al., 2020). Unlike prior innovations in computer-related technologies, there is concern that AI will replace more educated workers in high-wage jobs (e.g., loan application analysis and medical image processing) (Mitchell & Brynjolfsson, 2017; Frank et al., 2019; Frey, 2019). The extent to which workers may be displaced depends on the degree to which AI functions as a labor-enabling or a labor-replacing technology (Frey, 2019). Labor-enabling technologies create new jobs and/or complement existing job functions by making workers more productive, whereas labor-replacing technologies substitute for jobs and skills, making existing workers and machines redundant (Frey, 2019).

Therefore, although technological innovation has long-term workforce benefits, in the short-term it can have a disruptive impact on the workforce by rendering certain jobs obsolete (Frey, 2019). This disruption can last for decades, making concerns related to AI particularly salient. Displaced workers may face a challenging job search process, as many who have worked in the same occupation for years will now need to identify and apply to work in a different occupation. These workers may also experience a decline in wages as they transition to related but lower-paying occupations (Frey, 2019).

The adoption of autonomous vehicles (AVs) (i.e., self-driving cars) is a prime example of automation that is expected to have a major impact on the workforce (Yankelevich et al., 2018). Forecasts project that AV adoption may displace 1.3 to 2.3 million drivers over the next decades (Groshen et al., 2018), with an expected 300,000 truck driving jobs at risk of becoming obsolete (Viscelli, 2018). This is a concern because truck drivers tend to be older (e.g., the average fleet driver is 55 years-old, Costello & Suarez, 2015), which could make retraining for new jobs more difficult.

Given these challenges, the purpose of this research is to identify optimal potential transition occupations for truck drivers, as an archetypal occupation vulnerable to technology-driven labor displacement. We first identify alternate occupations based on occupational information provided by the 24.2 Occupational Information Network (O*NET) Database, then evaluate truck drivers' perceptions of the occupations. The O*NET Database was developed as a resource for job seekers and is the prime source of information about 900+ occupations in the U.S. (Gore & Hitch, 2005).

The O*NET Database is useful for determining whether a job seeker is qualified for an occupation based on its requirements (Converse et al., 2004). Specifically, O*NET presents information on the knowledge and skills deemed important to perform a job as well as the values and interests held by most job incumbents. Accordingly, O*NET characterizes the knowledge,

skills, abilities, and other qualifications (KSAOs), values, and interests held by the average truck driver. Considering alternate occupations, it is important to identify occupations for displaced workers that have a similar KSAO profile to that of their previous occupation for several reasons.

First, identifying occupations in which drivers can apply their extant skillset can help to ensure that displaced drivers do not have to move into lower-skill occupations and lose earnings. Moreover, doing so can minimize the time and resources needed to retrain for a new occupation. Research indicates that workers who transition into occupations that are a poor match to the skills developed in their previous occupation experience a drop in earnings (Eggenberger et al., 2015; Rinawi & Backes-Gellner, 2019). Job loss and the ensuing job search process itself is often difficult and costly. The total income that would be lost by workers who are at risk of being displaced due to AVs is estimated at $180 billion (Groshen et al., 2018). Identifying suitable alternative occupations for displaced drivers to quickly transition into can minimize these negative impacts.

Second, it is also important to locate occupations that match workers' KSAOs to maximize their satisfaction and performance. Theories of person-job (P-J) fit focus on the compatibility between a worker's characteristics (e.g., their KSAOs) and what an occupation demands and supplies (e.g., the knowledge and skills required and the interests and values that the job satisfies) (Kristof-Brown & Guay, 2011). Congruence between workers' characteristics and those of their job is related to higher job satisfaction, well-being, and performance, and lower intentions to quit and actual turnover (see Kristof-Brown & Guay, 2011, for a review).

In this study, we endeavor to evaluate and compare methods for identifying potential alternate occupations for long-distance truck drivers. As noted, the adoption of automated trucking is projected to increase in the coming decade (Litman, 2021; Yankelevich et al., 2018), and reports forecast that this will drastically reduce job openings for human drivers (Alonso Raposo et al., 2018; Beede et al., 2017). In Study 1, we generated sets of transition occupations through two search methods based on O*NET data and statistically compared the resulting three sets of potential transition occupations based on their similarity to the KSAOs of truck driving. In Study 2, we conducted a survey with a sample of truck drivers to evaluate whether drivers themselves view identified alternate occupations as similar to truck driving and desirable. Career planning agencies and job seekers can use the insights provided by our findings to generate longer lists of potential alternate occupations (Allen et al., 2012). We provide evidence of optimal procedures to identify transition occupations using O*NET data and outline our process so that it can be replicated by career management and planning services, organizations that will experience automation, and workers.

The O*NET Database

O*NET is the preeminent repository for descriptive occupational information in the U.S., and has served as a resource for vocational counselors, human resource professionals, researchers, and job seekers for decades (Levine & Oswald, 2012). The database is supported by the U.S. Department of Labor/Employment and Training Administration (USDOL/ETA). O*NET data on occupational characteristics are drawn from large-scale job analyses and ratings provided by job incumbents and trained job analysts. These ratings are used to classify the knowledge topics, skills, abilities, interests, work values, and more, that are important for 974 occupations. For most jobs this occupational information is updated annually. Additional information about the database can be accessed through the following link (https://www.onetcenter.org/overview.html).

[Table 1 About Here]

A description of occupational characteristics used in this study, with examples of important KSAOs for truck drivers as well as an unrelated occupation, childcare workers, is presented in Table 1. Research supports that these individual difference variables are important predictors of outcomes including occupational choice, satisfaction, and performance (Sackett et al., 2017). To summarize, O*NET provides information on what knowledge topics (out of 33 broad knowledge topics) as well as which skills (out of 35) are needed in an occupation.

O*NET also provides information about 6 vocational interests, derived from Holland's (1997) RIASEC model, may be satisfied by an occupation. The RIASEC model includes the interests of realistic, investigative, artistic, social, enterprising, and conventional, which are classified as points along a hexagonal structure. Interests that are on opposite ends of the hexagon are considered conflicting (e.g., investigative occupations involve working with ideas, whereas conventional occupations deal with clear routinized procedures and details rather than ideas).

O*NET likewise includes information on which of 6 work values an occupation satisfies. Values are derived from the Theory of Work Adjustment, a model of person-vocation fit, and refer to the aspects of work relevant to worker satisfaction (Ros et al., 1999). For instance, occupations that satisfy the value for "working conditions" are characterized by desirable conditions such as job security and task variety. The other values are achievement, independence, recognition, relationships, and support. In comparison to knowledge and skills, which can be learned and cultivated, interests and values are understood to be relatively enduring traits that can develop but generally tend to be stable across the lifespan (Sackett et al., 2017).

Occupations are further classified into job zones, which range from 1-5 and indicate the degree of preparation required to enter the occupation. Jobs in zone 1 require little or no preparation, jobs in zone 2 require some preparation (e.g., high school diploma), and jobs in zone 3 require medium preparation (e.g., associate's degree or vocational training). Job zones 4 and 5 require considerable (e.g., bachelor's degree) and extensive (e.g., a graduate degree) preparation, respectively.

Study 1

In Study 1, we identified potential transition occupations for truck drivers through different methods of searching the O*NET Database. Then, for each transition occupation, we coded the number of knowledge topics, skills, interests, and values that were shared and unshared (important for the transition occupation, but not truck driving) between the occupation and truck driving. Lastly, we statistically compared the occupations identified through the different search methods based on their KSAO similarity to truck driving.

Methods

We utilized two separate methods to identify alternate occupations for truck drivers based on the 24.2 O*NET Database, and these searches resulted in three separate sets of potential alternate occupations. Because truck driving falls into job zone 2, we included occupations in job zones 1 to 3. We did not include occupations in job zones 4 or 5.

We first utilized the Skills Search function provided by O*NET Online. We selected the 8 skills deemed important for the job of truck driving (operation and control, operation monitoring, time management, critical thinking, monitoring, reading comprehension, speaking, and troubleshooting) to search for occupations that share these skills. O*NET returned a list of occupations that shared 6 or more skills with truck driving. We included these occupations in our list of Shared Skills alternate occupations, which included a total of 158 occupations.

