Child Development, 2026, 423–436
https://doi.org/10.1093/chidev/aacaf032
Published: February 4, 2026
Empirical Article

Society for Research in Child Development
OXFORD

Children's social evaluations of occupations involving physical vs. intellectual labor

Yuhan Wang* and **Kristin Shutts**

Department of Psychology, University of Wisconsin-Madison, Madison, WI, United States
*Corresponding author: Department of Psychology, University of Wisconsin-Madison, 1202 W. Johnson St., Madison, WI 53706, United States.
Email: yuhan.wang4@wisc.edu

Abstract

This study investigated how children evaluate people whose occupations involve intellectual or physical labor. Children made inferences about the traits ($N = 66$, ages 6–11, 33 female, 42% White, tested in 2024) and hierarchical positions ($N = 66$, ages 6–11, 33 female, 53% White, tested in 2024) of people with different occupations. Analyses revealed that children thought intellectual laborers were smarter and higher in social rank, while physical laborers were more hard-working. Children's tendency to view intellectual laborers as smarter and higher in social rank increased with age; their tendency to associate physical laborers with hard work lessened with age. The findings reveal children's early use of occupational information when evaluating others. Furthermore, this study offers a method for studying children's apprehension of social roles—a critical aspect of children's intuitive sociology.

Keywords physical labor, intellectual labor, social roles

Lay summary

This research examined how children think about different kinds of work. Across two studies, 6- to 11-year-old children evaluated people who performed intellectual or physical labor. Children viewed intellectual laborers as smarter and higher in social status and saw physical workers as more hard-working. These findings reveal how children's ideas about work and social hierarchy begin to take shape and highlight early-developing beliefs that mirror real-world distinctions between physical and intellectual labor.

Navigating social environments is a fundamental aspect of people's lives, with these abilities taking root in early childhood. An essential social skill to acquire is understanding the social roles people occupy within society. Social roles represent shared prescriptive expectations for people's behavior (Tomasello, 2020). These roles influence how people are connected to each other, how we expect others to act, and what individuals themselves are obligated to do (Kalish, 2012; Kalish & Lawson, 2008; Shutts & Kalish, 2021).

One salient type of social role in adult life is occupation. Occupations play a critical role in social structures, shaping how individuals interact with each other and defining their responsibilities to society (Bank, 2018). Despite the importance of occupations, most of the research social scientists have carried out on occupations has focused on adults. This makes sense given that adults comprise much of the world's labor force. Nevertheless, children—who generally do not work—regularly encounter information about occupations. Occupations are depicted in children's media (e.g., storybooks and television); children frequently interact with people whose occupations are focused on childhood (e.g., teachers, school bus drivers, and pediatricians); and children's parents typically hold occupations. Additionally, children begin to think about their future occupations at an early age (Hung-Chang & Mei-Ju, 2014; Oliveira et al., 2020), and parents have expectations for their children's future occupations (Chhin et al., 2008; Irwin & Elley, 2013).

Substantial research has investigated how children think about social roles such as social relationship partners and group members (Afshordi & Liberman, 2021; Kalish, 2012; Noyes et al., 2020). A deeper investigation into children's understanding of occupations could enhance our understanding of how children apprehend the social world and inform theory (e.g., about the role of occupations in children's naive sociology; Shutts & Kalish, 2021). Research on children's thinking about occupations could also contribute to practical suggestions for how parents and teachers should engage with children about occupations and other social roles. The present research aims to characterize young children's thinking about occupations, shedding light on their understanding of the world

Handling Editor: Audun Dahl
Editor: Shauna Cooper
Received: March 4, 2025. **Revised:** October 30, 2025. **Accepted:** November 14, 2025

of work and illuminating how occupational roles guide children's social evaluations.

Before continuing, it is worth defining our terms. The International Standard Classification of Occupations defines a job as "a set of tasks and duties performed by one person" and an occupation as "a set of jobs whose main tasks and duties are characterized by a high degree of similarity." (ISCO-08; International Labour Organization, 2012). We use the term "occupation" to frame the focus of our research as we mean to study children's understanding of kinds of work, not their understanding of what activities, for example, their mother did for a specific company last year. That said, in everyday language, the terms "job," "occupation," and "work" are often used interchangeably; children are likely more familiar with "having a job" and "going to work" (vs. having an occupation or fulfilling an occupational obligation); and it is simpler to convey occupational information to children by describing what particular individuals do (i.e., their work activities) than by referencing formal labels for sets of jobs held by multiple people. Thus, for child participants in our studies, we used the terms "job" and "work" and conveyed occupational information by describing individual workers' activities rather than by labeling their occupations.

Characterizing kinds of occupations

Sociologists and economists have formally characterized occupations according to different dimensions (Bank, 2018; Van Reenen, 2011). Among such dimensions, one important one that many scholars have identified concerns whether physical vs. intellectual labor is required (Bank, 2018; Nancekivell et al., 2023; Van Reenen, 2011). Occupations characterized by physical labor involve manual effort and bodily strength (e.g., construction workers, drivers, and food service workers). In contrast, occupations characterized by intellectual labor involve cognitive analysis and production of ideas, with occupations such as economists, traders, and lawyers. Importantly, this distinction can also arise within the same occupational field. For example, in technology production, an assembly-line worker would physically assemble smartphone components, whereas a product designer would come up with the phone's software or circuitry; in construction, a builder would perform the manual work of erecting a house, while an architect would plan its design and layout. These examples highlight that distinctions between physical and intellectual labor often coexist within the same collaborative processes of modern work.

This distinction between physical and intellectual labor is connected to various social and economic factors. People in physically demanding occupations often come from lower socioeconomic backgrounds, in part due to unequal access to education and professional opportunities (Bank, 2018). For example, African Americans remain overrepresented in occupations requiring physical work (e.g., in manual service roles such as janitors and cashiers) and underrepresented in professions requiring advanced education (e.g., professors and scientists; Alonso-Villar et al., 2012; Center for American Progress, 2022 March 29, March 29; Jardina et al., 2023, August). These patterns reflect long-standing structural inequities and barriers to resources and opportunities (Alonso-Villar et al., 2012; Bigler et al., 2003; Jardina et al., 2023, August). The physical-intellectual labor distinction also maps onto persistent inequalities in society: Physical laborers are typically paid less and seen as holding lower status than intellectual workers, particularly in the context of a rapidly changing labor market shaped by globalization and automation (Frey & Osborne, 2017; Powell & Snellman, 2004).

At the same time, occupations involving intellectual labor are increasingly viewed as "future-proof." Intellectual occupations—especially those involving flexible thinking, creativity, and complex decision-making—are seen as less vulnerable to automation and more likely to yield social and financial rewards (Autor, 2015; Zhang et al., 2024). Public debates about labor inequality often highlight the irony that essential physical labor (e.g., caregiving) largely remains undercompensated and underrecognized compared to white-collar jobs involving intellectual labor (OECD, 2023). Meanwhile, occupations involving intellectual labor are increasingly viewed as less vulnerable to automation. Recent advances in artificial intelligence have renewed debates about which kinds of work are likely to persist and what these shifts mean for the value of human labor (Autor, 2015; Frey & Osborne, 2017). These patterns make clear that the distinction between physical and intellectual labor is more than descriptive—it is integral to how social hierarchies are constructed in the working world. Understanding how children think about different forms of labor therefore provides an early window into how people make sense of work in a changing world.

Studying how children begin to reason about the physical-intellectual labor distinction offers a valuable window into the developmental roots of occupational inequality. Although it is likely difficult for children to apprehend the full range of dimensions that sociologists and economists use to characterize different occupations, children certainly notice the kinds of tasks the people perform (Kushnir et al., 2013) and reason about cues to social hierarchies at an early age (Enright et al., 2020; Heck et al., 2022a). Thus, the physical-intellectual labor distinction offers a developmentally accessible entry point into children's early social reasoning about occupations, social hierarchies, and the structure of society. Furthermore, assessing whether children make different inferences about the attributes of those who hold different occupations contributes to our understanding of how children begin to internalize the social structure of work and could ultimately inform educational efforts to challenge narrow or biased views of labor early in development.

Previous research on children's thinking about occupations and domain expertise

As noted earlier, we know little about how children think about occupations generally (Taghon et al., 2024), let alone how they think about the distinction between physical and intellectual occupations specifically. However, work stemming from diverse research traditions provides evidence that young children know some relevant information about occupations. Preliminary insights into how children think about occupations come from research that has (1) asked children about their own occupational aspirations, (2) probed children's gender and racial stereotypes regarding particular occupations, and (3) studied what children understand about knowledge and expertise.