Although the Skills Search is quick and easy to use, it is limited by comparing only skills. We also searched for jobs with related tasks and work activities to truck driving as well as jobs in the same career cluster (Transportation, Distribution, & Logistics), industry (Transportation and Warehousing), and job family (Transportation and Material Moving). In total, this second Shared Work/Industry job set consists of 50 occupations.

Finally, we sorted occupations that were identified in both the Shared Skills and Shared Work/Industry job searches into a separate list, consisting of 41 Shared Skills and Work/Industry occupations. Each of these three sets of potential alternate jobs (Shared Skills, Shared Work/Industry, and Shared Skills and Work/Industry) represents a unique list of occupations.

For each occupation, we noted the number of knowledge topics, skills, interests, and values that the identified alternate job shared with truck driving. We also noted the number of each of these KSAOs judged to be important for the alternate job, but not for truck driving. For example, the job of non-destructive testing specialist (which entails testing the safety of vehicles or other structures using equipment, such as x-rays) shares three knowledge areas in common with that of truck driving: knowledge of customer and personal service, English language, and public safety and security. These knowledge topics are important for fulfilling both jobs. However, there are 6 other "unshared" knowledge topics that are important for the job of non-destructive testing specialist but not for truck driving (e.g., engineering and technology, mathematics, etc.). These topics therefore represent knowledge that truck drivers may need to acquire to transition into this alternate occupation. We also recorded the median annual salary (provided by the U.S. Bureau of Labor Statistics Occupational Employment Statistics (OES) program) and job zone for each occupation.

Results

As an example, Figure 1 presents plots depicting the number of knowledge topics, skills, interests, and values that are shared and unshared (i.e., deemed to be important for the alternate occupation but not for truck driving) for six occupations identified as similar to truck driving (three occupations, that were closest in similarity to truck driving and three that are not as similar—i.e., a farther-fit to truck driving). This figure also presents the number of shared and unshared KSAOs with truck driving for three occupations that were not identified in our search methods, for further comparison. As can be seen, the example occupations identified in our searches have a greater number of shared KSAOs with truck driving and fewer unshared KSAOs compared to the occupations that were not identified in our search.

[Figure 1 About Here]

Table 2 depicts 10 occupations for each of the Shared Skills, Shared Work/Industry, and Shared Skills and Work/Industry job lists along with the number of KSAOs for each job that are shared and unshared with truck driving.

[Table 2 About Here]

We conducted one-way ANOVAs in SPSS version 26.0 to assess the objective similarity to the KSAOs needed for truck driving between the Shared Skills, Shared Work/Industry, and Shared Skills and Work/Industry job sets. We applied the Bonferroni correction for all post hoc analyses probing for differences in KSAO similarity between these job sets. First, the three sets of occupations differed significantly in their average job zone ($F(2,240)=19.91$, $p<.01$). The Shared Skills and Shared Skills and Work/Industry occupations have a higher average job zone (i.e., requiring more preparation) than the Work/Industry jobs ($p<.01$).

There were also significant differences between the job sets in the amount of shared ($F(2,240)=48.65$, $p<.01$), as well as unshared ($F(2,240)=6.90$, $p<.01$), vocational interests with

truck driving. The Shared Skills and Shared Skills and Work/Industry occupations have significantly more shared interests with truck driving than the Shared Work/Industry occupations (*ps*<.01). There was also a significant difference between the three job sets in the degree that work values were shared with truck driving, ($F(2,240)=8.15$, $p<.01$), although there was not a significant difference in the amount of unshared values, ($F(2,240)=.81$, $p=.45$). A post hoc Tukey HSD test indicated that, on average, Shared Skills and Shared Skills and Work/Industry occupations have more shared work values with truck driving compared to the Shared Work/Industry jobs (*p*s<.01).

The three job sets also differed in average median income, ($F(2,244)=20.13$, $p<.01$). A post hoc Tukey HSD test suggested that the average median salary for the Shared Skills and Work/Industry jobs was significantly higher than the other job sets (*p*s<.01). The Shared Skills jobs also have a significantly higher income compared to the Shared Work/Industry jobs (*p*<.01). Next, the job sets differed in the amount of shared, ($F(2,239)=9.32$, $p<.01$), as well as unshared, ($F(2,240)=11.98$, $p<.01$), knowledge topics with trucking. The Shared Skills and Work/Industry jobs share significantly more knowledge topics with trucking than do the other job sets (*p*<.01). Conversely, the Shared Skills jobs require significantly more knowledge topics that are unshared from those required for trucking (*p*<.01).

Finally, there were significant differences in the amount of shared, ($F(2,240)=176.86$, $p<.01$), and unshared, ($F(2,240)=10.94$, $p<.01$), skills with truck driving between the three sets of alternate occupations. The Shared Work/Industry jobs have fewer shared skills with truck driving than the other sets (*p*s<.01), but also fewer unshared skills (*p*s<.05).

Discussion

Overall, the results of our statistical comparisons indicate that the different search methods may return occupations that meaningfully differ in their similarity to truck driving, an occupation at risk of becoming automated. Occupations that were identified in *both* a Shared Skills and Work/Industry search displayed the greatest congruence with truck driving in terms of the preparation required, knowledge, skills, vocational interests, and work values.

However, these different job searches may also be used to generate lists of jobs for displaced workers in different circumstances. The Shared Skills jobs aligned better with truck driving in terms of skills, interests, and values compared to Shared Work/Industry jobs; however, they also had a higher job zone, on average. Identifying alternate jobs via the Skills Search function may therefore be optimal for displaced workers who are open to undergoing additional training to obtain a job that satisfies their interests and values. Workers who are not interested in additional training may be better served by searching for occupations that share work activities and tasks and/or are in the same industry (i.e., "Shared Work/Industry" jobs) as their previous job.

Study 2

Identifying alternate occupations that are an objectively good fit to a displaced worker's previous occupation may be of limited use if workers themselves do not perceive that they are a good match. Several constructs are relevant for assessing the viability of a potential alternate occupation. We conducted a cross-sectional survey with a sample of truck drivers to confirm that these search methods identify occupations that are, indeed, viewed as viable potential transition occupations by truck drivers themselves. Further, evaluating whether jobs that are objectively

similar to truck driving, in terms of KSAOs, are also seen as similar by truck drivers will provide support that O*NET classifications can be used to identify relevant transition occupations.

To evaluate a transition occupation, it is important to ascertain whether an individual perceives that a job satisfies their needs as a worker and that they can perform this work role—that is, that an occupation is a good fit for them. Person-environment fit theories contend that stress arises from misfit between a worker's abilities and needs and the supplies and demands of their job (Edwards et al., 1998; Kristof-Brown & Guay, 2011). Therefore, workers will be drawn to occupations that are congruent with their abilities and needs and will experience greater well-being and performance in these occupations. It is likely that those who entered into truck driving and have stayed in the industry tended to enjoy a relatively good fit between their needs and abilities and driving, given that continuance is positively related to person-job fit (Kristof-Brown & Guay, 2011).

Needs-supply fit refers to the match between one's general needs and how well the job can fulfill them and demands-abilities fit refers to the match between what is required to perform the work role and one's attributes (van Vianen, 2018). These fit perceptions predict intentions to accept a job offer (Chapman et al., 2005) and attitudes and performance in a job (van Vianen, 2018). A good fit may also ensure that workers continue to be engaged in their jobs (Shabeer et al., 2019). Accordingly, drivers' fit perceptions can provide initial evidence that jobs identified as similar to truck driving with O*NET data will indeed be a good match for drivers.

In determining the applicability of potential alternate occupations identified through O*NET, it is also important to confirm that job incumbents are interested in these jobs (i.e., not only do they perceive that they could transition into them, but they would also want to do so). Job appeal is assessed as an indicator of desire and interest for a particular job (Gaucher et al., 2011), and is associated with perceptions of fit (Tresh et al., 2019) and intentions to apply for a job (Horvath & Sczesny, 2014). Furthermore, to confirm that drivers would be willing and open to the alternate occupations we also measured drivers' explicit interest in these jobs as alternatives to truck driving.

Hypothesis 1: Occupations with greater similarity to truck driving, in terms of KSAOs, will be perceived as better-fitting, more appealing, and more desirable to transition into compared to jobs that are less similar.

Although Shared Skills jobs displayed a good fit in KSAOs with driving, we predicted that the Shared Skills jobs would be seen as less favorable compared to Shared Work/Industry and Shared Skills and Work/Industry jobs, given that workers may be more inclined towards jobs that are familiar to them, and jobs in the same industry will be more familiar. This is because of the well-documented effect that suggests that greater familiarity tends to increase liking (Montoya et al., 2017).

Hypothesis 2: Shared Work/Industry and Shared Skills and Work/Industry occupations will be rated higher in fit, appeal, desirability, and familiarity, compared to Shared Skills occupations.

Method

Participants

The sample consisted of 210 truck drivers, although 8 were excluded from analyses due to data quality concerns (e.g., failing attention check questions), for a final sample size of 202. Participants were recruited by Qualtrics Panels. Individuals were eligible to participate if they spoke English and worked 20 or more hours per week as a long-distance truck driver. In addition, we instituted a quota on participant age to ensure that approximately 20% of the sample

was 50 years-old or above. This was to ensure a degree of representativeness, as the average fleet driver is 50 years-old or older (Costello & Suarez, 2015). Participants were compensated with a small monetary payment for completing the survey.

Participants were 44.17 years-old on average (*SD*=10.58, *Min*.=23.0, *Max*.=71.0), and had spent an average of 9.46 years working as a truck driver (*SD*=6.23, *Min*.=2.0, *Max*=50.0). The sample was majority male (81.2%, female=18.8%) and White (69.3%, 16.8% Black/African America, 7.4% Asian, 3.0% American Indian or Alaskan Native, 3.0% Native Hawaiian or Pacific Islander, and 0.5% Other). The majority indicated that they worked as a commercial fleet/company driver (62.4%), and others worked as an owner operator/independent driver (37.1%).

Procedure

Participants provided their informed consent prior to taking the survey. Participants were presented with 6 job titles and a description of the work performed for each job. These occupations and their descriptions are displayed in Table 3, and the number of shared and unshared KSAOs that they have with truck driving is also presented in Figure 1. Two occupations were selected from the Shared Skills, Shared Work/Industry, and Shared Skills and Work/Industry job sets each. For each job set, one occupation was selected that had a very close fit with truck driving (more shared KSAOs and fewer unshared KSAOs) and one was selected that had a farther-fit to truck driving (i.e., more dissimilar to truck driving, with fewer shared KSAOs and more unshared KSAOs). Each of these occupations were no farther than one scale-point from truck driving in prestige (Hauser & Warren, 1997).

[Table 3 About Here]

For each of these occupations, participants rated the needs-supply fit, demand-abilities fit, job appeal, and their interest in this job as an occupation to transition into. The order in which the 6 occupations were presented was randomized.

Measures

Needs-Supply Fit. The perceived fit between one's needs and the extent to which the occupation would satisfy them was measured with three items from Cable and DeRue (2002). Items were adapted such that respondents rated their perceptions of fit for the jobs presented in the survey. Ratings were made on a 5-point scale (1=Strongly disagree, 5=Strongly agree). A sample item is, "This job would give me just about everything that I want from a job." Cronbach's alpha ranged from .64 to .81 across the 6 occupations.

Demand-Abilities Fit. Fit between the perceived job demands and one's abilities was assessed with three items from Cable and DeRue (2002) and Resick et al. (2007). All ratings were made on a 5-point scale (1=Strongly disagree, 5=Strongly agree). A sample item reads, "My knowledge, skills and abilities match the requirements of this job." Cronbach's alpha ranged from .64 to .84 for the 6 occupations.

Job Appeal. The appeal of each occupation was assessed with 4 items adapted from a 6-item scale (Gaucher et al., 2011). Two items that referred to one's organization were not included. Ratings were made on a 7-point scale (1=Strongly disagree, 7=Strongly agree). A sample item is, "This job is appealing." Cronbach's alpha ranged from .63 to .78.

Interest in Job. Interest in each occupation as a potential transition job was measured with a single item created by the research team. This item read, "How interested would you be in

the job of [occupation] as an alternative to your current job?" and was rated on a 5-point scale (1=Very uninterested, 5=Very interested).

Familiarity with Job. We measured familiarity with each job with three items adapted from previous research (Gefen, 2000; Vasilopoulos et al., 2000; Edwards et al., 2006). Items were rated on a 7-point scale (1=Strongly disagree, 7=Strongly agree). A sample item is, "Overall, I am familiar with this job". Cronbach's alpha ranged from .75 to .88.

Results

We conducted a series of 2 (similarity to truck driving KSAOs: closest, farthest) X 3 (job set: Shared Skills, Shared Work/Industry, Shared Skills and Work/Industry) ANOVAs to compare drivers' perceptions of the example jobs. We applied the Bonferroni correction to all post hoc pairwise comparisons. Figure 2 displays the means across ratings for the jobs closest and farthest in KSAO similarity to truck driving. Figure 3 depicts average ratings for the study variables for each job set.

[Figure 2 About Here]

[Figure 3 About Here]

First, considering the prediction of needs-supply fit, there was a main effect of KSAO similarity with truck driving, $F(1, 201) = 29.55$, $p<.001$, $\eta^2=.13$, such that the jobs closest in similarity (M=3.79) were rated significantly higher in needs-supply fit than the jobs farthest in similarity (M=3.55). There was also a main effect of job set $F(2, 402) = 2.98$, $p=.006$, $\eta^2=.03$. The Shared Work/Industry jobs were rated significantly higher on fit (M=3.75) than the Shared Skills jobs (M=3.58). There was not a significant interaction between the factors, $F(2, 402) = .02$, $p=.98$, $\eta^2=.00$.

Again, there was a main effect of KSAO similarity in predicting demands-abilities fit, $F(1, 201) = 30.13$, $p<.001$, $\eta^2=.13$. Jobs closest in KSAO similarity to truck driving (M=3.76) were rated higher in demands-abilities fit than jobs farthest in KSAO similarity (M=3.48). There was also a main effect of job set, $F(2, 402) = 5.95$, $p=.003$, $\eta^2=.03$. The Shared Skills jobs (M=3.52) were rated significantly lower than both the Shared Work/Industry jobs (M=3.65), $p=.02$, and the Shared Skills and Work/Industry jobs (M=3.69), $p=.007$. The interaction between KSAO similarity with truck driving and job set was not significant, $F(2, 402) = 2.07$, $p=.13$, $\eta^2=.01$.

Concerning job appeal, the main effects for KSAO similarity, $F(1, 201) = 15.0$, $p<.001$, $\eta^2=.07$, and job set were significant, $F(2, 402) = 4.47$, $p=.01$, $\eta^2=.02$. Jobs closest in KSAO similarity (M=5.00) were rated as more appealing than jobs farthest in KSAO similarity (M=4.76). Moreover, Shared Work/Industry jobs (M=4.96) were also seen as more appealing than Shared Skills jobs (M=4.76), $p=.004$. However, the interaction between KSAO similarity and job sets was not significant, $F(2, 402) = .35$, $p=.70$, $\eta^2=.002$.

There were also main effects of KSAO similarity, $F(1, 201) = 13.38$, $p<.001$, $\eta^2=.06$, and job set, $F(2, 402) = 7.04$, $p=.001$, $\eta^2=.03$, in predicting interest in transitioning into the alternate jobs. Drivers expressed greater interest in jobs closest in KSAO similarity to trucking (M=3.83) compared to jobs farthest in KSAO similarity (M=3.60). Likewise, Shared Work/Industry jobs (M=3.84) were rated higher in interest than were Shared Skills jobs (M=3.60), $p<.001$. Lastly, there was not a significant interaction between KSAO similarity and job set, $F(2, 402) = 1.27$, $p=.28$, $\eta^2=.01$.