Researchers focused on career development in youth have asked both preschool and elementary school-age children about their own occupational aspirations (e.g., "What do you want to be when you grow up?"). This research reveals that as early as

the preschool years children can list the names of some occupations (Cinamon & Yeshayahu, 2021), but that children's ability to list diverse occupations, provide information about activities associated with different occupations, and articulate why people work develops a great deal from the preschool years into and across the elementary school years (Cinamon & Yeshayahu, 2021; Taghon et al., 2024). Research on young children's career aspirations also reveals that children are sensitive to gender norms and occupational prestige (Auger et al., 2005; Hayes et al., 2018; Olsen et al., 2023; Teig & Susskind, 2008). As one example, Auger and colleagues (2005) asked first, third, and fifth grade children in the United States what they wanted to be when they grew up. The responses of children in 1st grade reflected gender stereotypes (e.g., girls wanted to be teachers; boys wanted to be doctors) and older children were more likely than younger children to indicate an interest in occupations rated by adults as socially prestigious.

Studies focused more directly on children's gender and racial stereotypes also reveal that by the early elementary years, children have absorbed information from their culture about which occupations are for which people (Bigler et al., 2003; Hayes et al., 2018; Liben et al., 2001; Santhanagopalan et al., 2022; Teig & Susskind, 2008; Vivaldi & Rose, 2024). For example, as early as 6 years of age, children think that men should occupy culturally masculine occupations such as doctors and dentists, and that women should occupy culturally feminine occupations such as nurses and teachers (Liben et al., 2001). Children as young as 6 years of age also think African Americans are less likely to be doctors and politicians, and more likely to be cashiers and washers (Bigler et al., 2003). Finally, when asked to "draw a scientist," by 7–8 years of age, children start to systematically depict male figures, indicating implicit gender–occupation stereotypes (Miller et al., 2018). Taken together, research on social biases provides evidence that children are attuned to culturally shared expectations about occupational roles.

A final line of work relevant to the present research concerns studies of children's knowledge and expertise. Several studies provide evidence that from an early age, children understand that people can vary in their expertise across different tasks, an important component for understanding occupational roles (Keil et al., 2008; Kushnir et al., 2013; Lutz & Keil, 2002; Sobel & Corriveau, 2010). For example, one study conducted by Kushnir and colleagues (2013) presented preschool-age children with two characters: a "labeler" who knew the name of a tool and a "fixer" who could use that tool to fix the toy. The researchers found that 4-year-old children selectively turned to labelers for learning new labels and turned to fixers for fixing new broken toys, demonstrating an understanding that people possess different skills relevant to solving problems.

Taken together, findings from somewhat disparate research lines reveal that young children have some initial understanding of occupational information: They provide sensible answers when asked to list occupations for themselves (showing an awareness that different occupations exist), and they hold stereotypes about workers in different occupations (revealing a capacity to learn about the qualities of people who hold, or who should hold, different positions). However, research on children's occupational aspirations and stereotypes has focused on specific occupations (e.g., wanting to be professional athlete; reasoning about who should be a dentist) and thus does not address which occupational dimensions children use to guide their decisions and judgments. Research by Kushnir and colleagues (2013) reveals that children can differentiate between people with intellectual vs. physical skills in one domain, but this research does not speak to children's social evaluations of people who hold physical jobs vs. intellectual occupations.

The present study

To understand whether and how children think about occupations characterized by physical labor and intellectual labor, we probed children's evaluations of people described as performing physical vs. intellectual work. One important social evaluation concerns children's inferences about the traits of people who perform particular kinds of work. Among various traits, being (or being perceived as) smart and hardworking can result in large social benefits (Brown et al., 2018; Celniker et al., 2023; Fiske et al., 2007; Oldmeadow & Fiske, 2007). Adults' and young children's perceptions of others' intelligence produce cognitive, affective, and behavioral outcomes, such that those who are viewed as smart are provided with more opportunities and are perceived as having other positive attributes (Feldhusen, 1998; Fiske et al., 2007; Good & Shaw, 2022; Ma et al., 2023; Tsay, 2016). Being viewed as hardworking also results in benefits for people; for example, hard-working people are viewed as morally better and given more rewards by both adults and young children (Brown et al., 2018; Noh et al., 2019; Oldmeadow & Fiske, 2007; Rizzo et al., 2016; Zhao & Kushnir, 2023). Thus, understanding whether and how children link these two very positive traits (i.e., being smart and being hardworking) to different occupational roles is relevant to characterizing how children apprehend intellectual vs. physical laborers.

Apart from traits, another important social evaluation of occupational roles concerns people's positions in social hierarchies or their social rank (Heck et al., 2022a). Social hierarchies are often thought of as comprising multiple related but distinct dimensions: prestige (respect), power (control), and wealth (resources) (Kraus et al., 2012; Ridgeway, 2014). These dimensions do not always align (e.g., in some communities, a police officer may be high in power but not necessarily high in prestige). In the present study, we focused on two hierarchical dimensions—power and wealth—because these aspects are readily understood by children. Prior work shows that even very young children detect and reason about differences in wealth, especially when wealth differences are depicted using material resources (Ahl et al., 2019; Shutts et al., 2016). Furthermore, young children can detect and answer questions about differences in power between individuals and groups (Enright et al., 2020; Gülgöz & Gelman, 2017; Thomsen et al., 2011). In contrast, prestige is a more abstract hierarchical dimension and has been less frequently examined in developmental work (Enright et al., 2020), due in part to challenges related to designing age-appropriate measures.

Studies of children's reasoning about power and wealth have predominantly focused on children's linking of social hierarchy and social group information (e.g., children's use of race to make inferences about people's wealth; Mandalaywala et al., 2020; Olson et al., 2012). One recent study, however, did seek to understand whether children link social hierarchy information to occupations described as involving either "thinking" or "building." Specifically, Nancekivell and colleagues (2023) presented children ages 6–12 years with characters who lived far away and who differed in both wealth and power (e.g., one character lived at the top of the hill in a big house and had more choices; another character lived at the bottom of the hill in a small house and had fewer choices), and

asked participants to guess whether the characters were "thinkers" or "builders." Analyses revealed that participants as a group did not use social hierarchy information to infer occupational roles, though data patterns did suggest that the oldest children in the sample (i.e., those over 10) may have thought that characters who were higher in social rank were more likely to be thinkers. One possibility is that children—especially young children—struggled with the inferential structure of the question; indeed, previous research (Gelman et al., 1986) has shown that children find it difficult make inferences from attributes (here, social hierarchy) to categories (here, "thinkers" and "builders"). Another possibility is that children had difficulty reasoning about scenarios disconnected from what they have experienced in their own society (i.e., "one of these people builds gopps"). Contrasting with Nancekivell and colleagues (2023), children in the present study were (1) asked to infer attributes from occupations and (2) presented with descriptions of relatively familiar actions and objects.

The participants in this study were 6- to 11-year-old children. We chose this age range for two reasons. First, previous work has found that children around 6 years of age show systematic evaluations of people's traits and social hierarchy based on social categories such as gender and race (Bian et al., 2017; Mandalaywala et al., 2020; Shutts et al., 2016), so we set the youngest age to be 6. Second, as mentioned above, recent research has shown that children around 10 years of age may start to associate people who have intellectual jobs with higher social rank (Nancekivell et al., 2023). We extended our age range to include children up to 11 years of age to detect changes after 10 years of age.

We designed stimuli where two human characters matching in gender wore similar clothes and worked in the same scenario (e.g., a bakery). The key difference between the two characters involved whether their work concerned physical activities or intellectual activities; we use both verbal descriptions and visual cues to manipulate this distinction. Across multiple trials, participants were asked to make trait (Study 1) or social hierarchy (Study 2) evaluations of these two characters. Research questions, procedures, and data analyses for both studies were preregistered (https://osf.io/nx5up/?view_only=c5c284ebafe14e72b192946bd953c6d9).

Study 1

Method

Participants

According to a power analysis, 66 participants were sufficient to achieve power of.80 to detect an effect size of $f^2 = 0.15$. The final sample size for Study 1 was 66 children between 6 and 11 years of age (range = 6.15–11.96 years, $M = 8.66$, $SD = 1.65$, 33 girls and 33 boys). To ensure that children answered independently, research staff members monitored sessions closely for any signs of parental interference. Data for an additional two children (i.e., beyond the 66) were excluded from analysis; one child was repeatedly interrupted by their parent and one child was not able to pay attention to the task. Exclusions decisions were determined jointly by the testing experimenter and a second research staff member. The second research staff member was unaware of hypotheses for the study and independently evaluated session recordings.

Participants were recruited from LookIt, an online national testing platform capable of attracting a more diverse sample of child participants than is typical of single-lab participant databases (Scott & Schulz, 2017). Participants' racial/ethnic backgrounds were: Asian American (30.30%), Black or African American (3.03%), Hispanic or Latine (4.55%), White or European American (42.42%), and multiracial (19.70%). Most children (89.39%) came from families where parents had a college education or higher; 46.97% of participants had a household income of $100,000 or more. Data were collected during the summer of 2024.