Comparing ratings of familiarity, there were main effects of KSAO similarity, $F(1, 201) = 29.16$, $p<.001$, $\eta^2=.13$, and job set, $F(2, 402) = 6.02$, $p=.003$, $\eta^2=.03$. Jobs closest in KSAO

similarity to trucking (M=5.34) compared to jobs farthest in KSAO similarity (M=4.96), were seen as more familiar to truckers, p<.001. Shared Work/Industry (M=5.20) and Shared Skills and Work/Industry jobs (5.24) were both seen as more familiar than Shared Skills jobs (M=5.01), ps<.05. The interaction between KSAO similarity and job set was not significant, $F(2, 402) = 2.43$, p=.09, η^2=.01.

Discussion

We conducted this survey to examine whether truck drivers viewed potential alternative occupations identified from different O*NET search methods as 1) similar to truck driving and 2) viable transition occupations. Overall, drivers perceived jobs with greater objective similarity to truck driving (in terms of KSAOs) to be a better match to their needs and abilities, compared to jobs with less KSAO similarity. Drivers also rated jobs with greater KSAO similarity as more appealing, and they were more interested in them as potential transition occupations. These findings support our first hypothesis and suggest that O*NET data on KSAO similarity aligns with truck drivers' perceptions of job similarity and may thus be relied upon to identify transition occupations for displaced workers.

Although we presented truck drivers with jobs that had a closer and farther-fit to truck driving based on KSAOs, these jobs were all still identified as similar to truck driving through our searches, and in general drivers tended to have positive perceptions of them. Ratings of needs- and demands-fit, appeal, and interest in Shared Work/Industry jobs were also higher than ratings for Shared Skills jobs; this finding provides support for our second hypothesis. Drivers may have viewed the Shared Skills jobs of machine setter and electronics repairer less positively in part because they were less familiar to them. As predicted, drivers also viewed the Shared Work/Industry and Shared Skills and Work/Industry jobs (cargo and freight agents, bus and truck mechanics, etc.) as significantly more familiar compared to the Shared Skills jobs. In essence, survey results find evidence that truck drivers view the alternate occupations identified through our search methods as similar to their job and see them as viable transition occupations. However, alternate occupations that are identified through both a Skills Search *and* Shared Work/Industry search or just a Shared Work/Industry search, as opposed to only using O*NET's Skills Search, may be perceived as somewhat of a better fit and more viable.

General Discussion

Automation is poised to replace many jobs, and as a result workers will need to transition into new occupations (Zahidi et al., 2020). Career services organizations, policymakers, and organizations that employ workers at risk of displacement can prepare for the major disruption that will ensue by identifying occupations that are a good match to workers' current skill profiles to streamline reemployment and minimize costs associated with transitioning occupations (Rinawi & Backes-Gellner, 2019).

Given the disruptive impacts that autonomous vehicles are anticipated to have on the workforce, the goal of this project was to outline and compare processes for generating lists of alternate occupations from O*NET data, using the occupation of truck driver as an example. We identified and grouped alternate occupations by completing a Skills Search on O*NET and searched for occupations that share work activities/tasks and/or are in the same industry as truck driving. Comparisons of the objective similarity in knowledge, skills, vocational interests, and work values to truck driving across the three resulting job sets (Shared Skills, Shared Work/Industry, and Shared Skills and Work/Industry) indicated that Shared Skills and

Work/Industry occupations generally displayed the closest match to truck driving. Our second study further indicated that, for truck drivers, occupations with a greater objective similarity to truck driving in terms of KSAOs were seen as a better fit, more appealing, and more viable as potential transition occupations. Drivers also tended to have more favorable reactions to the Shared Work/Industry and Shared Skills and Work/Industry occupations compared to just Shared Skills occupations. O*NET offers several avenues to identify similar occupations (e.g., skills search and shared job zone, career cluster, and industry). However, it was not clear what search methods may be of the most use for identifying similar occupations, or how occupations uncovered in these different search methods may differ from one another in a way that is meaningful for job seekers. For example, some jobs that share similar skills may still differ in the vocational interests and work values that they satisfy, so workers with a similar skillset still may not wish to enter into these jobs. Thus, our study compares and provides evidence for the value of different search methods to identify potential alternate occupations for displaced workers using the O*NET Database.

These findings have several practical implications for workforce training organizations, educational institutions, career planning services, and policymakers. Occupations identified in the Skills Search were similar in KSAOs and paid more, but also required a greater degree of preparation, compared to occupations identified in the Shared Work/Industry search. Thus, the Skills Search function may be most useful for younger workers and/or those who are willing to undergo more extensive training or education. Those who are uninterested in undergoing additional education may find better options based on a Shared Work/Industry search. This could be a more useful option for older workers, who tend to be less interested in undertaking additional training (Ng & Feldman, 2012).

However, research also suggests that the reason why older workers are less interested in training is because of ubiquitous stereotypes that older workers are less motivated and capable of learning (Posthuma & Campion, 2009). Older workers may internalize these stereotypes and come to view training as more difficult for them and thus not worth attempting (Maurer et al., 2003). Yet evidence also indicates that older workers can be motivated and successful in training if they are informed of the positive benefits of training and if trainings are designed to support them (e.g., by including design elements such as self-pacing) (Beier, 2021; Truxillo et al., 2015).

Relatedly, employers often hold negative views of older workers as untrainable, uninterested in training, and not worth a training investment (Maurer et al., 2007). Additional research is needed to investigate how open workers in mid-skill occupations, and particularly those who are older, are to further education and training. However, these findings suggest that organizations that are considering retraining their workforce as a response to automation should be informed about harmful age-related stereotypes to ensure that older workers are encouraged and supported to retraining. This could entail distributing information about inaccurate stereotypes about older workers and hosting trainings, possibly coupled with bias training for managers and internal trainers. Retraining programs should likewise be designed to support older learners (Beier, 2021).

We hypothesized that Shared Work/Industry jobs may be preferred because they are seen as more familiar (Montoya et al., 2017). However, Shared Skills jobs also displayed a good fit for drivers in terms of skills, values, and interests. Career planning services may need to be prepared to defend transition jobs that are in a different industry to displaced workers, if they may initially be opposed to them. For example, career services and workforce training

organizations may need to highlight fit in terms of values and interests when presenting occupations in a different industry.

Moreover, identifying alternate occupations from O*NET data as we have described can also indicate exactly what KSAs displaced workers need to develop to transition into another job that will satisfy their values, interests, and lifestyle. This will be useful to inform policy by highlighting focal KSAs for training or reskilling programs. Reskilling programs may be especially important to support older displaced workers (such as truck drivers, Costello & Suarez, 2015) who may not feel as empowered to seek out further education themselves, compared to younger displaced workers (e.g., rideshare drivers, Hall & Krueger, 2018).

Career service agencies and workers can replicate the searches that we outlined to identify potential transition occupations for workers who may be displaced due to technological advancements. Our studies generally suggest that, overall, displaced workers may be served best by identifying potential alternate occupations through *both* a Skills Search and Shared Work/Industry search.

There are some caveats to note for this research. First, we only focused on one occupation – truck driving. The process of identifying potential transition occupations through O*NET may be the same for other jobs. However, it is possible that workers displaced from other occupations could have different preferences for a transition occupation that would not align with objective similarity in KSAOs. Moreover, O*NET provides information about the important KSAOs for an average worker in an occupation. Organizations such as career counseling services will need to adapt their advice to workers based on the more specific KSAOs required for transition occupations as well as the degree of variability in the KSAOs held by the workers displaced from an occupation.

Second, it is likely that automation will also replace some of the similar jobs identified as options for transition occupations. Future research can work to identify what jobs are likely to change or be replaced by technology, along with what new job openings there may be, and compare their KSAO requirements to the KSAOs held by displaced workers. For instance, additional policies and programs could target displaced workers for reskilling programs and further education to help meet demand for talent in other fields (Dufour, 2010; Hira, 2010).

Further work is thus needed to build upon this research and understand how open mid-skill workers are not only to reskilling, but also to transitioning into occupations that are likely to be less familiar to them. Along with new skills, retraining programs may need to incorporate criteria of worker reactions, such as openness towards alternate occupations, as training objectives. Further, it is unclear how displaced workers may fare in occupations that have a high demand for workers yet that do not satisfy their interests and values. Research suggests that workers are likely to have more negative work experiences and quit when their needs and preferences are not satisfied (Kristof-Brown & Guay, 2011). Worker openness could therefore be important to train, and work roles may need be designed and adapted to fulfill displaced workers' needs, such as allowing greater autonomy to fulfill the desire for independence (Parker et al., 2001).

Likewise, there is a need for further research and policy recommendations regarding the role companies may take in relation to displaced workers. Technology is forecasted to result in job loss, but there is also evidence that organizations may alter their internal divisions of labor in response to technology by changing what jobs are seen as valuable within the organization (Hanley, 2014). Firms could assist displaced workers by identifying transition occupations and retraining them for open positions; doing so could increase worker commitment to the

organization (Bulut & Culha, 2010) and mitigate negative reactions to mass lay-offs from those who are not displaced (Brockner & Greenberg, 2015).

Given the likely job-displacing impacts of automation on the trucking industry, useful tools to assist truck drivers transition into new occupations are needed. This research substantiates the effectiveness of a methodology that can be used across a range of jobs to identify viable options for career transitions.

References

Acemoglu, D., & Restrepo, P. (2020). Robots and jobs: Evidence from US labor markets. *Journal of Political Economy*, *128*(6), 2188-2244.

Allen, M. T., Waugh, G., Shaw, M., Tsacoumis, S., Rivkin, D., Lewis, P., ... & Connell, D. (2012). The development and evaluation of a new O* NET related occupations matrix. *National Center for O* NET Development. URL https://www. onetcenter. org/dl_files/Related. pdf*.

Alonso Raposo, M., Grosso, M., Després, J., Fernández Macías, E., Galassi, C., Krasenbrink, A., ... & Ciuffo, B. (2018). An analysis of possible socio-economic effects of a Cooperative, Connected and Automated Mobility (CCAM) in Europe. *European Union*.

Autor, D. (2007, September). Technological change and earnings polarization: Implications for skill demand and economic growth. In *Massachusetts Institute for Technology, Economics Program Working Paper Series, part of the Supplemental Materials for Innovation and US Competitiveness The Conference Board report*.

Autor, D. (2010). The polarization of job opportunities in the US labor market: Implications for employment and earnings. *Center for American Progress and The Hamilton Project*, *6*, 11-19.

Autor, D., Katz, L. F., & Kearney, M. S. (2006). The polarization of the US labor market. National Bureau of Economic Research (NBER) Working Paper 11986.

Autor, D. H., Levy, F., & Murnane, R. J. (2003). The skill content of recent technological change: An empirical exploration. *The Quarterly Journal of Economics*, *118*(4), 1279-1333.

Beede, D.; Powers, R.; Ingram, C. The Employment Impact of Autonomous Vehicles; (ESA Issue Brief # 05-17). Office of the Chief Economist, Economics and Statistics Administration, U.S. Department of Commerce: Washington, DC, USA, 2017. Available online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id= 3022818 (accessed on 1 June 2021).

Beier, M. E. (2021). Life-Span Learning and Development and Its Implications for Workplace Training. *Current Directions in Psychological Science*, 09637214211003891.

Brockner, J., & Greenberg, J. (2015). The impact of layoffs on survivors: An organizational justice perspective. In J. S. Carroll (Ed.), *Applied social psychology and organizational settings* (pp. 45-75). Psychology Press.

Bulut, C., & Culha, O. (2010). The effects of organizational training on organizational commitment. *International Journal of Training and Development*, *14*(4), 309-322.

Cable, D. M., & DeRue, D. S. (2002). The convergent and discriminant validity of subjective fit perceptions. *Journal of Applied Psychology*, *87*(5), 875-884.

Chapman, D. S., Uggerslev, K. L., Carroll, S. A., Piasentin, K. A., & Jones, D. A. (2005). Applicant attraction to organizations and job choice: a meta-analytic review of the correlates of recruiting outcomes. *Journal of Applied Psychology*, *90*(5), 928.

Converse, P. D., Oswald, F. L., Gillespie, M. A., Field, K. A., & Bizot, E. B. (2004). Matching individuals to occupations using abilities and the O* NET: Issues and an application in career guidance. *Personnel Psychology*, *57*(2), 451-487.

Costello, B., & Suarez, R. (2015). Truck driver shortage analysis 2015. *Arlington, VA: The American Trucking Associations*.

Dufour, P. (2010). Supplying demand for Canada's knowledge society: A warmer future for a cold climate?. *American Behavioral Scientist*, *53*(7), 983-996.

Edwards, J. R., Cable, D. M., Williamson, I. O., Lambert, L. S., & Shipp, A. J. (2006). The phenomenology of fit: linking the person and environment to the subjective experience of person-environment fit. *Journal of Applied Psychology*, *91*(4), 802.

Edwards, J. R., Caplan, R. D., & Van Harrison, R. (1998). Person-environment fit theory. *Theories of Organizational Stress*, *28*(1), 67-94.

Eggenberger, C., Rinawi, M., & Backes-Gellner, U. (2015). Measuring the Specificity of Occupational Training Curricula and Labor Market Flexibility–An Economic Perspective on the Curriculum Development of VET Occupations, Swiss Leading House of Education, University of Zurich. *Swiss Leading House WP*, *106*.

Ford, M. (2015). *The rise of the robots: Technology and the threat of mass unemployment.* Basic Books.

Frank, M. R., Autor, D., Bessen, J. E., Brynjolfsson, E., Cebrian, M., Deming, D. J., ... & Rahwan, I. (2019). Toward understanding the impact of artificial intelligence on labor. *Proceedings of the National Academy of Sciences*, *116*(14), 6531-6539.

Frey, C. B. (2019). *The technology trap*. Princeton University Press.

Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation?. *Technological Forecasting and Social Change*, *114*, 254-280.

Gaucher, D., Friesen, J., & Kay, A. C. (2011). Evidence that gendered wording in job advertisements exists and sustains gender inequality. *Journal of Personality and Social Psychology*, *101*(1), 109.

Gefen, D. (2000). E-commerce: the role of familiarity and trust. *Omega*, *28*(6), 725-737.

Goos, M., & Manning, A. (2003). McJobs and MacJobs: the growing polarisation of jobs in the UK. In *The labour market under New Labour* (pp. 70-85). Palgrave Macmillan, London.

Gore, P. A., & Hitch, J. L. (2005). Occupational classification and sources of occupational information. *Career development and counseling. Putting theory and research to work*, 382-413.

Groshen, E. L., Helper, S., MacDuffie, J. P., & Carson, C. (2018). Preparing US workers and employers for an autonomous vehicle future. Working paper, Washington D.C., Securing America's Future Energy. https://avworkforce.secureenergy.org/wp-content/uploads/2018/06/Groshen-et-al-Report-June-2018-1.pdf. Accessed July 13, 2021.

Hall, J. V., & Krueger, A. B. (2018). An analysis of the labor market for Uber's driver-partners in the United States. *Ilr Review*, *71*(3), 705-732.

Hanley, C. (2014). Putting the bias in skill-biased technological change? A relational perspective on white-collar automation at General Electric. *American Behavioral Scientist*, *58*(3), 400-415.

Hauser, R. M., & Warren, J. R. (1997). Socioeconomic indexes for occupations: A review, update, and critique. *Sociological Methodology*, *27*(1), 177-298.

Hira, R. (2010). US policy and the STEM workforce system. *American Behavioral Scientist*, *53*(7), 949-961.

Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Psychological Assessment Resources.

Horvath, L. K., & Sczesny, S. (2014). Gender-fair language in organizations: Attracting potential leaders and promoting the organizational image of gender equality. Paper presented at the 17th General Meeting of the European Association of Social Psychology, Amsterdam, NL.

Kristof-Brown, A., & Guay, R. P. (2011). Person–environment fit. In *APA handbook of industrial and organizational psychology, Vol 3: Maintaining, expanding, and contracting the organization.* (pp. 3-50). American Psychological Association.