Procedure and design

The experimenter first guided children through four training trials to familiarize them with the task format and teach them how to indicate their choices in the experiment. For the practice trials, children saw four pairs of monsters and were asked questions about these monsters (e.g., "Which monster has pointy teeth?"; "Which monster do you think likes sweets more?"). Participants were asked to use circle and triangle shapes (which appeared below the monsters) to indicate their choices. Specific scripts can be found on the OSF platform (https://osf.io/nx5up/?view_only=c5c284ebafe14e72b192946bd953c6d9).

For the test trials, children viewed eight pairs of characters; each member of the pair worked in the same context (e.g., "Both of their work is about cakes."). One character was described as performing physical labor, and one character was described as performing intellectual labor. The experimenter described three actions for each character, to convey the distinction (e.g., Intellectual laborer: "She works out the right shape of the roof. She invents painting design. She decides the type of wood." Physical laborer: "She attaches pieces of wood to build walls. She applies the paint on the wall. She builds the roof"). Table 1 presents all eight working scenarios as well as the text used to convey the intellectual vs. physical labor distinction.

Pictures of two characters who were matched in their gender, race, and clothing style were also provided with these descriptions on each trial. The physical laborer held a tool in their hand, and the intellectual laborer had a thinking posture. See Figure 1 for example stimuli for boy and girl participants. On all trials, participants viewed characters who matched their own gender. We matched participant gender and held gender constant within and across trials to focus children's evaluations on the occupation information. Prior research reveals that children use gender information in its own right to make trait judgments, including about who is smart (Bian et al., 2017).

On each trial, after meeting the two characters, children were asked to infer which of the two characters possessed an attribute. For four (unique) pairs in a row, children were asked "Who is smarter?" (i.e., smart measure); for an additional four (unique) pairs in a row, they were asked, "Who works harder?" (i.e., hard-working measure). The order of these two questions was counterbalanced across participants such that half of the participants answered the smart questions first and half answered the hard-working questions first. The locations of the two characters were also counterbalanced within each question type such that the physical laborer appeared on the left for half of the trials and on the right for half of the trials. Finally, the order of the working contexts varied across participants such that half of the children saw the eight working contexts in one randomized order (i.e., cakes first) and half of the children saw the eight working contexts in reverse order (i.e., cakes last).

Table 1 Working scenarios and descriptions for physical and intellectual laborers in each scenario.

Working scenario	Description for the physical laborer	Description for the intellectual laborer
Cakes	This is Sarah. Sarah's work is about cakes. She uses a bowl to mix ingredients for the recipe. She puts the pan in the oven to bake. She adds frosting to the cake.	This is Linda. Linda's work is about cakes. She comes up with ingredients. She chooses the oven's heat. She figures out how frosting looks.
Houses	This is Alice. Alice's work is about houses. She attaches pieces of wood to build walls. She applies the paint on the wall. She builds the roof.	This is Ellie. Ellie's work is about houses. She works out the right shape of the roof. She invents painting design. She decides the type of wood.
Phones	This is Lisa. Lisa's work is about phones. She attaches the battery to the phone. She applies the phone screen and the buttons. She builds the phone with tools.	This is Lucy. Lucy's work is about phones. She works out how to make the battery. She invents ways to put the phone together. She decides how the screen looks.
Backpacks	This is Lindsay. Lindsay's work is about backpacks. She uses fabric for the backpack. She puts the backpack together. She adds decorations to the backpack.	This is Katie. Katie's work is about backpacks. She comes up with the backpack's look. She chooses fabric for the backpack. She figures out decoration designs.
Bikes	This is Susan. Susan's work is about bikes. She attaches parts to the bike. She applies different colors of paint on the bike. She builds the bike.	This is Ashley. Ashley's work is about bikes. She works out how to make parts of the bike. She invents how the bike will look. She decides the painting design.
TVs	This is Mia. Mia's work is about TVs. She attaches the wires to the correct plugs. She applies the screen to the TV. She builds the TV with tools.	This is Emma. Emma's work is about TVs. She works out how to wire the TV correctly. She invents how the TV will look. She decides how the screen will look when the TV is on.
Chairs	This is Ava. Ava's work is about chairs. She uses wood to build the chair. She puts screws into the wood to hold the chair in place. She adds fabric to the cushion.	This is Bella. Bella's work is about chairs. She comes up with what the chair will look like. She chooses the wood for the chair. She figures out the cushion's fabric.
Toys	This is Cindy. Cindy's work is about toys. She uses scissors to cut pieces of cloth. She puts the toy together. She adds decorations to the toy.	This is Rachel. Rachel's work is about toys. She comes up with the toy's look. She chooses clothes for the toy. She figures out decoration designs.

Note. The table shows the script presented to girl participants. Boys received the same content with stereotypically male names and he/him pronouns.

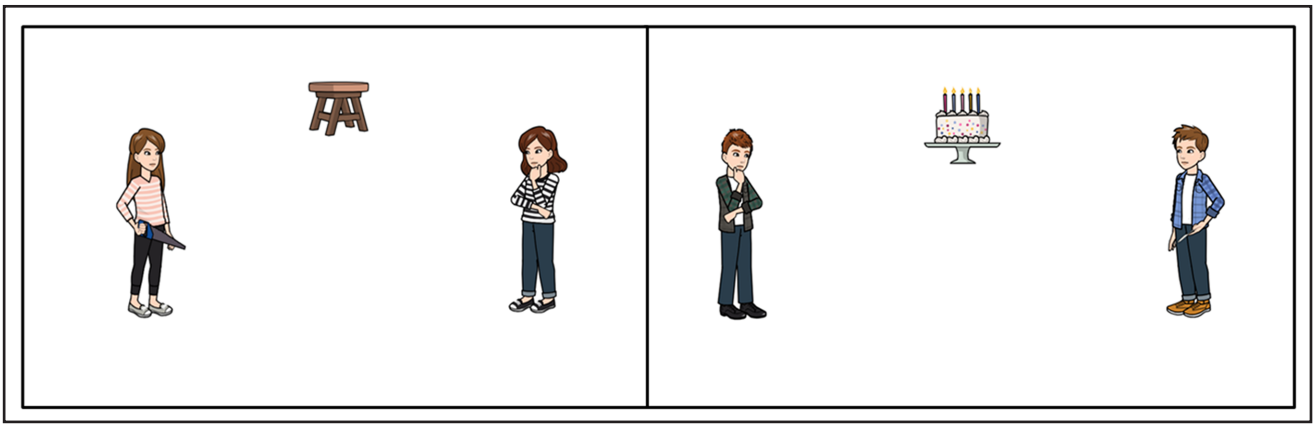

Figure 1 Example stimuli for participants. The left panel shows an example of what girls saw when the working context was chairs; the left character was described as performing physical labor and the right character was described as performing intellectual labor. The right panel shows an example of what boys saw when the working context was about cakes; the left character was described as performing intellectual labor and the right character was described as performing physical labor.

Results

Analytic approach

Data were analyzed using lme4 package in R (Bates et al., 2015). Following our preregistration plan, we first performed separate binomial linear mixed models predicting children's comparative judgments (0 = physical laborers, 1 = intellectual laborers) of the two characters for each measure with a random intercept for participants. We then performed separate binomial models predicting children's comparative evaluations of two characters as a function of question type, age, and their interaction with a random effect for participants. Although age was not included in the primary models specified in our preregistered analysis plan, we noted that we might explore age effects and their interaction with question type.

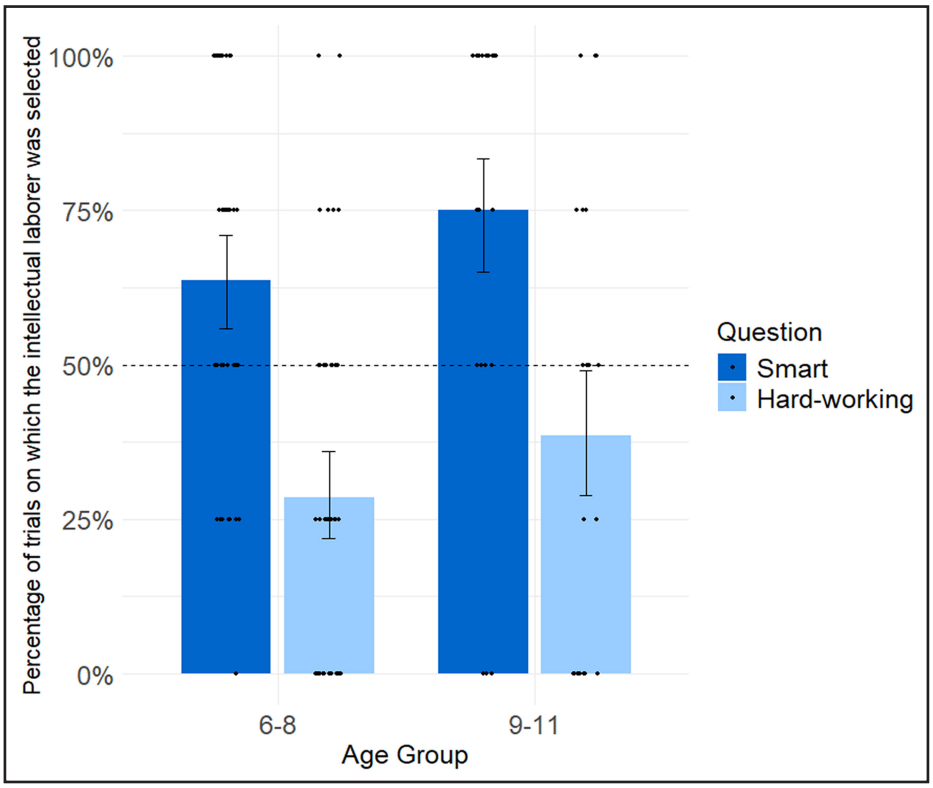

Figure 2 Responses binned by question type (smart vs. hard-working) and participant age (6–8, 9–11). Colored bars show the mean percentage of responses on which the intellectual laborer was chosen. Each dot represents the percentage of trials on which a participant chose the intellectual laborer. Note that for main analyses age was treated as a continuous variable. Error bars represent 95% confidence intervals.

Preliminary analyses revealed no gender or order effects (*ps* > .697). Additionally, point-biserial correlations between children's responses for each question type and their household income revealed no significant relations (smart: $r = .09$, $p = .788$; hard-working: $r = .11$, $p = .671$). Data, scripts, and preregistration documents can be found on OSF: https://osf.io/nx5up/?view_only=c5c284ebafe14e72b192946bd953c6d9.

Main analyses

First, we aimed to determine whether children's comparative evaluations of the two characters favored any character for each question type. Our model showed that children chose intellectual laborers when asked who was smarter ($B = 1.02$, $SE = .25$, 95% CI [.53, 1.5], OR = 2.77, $p < .001$). However, when asked who worked harder, children chose physical laborers ($B = -1.14$, $SE = .29$, 95% CI [−1.71, −.56], OR = 0.32, $p < .001$).

We then examined whether children's comparative evaluations of the two characters varied by participant age, question type, and their interactions. Our final model revealed a significant main effect of question type ($B = 2.16$, $SE = .36$, 95% CI [1.45, 2.87], OR = 8.67, $p < .001$) such that children are more likely to choose intellectual laborers for the smart question compared to the hard-working question. We also found a main effect of age ($B = .28$, $SE = .11$, 95% CI [.06, .50], OR = 1.33, $p = .012$). With increasing age, children were significantly more likely to indicate that intellectual laborers were smart and hard-working. The interaction between age and question type was not significant ($p = .304$). See Figure 2 for participants' responses split by age and question type (smart vs. hard-working). All statistical analyses treated age as a continuous variable.

Study 2

In Study 1, we found that children associated intellectual laborers with being smarter, and physical laborers with being more hard-working. Additionally, with age, children were more likely to indicate that intellectual laborers were smart, and less likely to endorse that physical laborers were hard-working. These findings suggest that children use information about the physical vs. intellectual labor required for different jobs to guide their social evaluations of people who hold those jobs. In Study 2, we aimed to examine whether and how children make other important social inferences about intellectual laborers and physical laborers—namely, inferences about social hierarchy positions.

Method

Participants

According to a power analysis, 66 participants were sufficient to achieve power of.80 to detect an effect size of $f^2 = 0.15$. The final sample size for Study 2 was 66 children between 6 and 11 years of age (range = 6.10–11.98 years, $M = 8.96$, $SD = 1.82$, 33 girls and 33 boys). Data for an additional two children (i.e., beyond the 66) were excluded from the final analysis due to being unable to pay attention to the task. Participants' racial/ethnic backgrounds included: Asian American (18.18%), Hispanic or Latine (4.55%), White or European American (53.03%) and multiracial (15.15%). Most children (92.42%) came from families where parents had a college education or higher; 62.12% of participants had a family income of $100,000 or more. Participants were recruited from LookIt. All data were collected during the summer of 2024.

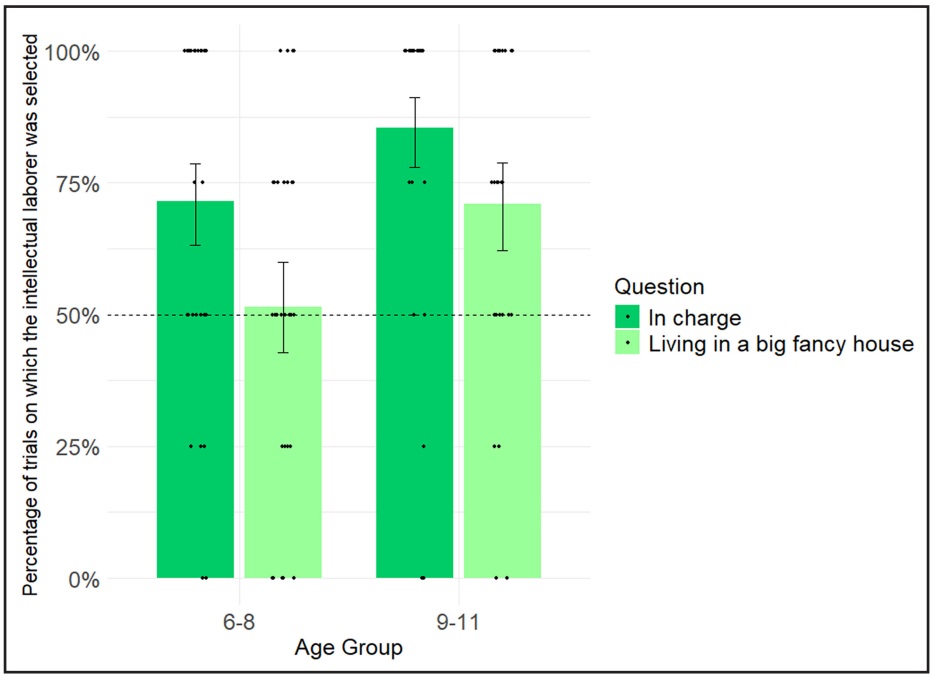

Figure 3 Responses binned by question type (in charge vs. living in a big fancy house) and participant age (6–8, 9–11). Colored bars show the mean percentage of responses on which the intellectual laborer was chosen. Each dot represents the percentage of trials on which a participant chose the intellectual laborer. Note that for main analyses, age was treated as a continuous variable. Error bars represent 95% confidence intervals.

Procedure and design

The procedure was similar to Study 1. Children first completed four training trials to familiarize them with question structures as well as teach them how to indicate different choices in the experiment. For the formal trials, children viewed eight pairs of characters; each member of the pair worked in the same context. One character was described as performing physical labor, and one character was described as performing intellectual labor.

On each trial, after meeting the two characters, children were asked to infer which of the two characters was higher in social rank. For four (unique) pairs in a row, children were asked "Who is in charge?" (to capture inferences about power); for an additional four (unique) pairs in a row, they were asked, "Who lives in this really big fancy house?" (to capture inferences about wealth). The counterbalancing of question type, character location, and context mimicked Study 1.

Results

Analytic approach

Data were analyzed using the lme4 package in R (Bates et al., 2015). Following our preregistration plan, we first performed separate binomial linear mixed models predicting children's comparative judgments (0 = physical laborers, 1 = intellectual laborers) of two characters for each social hierarchy measure with a random effect for participants. We then performed separate binomial models predicting children's comparative evaluations of two characters as a function of question type, age, and their interaction with a random effect for participants. Preliminary analyses revealed no gender or order effects ($ps > .761$). Additionally, point-biserial correlations between children's responses for each question type and their household income revealed no significant relations (in charge: $r = .13$, $p = .567$; house: $r = .15$, $p = .209$). Data, scripts, and preregistration documents can be found on OSF (https://osf.io/nx5up/?view_only=c5c284ebafe14e72b192946bd953c6d9).

Main analyses

First, we examined whether children's comparative evaluations of the two characters favored any character for each question type. Our model showed that children chose intellectual laborers as being in charge ($B = 2.75$, $SE = .72$, 95% CI [1.34, 4.16], OR = 15.62, $p < .001$). Children also thought that intellectual laborers were significantly more likely to live in really big fancy houses ($B = .56$, $SE = .21$, 95% CI [.15, .97], OR = 1.75, $p = .007$).