Levine, J. D., & Oswald, F. L. (2012). O*NET: The Occupational Information Network. In M. A. Wilson, W. Bennett, Jr., S. G. Gibson, & G. M. Alliger (Eds.), *The handbook of work analysis: Methods, systems, applications and science of work measurement in organizations* (pp. 281–301). Routledge/Taylor & Francis Group.

Litman, T. (2021). *Autonomous vehicle implementation predictions*. Victoria, Canada: Victoria Transport Policy Institute.

Maurer, T. J., Weiss, E. M., & Barbeite, F. G. (2003). A model of involvement in work-related learning and development activity: the effects of individual, situational, motivational, and age variables. *Journal of Applied Psychology*, *88*(4), 707.

Maurer, T. J., Shultz, K. S., & Adams, G. A. (2007). Employee development and training issues related to the aging workforce. *Aging and work in the 21st century*, 163-178.

Mitchell, T., & Brynjolfsson, E. (2017). Track how technology is transforming work. *Nature News*, *544*(7650), 290.

Montoya, R. M., Horton, R. S., Vevea, J. L., Citkowicz, M., & Lauber, E. A. (2017). A re-examination of the mere exposure effect: The influence of repeated exposure on recognition, familiarity, and liking. *Psychological Bulletin*, *143*(5), 459.

National Center for O*NET Development. The O*NET® Content Model. *O*NET Resource Center*. Retrieved July 27, 2021, from https://www.onetcenter.org/content.html

Ng, T. W., & Feldman, D. C. (2012). Evaluating six common stereotypes about older workers with meta-analytical data. *Personnel Psychology*, *65*(4), 821-858.

Parker, S. K., Wall, T. D., & Cordery, J. L. (2001). Future work design research and practice: Towards an elaborated model of work design. *Journal of Occupational and Organizational Psychology*, *74*(4), 413-440.

Posthuma, R. A., & Campion, M. A. (2009). Age stereotypes in the workplace: Common stereotypes, moderators, and future research directions. *Journal of Management*, *35*(1), 158-188.

Resick, C. J., Baltes, B. B., & Shantz, C. W. (2007). Person-organization fit and work-related attitudes and decisions: Examining interactive effects with job fit and conscientiousness. *Journal of Applied Psychology*, *92*(5), 1446-1455.

Rinawi, M., & Backes-Gellner, U. (2019). Occupational tasks and wage inequality in West Germany: A decomposition analysis. *Economics of Education Working Paper Series*, *112*.

Ros, M., Schwartz, S. H., & Surkiss, S. (1999). Basic individual values, work values, and the meaning of work. *Applied Psychology*, *48*(1), 49-71.

Sackett, P. R., Lievens, F., Van Iddekinge, C. H., & Kuncel, N. R. (2017). Individual differences and their measurement: A review of 100 years of research. *Journal of Applied Psychology*, *102*(3), 254.

Shabeer, S., Mohammed, S. J., Jawahar, I. J., & Bilal, A. R. (2019). The mediating influence of fit perceptions in the relationship between career adaptability and job content and hierarchical plateaus. *Journal of Career Development*, *46*(3), 332-345.

Tresh, F., Steeden, B., Randsley de Moura, G., Leite, A. C., Swift, H. J., & Player, A. (2019). Endorsing and reinforcing gender and age stereotypes: The negative effect on self-rated leadership potential for women and older workers. *Frontiers in Psychology*, *10*, 688.

Truxillo, D. M., Cadiz, D. M., & Hammer, L. B. (2015). Supporting the aging workforce: A review and recommendations for workplace intervention research. *Annu. Rev. Organ. Psychol. Organ. Behav.*, *2*(1), 351-381.

van Vianen, A. E. (2018). Person–environment fit: A review of its basic tenets. *Annual Review of Organizational Psychology and Organizational Behavior*, *5*, 75-101.

Vasilopoulos, N. L., Reilly, R. R., & Leaman, J. A. (2000). The influence of job familiarity and impression management on self-report measure scale scores and response latencies. *Journal of Applied Psychology*, *85*(1), 50.

Viscelli, S. (2018). Driverless? Autonomous trucks and the future of the American trucker. Retrieved from http://driverlessreport.org. Accessed: July 13, 2021.

Yankelevich, A., Rikard, R. V., Kadylak, T., Hall, M. J., Mack, E. A., Verboncoeur, J. P., & Cotten, S. R. (2018). Preparing the workforce for automated vehicles. *American Center for Mobility*.

Zahidi, S., Ratcheva, V., Hingel, G., Brown, S. (2020). *The Future of Jobs Report.* World Economic Forum. http://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

Table 1

Description of Occupational Characteristics for Determining Similarity between Occupations

Characteristic	Definition	O*NET Examples for Truck Driving	O*NET Examples for Childcare Workers
Knowledge	General, organized sets of facts	English Language, Mechanical, Transportation	Education and Training, Psychology, Customer and Personal Service
Skills	Developed capacities that aid in learning and gaining knowledge, or in job performance.	Troubleshooting, Time Management, Monitoring	Social Perceptiveness, Active Listening, Service Orientation
Vocational Interests	Preferences for different types of work environments, based on Holland's (1997) hexagonal model.	Support, Independence, Working Conditions	Social, Artistic
Values	Aspects of work that can fulfill different needs important for job satisfaction, based on the Theory of Work Adjustment (Dawis & Lofquist, 1984).	Realistic, Conventional	Relationships, Support, Independence

Note. Definitions are those used by O*NET (National Center for O*NET Development, n.d.).

Table 2
KSAO Comparisons Between 30 Alternate Career Occupations and Truck Driving

Occupation	Job Zone	Income	Knowledge		Skills		Interests		Values	
			S	U	S	U	S	U	S	U
Shared Skills Jobs										
1. Non-Destructive Testing Specialists	2	62,990	3	6	8	11	2	1	3	1
2. First-Line Supervisors of Logging Workers	2	46,960	3	2	8	5	2	1	2	1
3. Millwrights	2									
4. Manufactured Building and Mobile Home Installers	2	55,060	2	3	8	15	2	1	3	1
5. Rolling Machine Setters, Operators, and Tenders, Metal and Plastic	2	40,490	2	2	8	8	2	0	2	1
6. Biomass Plant Technicians	2	58,390	2	3	8	7	2	1	2	1
7. Chemical Equipment Operators and Tenders	2	49,130	3	9	8	7	1	0	2	1
8. Cooling and Freezing Equipment Operators and Tenders	2	35,290	3	5	8	7	2	1	2	0
9. Aerospace Engineering and Operations Technicians	3	66,020	3	7	8	11	2	1	3	2
10. Electro-Mechanical Technicians	3	58,350	2	3	8	12	2	1	3	1
Shared Work/Industry Jobs										
1. First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	2	55,060	4	5	5	14	0	1	3	3
2. Conveyor Operators and Tenders	1	34,660	3	1	5	2	1	0	1	1
3. Laborers and Freight, Stock, and Material Movers, Hand	2	29,510	0	0	0	0	1	0	1	1
4. Cleaners of Vehicles and Equipment	2	25,800	1	0	1	1	1	0	0	0
5. Refuse and Recyclable Material Collectors	2	37,840	4	0	4	2	1	0	1	1
6. First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	2	55,060	5	7	5	12	1	0	3	3
7. Automotive and Watercraft Service Attendants	2	25,200	2	6	4	7	1	0	1	0
8. Automotive Glass Installers and Repairers	2	35,790	3	1	1	2	1	0	2	1