We then tested whether children's comparative evaluations of the two characters varied by participant age, question type, and their interaction. Our final model revealed a main effect of age ($B = .47$, $SE = .14$, 95% CI [.19, .74], OR = 1.60, $p = .001$). With age, children were significantly more likely to choose intellectual laborers as having high social hierarchy. We also found a significant main effect of question type ($B = 2.18$, $SE = .64$, 95% CI [.92, 3.44], OR = 8.85, $p = .001$), indicating that children were more likely to choose intellectual laborers for the "in charge" question compared to the "big, fancy house" question. The interaction between age and question type was not significant ($p = .744$). See Figure 3 for participants' responses split by age group (6–8, 9–11) and question type (in-charge vs. house).

Discussion

This study examined whether and how children think about different occupations—in particular, whether 6- to 11-year-old children differentiate occupations characterized by physical vs. intellectual labor and how they evaluate people who hold such occupations. Analyses revealed that children think people who perform intellectual labor are smarter and positioned higher in

the social hierarchy and view those who perform physical labor as more hard-working. There were also age effects: with increasing age, children were more likely to associate being smart and higher in social rank with people whose occupations involve intellectual labor, and they were relatively less likely to associate being hard-working with people whose occupations involve physical labor (yet across all ages physical laborers were still viewed as more hard-working overall).

The present findings indicate that children can use abstract dimensions (e.g., whether a job involves idea creation or task execution) to make social evaluations of occupational roles. Previous research had shown that children are capable of reasoning about specific, familiar jobs (e.g., bus driver, scientist) and associating such jobs with people from different social backgrounds (e.g., Bigler et al., 2003; Lei et al., 2019; Liben et al., 2001; Miller et al., 2018). This study suggests that children not only know and reason about these specific and familiar jobs but also use occupational features deemed important by sociologists and economists when evaluating occupations.

It is important to note that in the current work, gender, race, and clothing type for physical and intellectual laborers were controlled. Meanwhile, both characters in the same scenario worked on the same product, and each action they performed on the product was designed to be functionally equivalent in terms of its contribution to the product. That is, while the physical laborer engaged in tangible, hands-on physical labor (e.g., mixing ingredients), the intellectual laborer engaged in cognitive or conceptual labor (e.g., coming up with which ingredients to use). This ensured that both roles were involved in the same process, differing only in the type of labor they performed. Furthermore, we did not use generic language or labels such as "big thinkers" or "great workers" to describe any character. The only difference concerned whether the character was described as performing concrete actions on the product or designing plans for the product—and our findings revealed that children used work process information to distinguish and evaluate the characters.

Children's associations of physical and intellectual laborers with different traits

Why might children associate intellectual laborers with intelligence but associate physical laborers with hard work? Children may view jobs characterized by intellectual labor positively and thus link positive traits (e.g., being smart) to people who hold those jobs—i.e., a "halo effect" might account for children's responses (Nisbett & Wilson, 1977). However, research suggests that children view being hard-working as a positive trait as well: Children as young as 6 years of age prefer those who work hard compared to those who are talented, think people who work hard should be rewarded, and believe those who work hard will be more successful in future (Noh et al., 2019; Yang et al., 2024; Zhao & Yang, 2022). The fact that children in the present study thought physical laborers were more likely to be hard-working (a positive trait) casts doubt on the idea that the full pattern of results observed in the present work can be explained via a "halo effect" (i.e., children did not pair all positive traits with the intellectual laborer). Children's reasoning went beyond simply assigning all desirable qualities to physical or intellectual laborers and our results suggest there are some other mechanisms driving children's responses.

What other possible mechanisms might explain why children link intellectual (vs. physical) labor with intelligence? One such mechanism may involve early cognitive biases. Research suggests that even young children treat mental attributes as more enduring, essential, and causally powerful than physical traits—a pattern sometimes described as intuitive mind-body dualism (Bloom, 2005; Chudek et al., 2018; Wellman & Gelman, 1992). These early-emerging beliefs may lead children to view intellectual labor—work of the mind—as more unique or irreplaceable than physical labor, thereby contributing to the stronger associations between intellectual labor and being smart.

Another potential mechanism guiding children's responses is learning from sociocultural input, including media (e.g., books, television) and everyday observations. For example, scientists are often featured in children's books and are also described as brilliant (Farland, 2006; Hewitt, 2002; Shevick, 2004). Stories told to children often show scientists solving problems quickly and easily, focusing more on their intellectual ability rather than the effort they put in (Hong & Lin-Siegler, 2012; Lin-Siegler et al., 2016). With numerous examples depicted this way in books and other media (e.g., television shows), children may develop a strong association between being smart and having a job characterized by intellectual labor. Furthermore, children may develop beliefs about hard work through more direct observation of people's behavior in real life. From an early age, children view time and energy spent on a task as indicators of effort (Muradoglu & Cimpian, 2020). When they see physical laborers engaging in visibly strenuous, time-intensive tasks—such as lifting, building, or cleaning—they may infer that these workers are especially hardworking. Thus, children's emerging associations may be shaped by a combination of cultural messages and observable features of different types of labor.

The findings from Study 1 also contribute to ongoing discussions about how children think about the relation between intelligence and effort. While being intelligent and hardworking are generally both viewed as positive traits, prior research suggests that they are sometimes perceived as inversely related—especially in domains where innate "brilliance" is culturally emphasized, such as STEM fields (Amemiya & Wang, 2018). Working hard therefore may be seen as a sign of lower ability or even low social rank (Yang & Dunham, 2022). However, our data do not provide clear evidence for this compensatory view. Children's judgments of intelligence and effort were not significantly correlated ($r = 0.06$, $p = .344$), suggesting that children's judgments of these traits were largely independent. We also found no order effects in children's responses—i.e., whether they were to make inferences about intelligence or hard work first—suggesting that judgments of one trait were not systematically derived from the other. Moreover, our age-related findings further complicate this picture. With age, children increasingly associated intellectual laborers with both intelligence and effort, indicating that they did not treat these traits as mutually exclusive. This age-related pattern aligns with research showing that as children grow older, they increasingly recognize that intelligence and effort can co-occur, rather than operate as opposing factors—findings that comport with other research showing that trait reasoning becomes more integrative and nuanced with age (Lockhart et al., 2009; Rholes & Ruble, 1984).

Children's associations of intellectual laborers with high social rank

We found that children as young as 6 years of age viewed intellectual laborers as higher in social rank; this tendency was especially

evident on the "in charge" measure (vs. the house measure). This finding expands on previous work showing children's associations of social rank with people from different social groups (i.e., gender, race; Mandalaywala et al., 2020; Olson et al., 2012; Shutts et al., 2016); our research reveals that children also think that individuals who hold different occupations have different positions on the social hierarchy. Children's strong association between intellectual laborers and high social rank aligns with adults' reasoning as well as real-world social standings of intellectual laborers and physical laborers (Bank, 2018; Powell & Snellman, 2004).

Although this study reveals that children think intellectual laborers are higher in social rank than physical laborers, questions remain for future research on mechanisms for the development of such early reasoning about social rank inequalities for different occupational roles. One potential mechanism is that children may infer social rank by observing statistical patterns in their daily environments regarding people with physical versus intellectual jobs. Although children do not work formally themselves, they may notice how schools, companies, and other institutions are structured through books, television, or observations of their parents. For example, many children are familiar with iPhones and other Apple products. They may recognize that only a few people—those who create or speak for new Apple products—receive media attention, wear formal attire, and are portrayed as wealthy and influential. In contrast, the larger group of factory workers who assemble these products remain largely unseen. Meanwhile, children in schools may notice that authority figures in their environment who can give commands to others typically hold intellectual occupations, such as teachers.

The pyramid structure of wealth distribution—where a few idea generators receive significant wealth and social recognition, while many workers receive less compensation and remain largely anonymous—may shape children's understanding of social hierarchies. Indeed, previous research has shown that by age 5, children begin to display a scarcity bias, valuing rare objects more than common ones (Echelbarger & Gelman, 2017; Ferera et al., 2020). Recent research also shows that both children and adults associate smaller group size with higher social rank, suggesting that children may intuitively link rarity with social hierarchy (Heck et al., 2022b). Children may observe that there are far fewer intellectual laborers than physical laborers in their society and use these numerical cues to form judgments about social value, concluding that the rarer "thinkers" have higher social rank.

Interestingly, we also found that children were more likely to associate intellectual laborers with being powerful than with being wealthy. This finding suggests that children already distinguish between different dimensions of social hierarchy and comports with other research findings: 5-year-old children start to infer power dynamics based on cues such as who set norms, who achieves their goals, and who gives orders to others (Gülgöz & Gelman, 2017), and infants use physical size to make inferences about dominance (Thomsen et al., 2011). In contrast, children's understanding of wealth develops gradually, moving from a focus on visible signs such as houses and clothing to more abstract concepts like money, income, and also opportunities from wealth—a person's ability to pay bills, be healthy, and send their children to college (Leahy, 1981; Mistry et al., 2017; Olson et al., 2012).

Children may perceive intellectual laborers as individuals who make decisions and guide others' actions, aligning them with authority or leadership, even if they do not always appear wealthier. The link between intellectual labor and power may be more intuitive for children than the link between intellectual labor and wealth: individuals who plan, strategize, and solve problems are often seen as the ones guiding others' work. It is worth noting that children's inferences align real-world occupational structures, where intellectual labor roles often involve influence and control within institutions—such as setting norms, overseeing projects, or delegating tasks—without necessarily guaranteeing high material wealth (Autor et al., 2003; Katz & Autor, 1999). Our findings may indicate that children possess an intuitive understanding that intellectual labor is more closely linked to power and leadership than to material wealth.

Potential mechanisms for age effects

We also found age effects such that children were more likely to associate intellectual laborers with being smarter and higher in social rank with age. Our findings could be related to social influences and children's personal experiences at school. Classroom environments often praise intellectual achievements—good grades, creativity, problem-solving—more than physical capabilities (Blazar & Kraft, 2017; Cohen, 2011). As children age and engage in more intellectual tasks, such as writing a well-crafted diary or telling a clever joke, they may receive praise for their creative efforts. Such personal experiences might make older children endorse the idea that people who perform intellectual labor are smart to a greater extent than younger children, and older children may also come to realize that the unobservable process of producing ideas actually requires a lot of hard work. Indeed, previous research on children's understanding of ownership shows that children from 5 to 6 years of age start to value unique ideas and products with people's creative thoughts and think ideas belong to people who produce them (Olson & Shaw, 2011; Yang et al., 2014). This tendency could be especially strong in Western cultures, where children gradually learn from school that generating original ideas is more important than simply reproducing others' work (Chao, 1994; Li, 2005; OECD, 2024; Shao et al., 2019). In such contexts, individuals whose occupations are characterized by generating ideas are highly respected and reap significant rewards, and children may gradually grasp this and think people who generate ideas are higher in social rank than those who produce things.

Additionally, children's storybooks and school materials also frequently depict scientists and inventors as individuals who persist through challenges and work hard to solve problems (Hong & Lin-Siegler, 2012; Lin-Siegler et al., 2016). As children mature, they may better comprehend these narratives and begin to view intellectual laborers as not only smart but also hardworking. As children age, they may become more attuned to cultural messages suggesting that success in certain intellectual fields—such as science, medicine, or law—requires both intelligence and sustained effort. These messages are often embedded in the way society discusses prestigious careers and the people who hold them, emphasizing not only brilliance but also perseverance (Leslie et al., 2015). Together, cultural messages about ability and effort may lead children to revise earlier assumptions that only physical labor involves effort, and instead adopt a more nuanced understanding that intellectual work also demands (less visible) cognitive effort. This developmental shift may help explain why the association between physical labor and effort becomes less pronounced with age.

Another potential mechanism for age effects is family input. Children's reasoning about different occupations could be strongly influenced by their parents' occupations, especially when they grow older and know more about their parents' occupations or their parents' thinking about occupations. Given that children in our samples were mostly from middle- and high-income families, it is likely that many of them have parents who hold intellectual jobs. Children typically hold their parents in high regard, and they may assume people who are similar to their parents (i.e., are also intellectual laborers) are smart, hard-working, and high in social rank. However, it is also possible that parents' beliefs about occupations influence children's reasoning to a greater extent than parents' occupations themselves. Sociological work (Irwin & Elley, 2013) has shown that parents who themselves hold occupations characterized by physical labor (e.g., bricklayers, drivers) often hope their children will have jobs characterized by intellectual labor (e.g., lawyers, professors). Parents explained that these professional jobs, which involve less physical labor, are better compensated and more desirable (Irwin & Elley, 2013). Although there is little work conducted on how parents directly talk to children about different occupations, it is possible parents talk to their children about the qualities of different jobs as well as the qualities of people who hold those jobs—and that these influences grow over time. Future work should investigate how parents' own occupations and parents' beliefs about different occupations shape children's inferences about different occupations.

Limitations

One limitation of our study is that all illustrated characters were White and gender-matched to participants. This design allowed us to isolate children's reasoning about the nature of work while minimizing potential influences of social categories such as race and gender. Although our analyses revealed no gender differences in children's judgments, our findings may primarily reflect children's evaluations of people who share their own gender. Future research should examine how gender and race jointly interact with occupational information in shaping children's social inferences.

Another limitation of our study is that we did not include a direct measure of prestige or perceived respect, which is conceptually distinct from power and wealth. While adults often associate prestige with intellectual occupations, it remains an open question how and when children form different or similar evaluations. Future work should develop age-appropriate ways to assess children's intuitions about the prestige of physical versus intellectual occupations, such as asking which workers others admire or want to be like.

Another limitation of the present work is that we depicted both characters within the same working context and thus may have implicitly cued a temporal sequence to their work. It is therefore possible that children's judgments were driven not by the intellectual-physical distinction per se, but rather by their inferences about those whose work came first vs. second (e.g., deciding on the frosting design for a cake necessarily precedes putting the frosting on the cake). We counterbalanced across trials whether the intellectual laborer's work or physical laborer's work was described first, but it is possible that children nevertheless inferred an order from the descriptions. It is also worth noting that the intellectual–physical laborer distinction has a temporal order to it in real-world settings—especially in production lines where ideas about what and how to make things come before the making of those things (Barley & Kunda, 2001; Zuboff, 1988). Nevertheless, future studies could place characters in separate settings or ask children to evaluate jobs individually (rather than in pairs) to more clearly isolate how children conceptualize different types of labor independent of temporal dynamics.

Implications and future directions

This study establishes a paradigm for testing children's thinking about different features and classes of occupations. In this paradigm, rather than presenting specific, familiar occupations to children (e.g., "scientist," Miller et al., 2018), we presented pairs of characters whose occupations varied systematically along one dimension (i.e., intellectual vs. physical labor), and asked children to make comparative evaluations of these two characters across multiple trials. Results indicated that children could understand the paradigm and that the approach captured their social judgments about people who hold different occupations.

One important direction for future research is to explore how children reason about more nuanced forms of physical and intellectual labor. Our study focused on a production-line structure where one person plans work and another person executes work. This design helped isolate children's reasoning about the type of labor while controlling for the domain of the occupation. However, many real-world occupations—such as sculpture, skilled trades, or fine arts—require both complex cognitive planning and skilled manual execution. These roles may challenge the typical division between "thinking" and "doing," and may be perceived as both intellectually and physically demanding. Future work could examine whether children recognize these blended forms of labor and how they evaluate roles that defy the simple physical–intellectual distinction.

Another key future direction will be to examine how children reason about other important occupational dimensions. One such feature is replaceability—how easily a job can be performed by machines, software, or other workers—which is closely tied to compensation in the adult workforce (Alabdulkareem et al., 2018; Zhang et al., 2024). Another important dimension is social impact, whether a job helps others or contributes to society. Prior research shows that even young children care about prosociality in evaluating people (e.g., Hamlin et al., 2007), and adolescents begin to value careers that "make a difference" (Hoff et al., 2022). Future research could investigate whether children factor in qualities such as replaceability and perceived societal benefit when evaluating different forms of labor. Such work would provide a more comprehensive understanding of how children make sense of the social and economic structure of work.

Additionally, future research should further investigate the mechanisms underlying children's inferences about intellectual and physical laborers. As noted above, children's inferences about the traits of those who occupy different occupational roles could be shaped by a range of social and cultural inputs, both from society at large as well as in children's own families. Future studies could also manipulate children's exposure to information about different occupations roles, and assess its impact on children's inferences. It would be useful to develop precise methods for classifying parental occupations and investigate their influence on children's occupational beliefs.

This study provides a first step in understanding how children perceive key distinctions between occupations, particularly physical and intellectual labor. The present results suggest that occupation-based social inferences emerge early but also change with

age. The present research, together with future research examining other occupational dimensions and social contexts, can offer deeper insights into the development of children's reasoning about social roles and social structures.

Data availability

All study materials, data, scripts, and pre-registration information have been made publicly available via the Open Science Framework (OSF) and can be accessed at https://osf.io/nx5up/?view_only=c5c284ebafe14e72b192946bd953c6d9.

Author contributions

Yuhan Wang (Conceptualization [lead], Data curation [supporting], Formal analysis [lead], Investigation [lead], Methodology [lead], Visualization [lead], Writing—original draft [lead], Writing—review & editing [lead]), and Kristin Shutts (Conceptualization [lead], Funding acquisition [lead], Investigation [lead], Methodology [lead], Writing—review & editing [supporting])

Funding

This research was supported by the National Institutes of Health grant NIH R01HD106970 to Kristin Shutts.

Conflicts of interest

None declared.