9. Electronic Equipment Installers and Repairers, Motor Vehicles	3	37,380	3	4	6	9	0	1	2	0
10. Motorboat Mechanics and Service Technicians	3	41,330	4	5	5	7	1	0	2	0
Shared Skills and Work/Industry Jobs										
1. Locomotive Firers	2	60,260	4	0	6	3	2	0	1	0
2. Motorboat Operators	2	50,290	5	2	6	10	2	1	2	1
3. Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation	2	75,820	4	0	6	2	2	1	1	0
4. Wellhead Pumpers	2	55,040	1	1	6	4	2	0	1	1
5. Automotive Specialty Technicians	3	42,090	3	4	6	9	1	0	2	1
6. Air Traffic Controllers	3	122,990	4	5	6	12	1	1	3	2
7. Rail-Track Laying and Maintenance Equipment Operators	2	56,100	3	3	6	6	1	0	1	0
8. Locomotive Engineers	2	67,090	5	1	7	6	2	0	2	1
9. Crane and Tower Operators	3	56,690	1	1	7	2	2	0	2	0
10. Motorcycle Mechanics	3	37,600	3	2	6	8	1	0	3	1

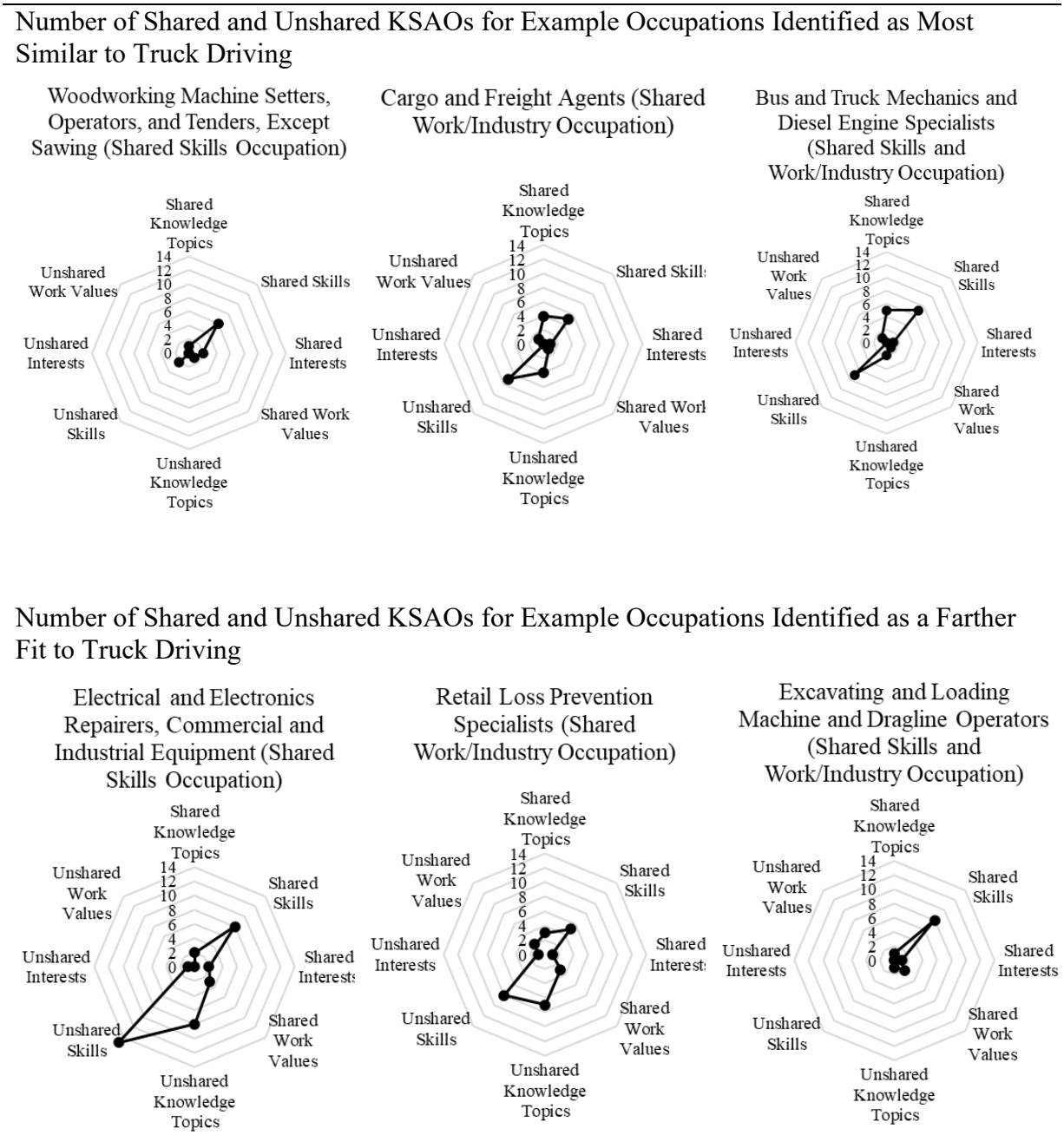
Note. Income=annual median income. S=the number of shared KSAOs between truck drivers and the transition occupation. U=the number of unshared KSAOs between truck drivers and the transition occupation (i.e., KSAOs deemed important for the transition occupation, but not for truck driving). The full list of shared and unshared KSAOs for all identified alternate occupations is available from the first author upon request.

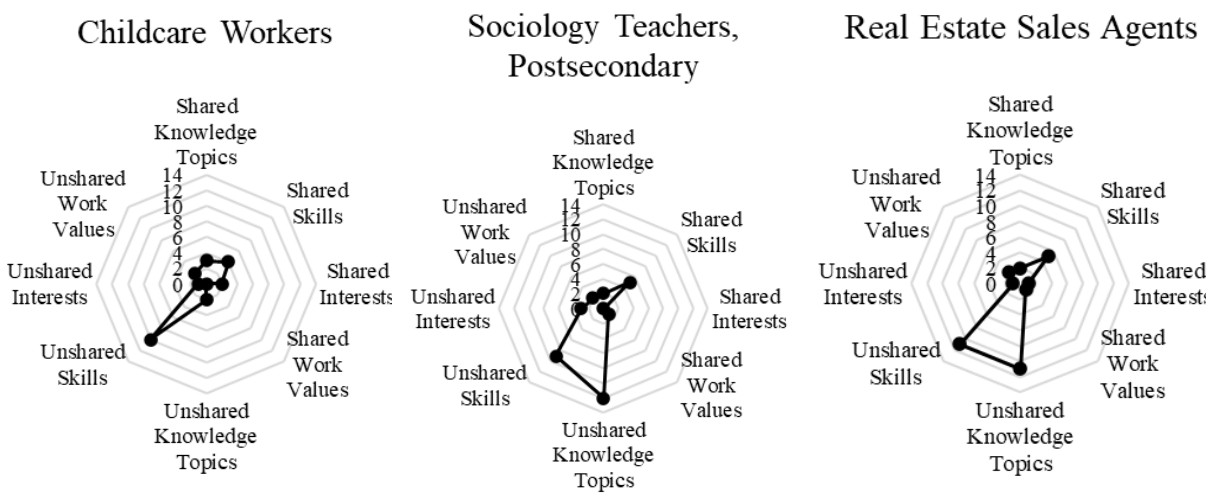
Table 3
Study 2 Alternate Potential Occupations Presented to Truck Drivers

	Shared Skills Occupations	Shared Work/Industry Occupations	Shared Skills and Work/Industry Occupations
Occupation with closest match to truck driving:	Machine setters, operators, and tenders Description: *Set up, operate, or tend more than one type of cutting or forming machine tool or robot, or plastic molding, casting, or coremaking machines to mold or cast metal or thermoplastic parts or products, or tend machines to saw, cut, shear, slit, punch, crimp, notch, bend, or straighten metal or plastic material, etc.*	Cargo and freight agents Description: *Expedite and route movement of incoming and outgoing cargo and freight shipments in airline, train, and trucking terminals and shipping docks. Take orders from customers and arrange pickup of freight and cargo for delivery to loading platform. Prepare and examine bills of lading to determine shipping charges and tariffs.*	Bus and truck mechanics and diesel engine specialists Description: *Diagnose, adjust, repair, or overhaul buses and trucks, or maintain and repair any type of diesel engines. Includes mechanics working primarily with automobile or marine diesel engines.*
Occupation selected as a farther fit to truck driving:	Electrical and electronics repairers, commercial and industrial equipment Description: *Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.*	Retail loss prevention specialists Description: *Implement procedures and systems to prevent merchandise loss. Conduct audits and investigations of employee activity. May assist in developing policies, procedures, and systems for safeguarding assets.*	Excavating and loading machine and dragline operators Description: *Operate or tend machinery at surface mining site, equipped with scoops, shovels, or buckets to excavate and load loose materials.*