Acknowledgments

The authors thank Swetha Ganesh and Sofia Zelazoski for their assistance on data collection. We also thank Patricia Devine, Ashley Jordan, Pearl Han Li, Olivia Adelabu and people in the Social Kids Lab (Eren Fukuda, Kat Swerbenski, Natalie Sarmiento, Olivia Fry and Sofia Romero) for providing feedback on this project. This research was supported by National Institutes of Health grant NIH R01HD106970 to Kristin Shutts.

References

Afshordi, N., & Liberman, Z. (2021). Keeping friends in mind: Development of friendship concepts in early childhood. *Social Development*, **30**, 331–342. https://doi.org/10.1111/sode.12493

Ahl, R. E., Duong, S., & Dunham, Y. (2019). Children employ wealth cues when predicting others' sharing. *Developmental Psychology*, **55**, 303–314. https://doi.org/10.1037/dev0000643

Alabdulkareem, A., Frank, M. R., Sun, L., AlShebli, B., Hidalgo, C., & Rahwan, I. (2018). Unpacking the polarization of workplace skills. *Science Advances*, **4**, eaao6030. https://doi.org/10.1126/sciadv.aao6030

Alonso-Villar, O., Del Rio, C., & Gradin, C. (2012). The extent of occupational segregation in the United States: Differences by race, ethnicity, and gender. *Industrial Relations: A Journal of Economy and Society*, **51**, 179–212. https://doi.org/10.1111/j.1468-232X.2012.00674.x

Amemiya, J., & Wang, M.-T. (2018). Why effort praise can backfire in adolescence. *Child Development Perspectives*, **12**, 199–203. https://doi.org/10.1111/cdep.12284

Auger, R. W., Blackhurst, A. E., & Wahl, K. H. (2005). The development of elementary-aged children's career aspirations and expectations. *Professional School Counseling*, **8**, 322–329.

Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of Economic Perspectives*, **29**, 3–30. https://doi.org/10.1257/jep.29.3.3

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**, 1279–1333. https://doi.org/10.1162/003355303322552801

Bank, W. (2018). *World development report 2019: The changing nature of work*. The World Bank.

Barley, S. R., & Kunda, G. (2001). Bringing work back in. *Organization Science*, **12**, 76–95. https://doi.org/10.1287/orsc.12.1.76.10122

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, **67**, 1–48. https://doi.org/10.18637/jss.v067.i01

Bian, L., Leslie, S.-J., & Cimpian, A. (2017). Gender stereotypes about intellectual ability emerge early and influence children's interests. *Science*, **355**, 389. https://doi.org/10.1126/science.aah6524

Bigler, R. S., Averhart, C. J., & Liben, L. S. (2003). Race and the workforce: Occupational status, aspirations, and stereotyping among African American children. *Developmental Psychology*, **39**, 572–580. https://doi.org/10.1037/0012-1649.39.3.572

Blazar, D., & Kraft, M. A. (2017). Teacher and teaching effects on students' attitudes and behaviors. *Educational Evaluation and Policy Analysis*, **39**, 146–170. https://doi.org/10.3102/0162373716670260

Bloom, P. (2005). *Descartes' baby: How the science of child development explains what makes us human*. Random House.

Brown, C. M., Troy, N. S., Jobson, K. R., & Link, J. K. (2018). Contextual and personal determinants of preferring success attributed to natural talent or striving. *Journal of Experimental Social Psychology*, **78**, 134–147. https://doi.org/10.1016/j.jesp.2018.03.017

Celniker, J. B., Gregory, A., Koo, H. J., Piff, P. K., Ditto, P. H., & Shariff, A. F. (2023). The moralization of effort. *Journal of Experimental Psychology: General*, **152**, 60–79. https://doi.org/10.1037/xge0001259

Center for American Progress. (2022 March 29). *Occupational segregation in America*. https://www.americanprogress.org/article/occupationalsegregation-in-america/. Retrieved February 16, 2025.

Chao, R. K. (1994). Beyond parental control and authoritarian parenting style: Understanding Chinese parenting through the cultural notion of training. *Child Development*, **65**, 1111–1119. https://doi.org/10.1111/j.1467-8624.1994.tb00806.x

Chhin, C. S., Bleeker, M. M., & Jacobs, J. E. (2008). Gender-typed occupational choices: The long-term impact of parents' beliefs and expectations. In *Gender and occupational outcomes: Longitudinal assessments of individual, social, and cultural influences* (pp. 215–234). American Psychological Association. https://doi.org/10.1037/11706-008

Chudek, M., McNamara, R. A., Birch, S., Bloom, P., & Henrich, J. (2018). Do minds switch bodies? Dualist interpretations across ages and societies. *Religion, Brain & Behavior*, **8**, 354–368. https://doi.org/10.1080/2153599X.2017.1377757

Cinamon, R. G., & Yeshayahu, M. (2021). Children's occupational knowledge: A conceptual framework and measure.

International Journal for Educational and Vocational Guidance, **21**, 15–31. https://doi.org/10.1007/s10775-020-09425-4

Cohen, D. K. (2011). *Teaching and its predicaments*. Harvard University Press.

Echelbarger, M., & Gelman, S. A. (2017). The value of variety and scarcity across development. *Journal of Experimental Child Psychology*, **156**, 43–61. https://doi.org/10.1016/j.jecp.2016.11.010

Enright, E. A., Alonso, D. J., Lee, B. M., & Olson, K. R. (2020). Children's understanding and use of four dimensions of social status. *Journal of Cognition and Development*, **21**, 573–602. https://doi.org/10.1080/15248372.2020.1797745

Farland, D. (2006). The effect of historical, nonfiction trade books on elementary students' perceptions of scientists. *Journal of Elementary Science Education*, **18**, 31–47. https://doi.org/10.1007/BF03174686

Feldhusen, J. F. (1998). A conception of talent and talent development. In *Talent in context: Historical and social perspectives on giftedness* (pp. 193–209). American Psychological Association. https://doi.org/10.1037/10297-010

Ferera, M., Benozio, A., & Diesendruck, G. (2020). The development of a scarcity bias. *Child Development*, **91**, 1698–1708. https://doi.org/10.1111/cdev.13368

Fiske, S. T., Cuddy, A. J., & Glick, P. (2007). Universal dimensions of social cognition: Warmth and competence. *Trends in Cognitive Sciences*, **11**, 77–83. https://doi.org/10.1016/j.tics.2006.11.005

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. https://doi.org/10.1016/j.techfore.2016.08.019

Gelman, S. A., Collman, P., & Maccoby, E. E. (1986). Inferring properties from categories versus inferring categories from properties: The case of gender. *Child Development*, **57**, 396–404. https://doi.org/10.2307/1130595

Good, K., & Shaw, A. (2022). Being versus appearing smart: Children's developing intuitions about how reputational motives guide behavior. *Child Development*, **93**, 418–436. https://doi.org/10.1111/cdev.13711

Gülgöz, S., & Gelman, S. A. (2017). Who's the boss? Concepts of social power across development. *Child Development*, **88**, 946–963. https://doi.org/10.1111/cdev.12643

Hamlin, J. K., Wynn, K., & Bloom, P. (2007). Social evaluation by preverbal infants. *Nature*, **450**, 557–559. https://doi.org/10.1038/nature06288

Hayes, A. R., Bigler, R. S., & Weisgram, E. S. (2018). Of men and money: Characteristics of occupations that affect the gender differentiation of Children's occupational interests. *Sex roles*, **78**, 775–788. https://doi.org/10.1007/s11199-017-0846-8

Heck, I. A., Bas, J., & Kinzler, K. D. (2022b). Small groups lead, big groups control: Perceptions of numerical group size, power, and status across development. *Child Development*, **93**, 194–208. https://doi.org/10.1111/cdev.13670

Heck, I. A., Shutts, K., & Kinzler, K. D. (2022a). Children's thinking about group-based social hierarchies. *Trends in Cognitive Sciences*, **26**, 593–606. https://doi.org/10.1016/j.tics.2022.04.004

Hewitt, P. G. (2002). *Conceptual physics*. Pearson Educación.

Hoff, K., Van Egdom, D., Napolitano, C., Hanna, A., & Rounds, J. (2022). Dream jobs and employment realities: How adolescents' career aspirations compare to labor demands and automation risks. *Journal of Career Assessment*, **30**, 134–156. https://doi.org/10.1177/10690727211026183

Hong, H.-Y., & Lin-Siegler, X. (2012). How learning about scientists' struggles influences students' interest and learning in physics. *Journal of Educational Psychology*, **104**, 469–484. https://doi.org/10.1037/a0026224

Hung-Chang, L., & Mei-Ju, C. (2014). Behind the mask: The differences and stability of Children's career expectations. *Procedia—Social and Behavioral Sciences*, **116**, 2832–2840. https://doi.org/10.1016/j.sbspro.2014.01.665

International Labour Organization. 2012. *International Standard Classification of Occupations (ISCO-08): Definitions of job and occupation*. https://ilostat.ilo.org/methods/concepts-and-definitions/classification-occupation/. Retrieved February 16, 2025.