Figure 1

Number of Shared and Unshared KSAOs Between Truck Driving and Example Alternate Occupations

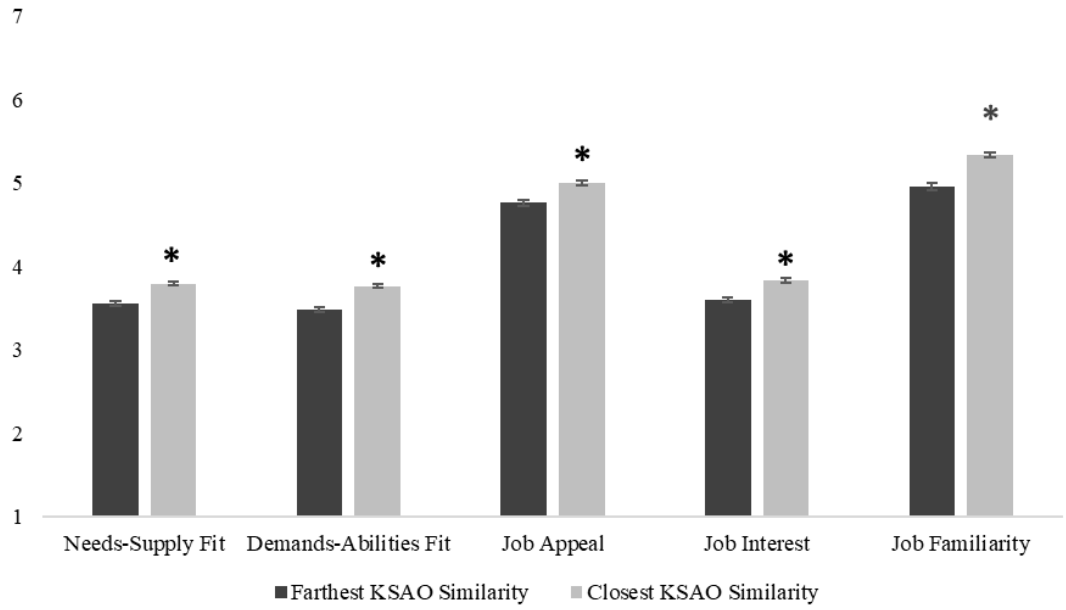




Note. Shared KSAOs are those deemed important for both truck driving and the example occupation. Unshared KSAOs are deemed important for the alternate occupation, but not truck driving (e.g., indicating the number of knowledge topics/skills that drivers may need to learn or gain, or work preferences for vocational interests/values that they are less likely to have).

Figure 2

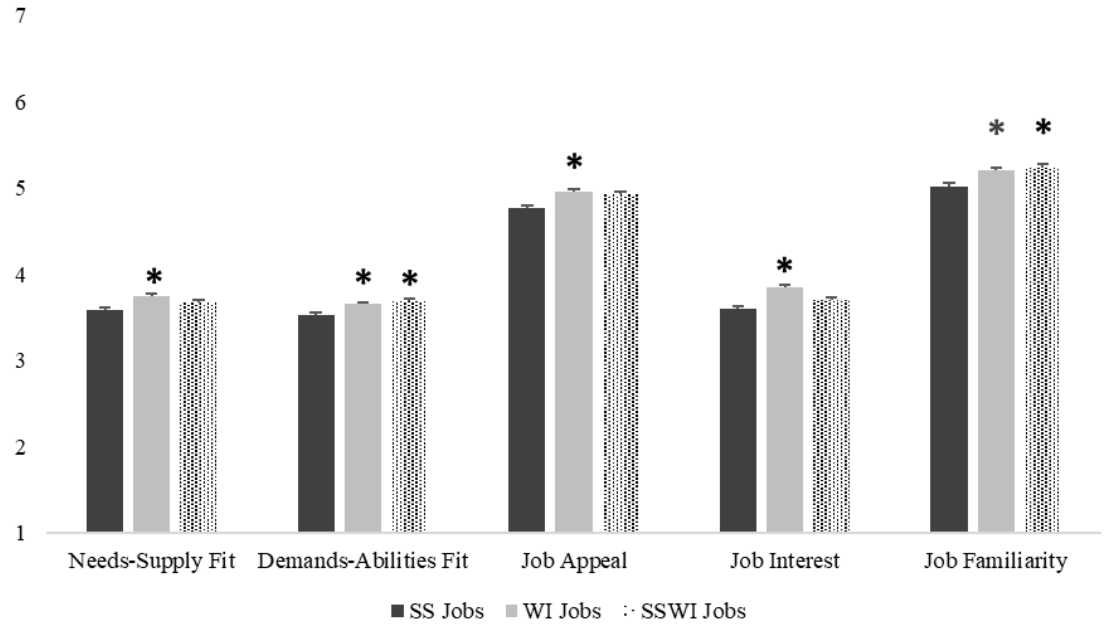
Ratings in Study Variables for Jobs Closest and Farthest in KSAO similarity to Truck Driving



Note. N=202. *p<.05. Job Appeal was rated on a 7-point scale and all other variables were rated on a 5-point scale. Error bars represent the standard error.

Figure 3

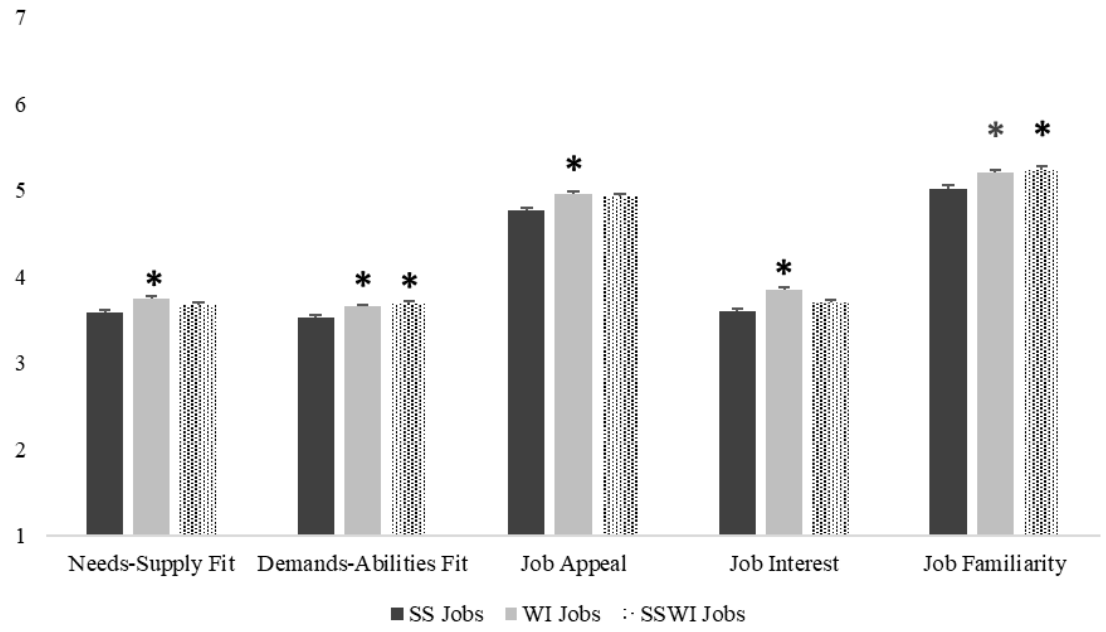
Ratings in Study Variables Across Job Sets



Note. N=202. *p<.05. Job Appeal was rated on a 7-point scale and all other variables were rated on a 5-point scale. Error bars represent the standard error.

Figure 3

Ratings in Study Variables Across Job Sets



Note. N=202. *p<.05. Job Appeal was rated on a 7-point scale and all other variables were rated on a 5-point scale. Error bars represent the standard error.