Irwin, S., & Elley, S. (2013). Parents' hopes and expectations for their Children's future occupations. *The Sociological Review*, **61**, 111–130. https://doi.org/10.1111/j.1467-954X.2012.02139.x

Jardina, A., Blair, P. Q., Heck, J., & Debroy, P. (2023, August). *The limits of educational attainment in mitigating occupational segregation between Black and White workers (NBER Working Paper No. 31641)*. National Bureau of Economic Research. https://www.nber.org/papers/w31641. Retrieved February 16, 2025.

Kalish, C. W. (2012). Generalizing norms and preferences within social categories and individuals. *Developmental Psychology*, **48**, 1133–1143. https://doi.org/10.1037/a0026344

Kalish, C. W., & Lawson, C. A. (2008). Development of social category representations: Early appreciation of roles and deontic relations. *Child Development*, **79**, 577–593. https://doi.org/10.1111/j.1467-8624.2008.01144.x

Katz, L. F., & Autor, D. H. (1999). Chapter 26—changes in the wage structure and earnings inequality. In O. C. Ashenfelter, & D. Card (Eds.), *Handbook of labor economics* (Vol. **3**, pp. 1463–1555). Elsevier. https://doi.org/10.1016/S1573-4463(99)03007-2

Keil, F. C., Stein, C., Webb, L., Billings, V. D., & Rozenblit, L. (2008). Discerning the division of cognitive labor: An emerging understanding of how knowledge is clustered in other minds. *Cognitive Science*, **32**, 259–300. https://doi.org/10.1080/03640210701863339

Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social class, solipsism, and contextualism: How the rich are different from the poor. *Psychological review*, **119**, 546–572. https://doi.org/10.1037/a0028756

Kushnir, T., Vredenburgh, C., & Schneider, L. A. (2013). Who can help me fix this toy?" the distinction between causal knowledge and word knowledge guides preschoolers' selective requests for information. *Developmental Psychology*, **49**, 446–453. https://doi.org/10.1037/a0031649

Leahy, R. L. (1981). The development of the conception of economic inequality. I. Descriptions and comparisons of rich and poor people. *Child Development*, **52**, 523–532. https://doi.org/10.2307/1129170

Lei, R. F., Green, E. R., Leslie, S.-J., & Rhodes, M. (2019). Children lose confidence in their potential to "be scientists," but not in their capacity to "do science". *Developmental Science*, **22**, e12837. https://doi.org/10.1111/desc.12837

Leslie, S.-J., Cimpian, A., Meyer, M., & Freeland, E. (2015). Expectations of brilliance underlie gender distributions across academic disciplines. *Science*, **347**, 262–265. https://doi.org/10.1126/science.1261375

Li, J. (2005). Mind or virtue: Western and Chinese beliefs about learning. *Current Directions in Psychological Science*, **14**, 190–194. https://doi.org/10.1111/j.0963-7214.2005.00362.x

Liben, L. S., Bigler, R. S., & Krogh, H. R. (2001). Pink and blue collar jobs: Children's judgments of job Status and job aspirations in relation to sex of worker. *Journal of Experimental Child Psychology*, **79**, 346–363. https://doi.org/10.1006/jecp.2000.2611

Lin-Siegler, X., Ahn, J. N., Chen, J., Fang, F.-F. A., & Luna-Lucero, M. (2016). Even Einstein struggled: Effects of learning about great scientists' struggles on high school students' motivation to learn science. *Journal of Educational Psychology*, **108**, 314–328. https://doi.org/10.1037/edu0000092

Lockhart, K. L., Nakashima, N., Inagaki, K., & Keil, F. C. (2009). From ugly duckling to swan? Japanese and American beliefs about the stability and origins of traits. *Cognitive Development*, **23**, 155–179. https://doi.org/10.1016/j.cogdev.2007.08.001

Lutz, D. J., & Keil, F. C. (2002). Early understanding of the division of cognitive labor. *Child Development*, **73**, 1073–1084. https://doi.org/10.1111/1467-8624.00458

Ma, S., Tsay, C.-J., & Chen, E. E. (2023). Preference for talented naturals over hard workers emerges in childhood and shapes behavior. *Child Development*, **94**, 674–690. https://doi.org/10.1111/cdev.13886

Mandalaywala, T. M., Tai, C., & Rhodes, M. (2020). Children's use of race and gender as cues to social status. *PLoS One*, **15**, e0234398. https://doi.org/10.1371/journal.pone.0234398

Miller, D. I., Nolla, K. M., Eagly, A. H., & Uttal, D. H. (2018). The development of Children's Gender-science stereotypes: A meta-analysis of 5 decades of U.S. *Draw-A-Scientist Studies. Child Development*, **89**, 1943–1955. https://doi.org/10.1111/cdev.13039

Mistry, R. S., Nenadal, L., Hazelbaker, T., Griffin, K. M., & White, E. S. (2017). Promoting elementary school-age Children's understanding of wealth, poverty, and civic engagement. *PS: Political Science & Politics*, **50**, 1068–1073. https://doi.org/10.1017/S1049096517001329

Muradoglu, M., & Cimpian, A. (2020). Children's intuitive theories of academic performance. *Child Development*, **91**, e902–e918. https://doi.org/10.1111/cdev.13325

Nancekivell, S. E., Farrow, T., & Maurer, B. A. (2023). Who is a thinker? With age, higher SES American children increasingly associate social status with divisions in labour. *Infant and Child Development*, **32**, e2379. https://doi.org/10.1002/icd.2379

Nisbett, R. E., & Wilson, T. D. (1977). The halo effect: Evidence for unconscious alteration of judgments. *Journal of Personality and Social Psychology*, **35**, 250–256. https://doi.org/10.1037/0022-3514.35.4.250

Noh, J. Y., D'Esterre, A., & Killen, M. (2019). Effort or outcome? Children's meritorious decisions. *Journal of Experimental Child Psychology*, **178**, 1–14. https://doi.org/10.1016/j.jecp.2018.09.005

Noyes, A., Keil, F. C., & Dunham, Y. (2020). Institutional actors: Children's emerging beliefs about the causal structure of social roles. *Developmental Psychology*, **56**, 70–80. https://doi.org/10.1037/dev0000847

OECD. (2023). *Beyond applause? Improving working conditions in long-term care*. OECD Publishing.

OECD. (2024). *PISA 2022 Results (Volume III)*. OECD Publishing. https://doi.org/10.1787/765ee8c2-en

Oldmeadow, J., & Fiske, S. T. (2007). System-justifying ideologies moderate status = competence stereotypes: Roles for belief in a just world and social dominance orientation. *European Journal of Social Psychology*, **37**, 1135–1148. https://doi.org/10.1002/ejsp.428

Oliveira, ÍM, Porfeli, E. J., do Céu Taveira, M., & Lee, B. (2020). Children's career expectations and parents' jobs: Intergenerational (dis)continuities. *The Career Development Quarterly*, **68**, 63–77. https://doi.org/10.1002/cdq.12213

Olsen, M., Parks-Stamm, E. J., Thorsteinsen, K., & Martiny, S. E. (2023). Salary and power: How occupational status affects children's occupational aspirations. *Journal of Experimental Child Psychology*, **232**, 105667. https://doi.org/10.1016/j.jecp.2023.105667

Olson, K. R., & Shaw, A. (2011). No fair, copycat!': What children's response to plagiarism tells US about their understanding of ideas. *Developmental Science*, **14**, 431–439. https://doi.org/10.1111/j.1467-7687.2010.00993.x

Olson, K. R., Shutts, K., Kinzler, K. D., & Weisman, K. G. (2012). Children associate racial groups with wealth: Evidence from South Africa. *Child Development*, **83**, 1884–1899. https://doi.org/10.1111/j.1467-8624.2012.01819.x

Powell, W. W., & Snellman, K. (2004). The knowledge economy. *Annual Review of Sociology*, **30**, 199–220. https://doi.org/10.1146/annurev.soc.29.010202.100037

Rholes, W. S., & Ruble, D. N. (1984). Children's understanding of dispositional characteristics of others. *Child Development*, **55**, 550–560. https://doi.org/10.2307/1129966

Ridgeway, C. L. (2014). Why Status matters for inequality. *American Sociological Review*, **79**, 1–16. https://doi.org/10.1177/0003122413515997

Rizzo, M. T., Elenbaas, L., Cooley, S., & Killen, M. (2016). Children's recognition of fairness and others' welfare in a resource allocation task: Age related changes. *Developmental Psychology*, **52**, 1307–1317. https://doi.org/10.1037/dev0000134

Santhanagopalan, R., Heck, I. A., & Kinzler, K. D. (2022). Leadership, gender, and colorism: Children in India use social category information to guide leadership cognition. *Developmental Science*, **25**, e13212. https://doi.org/10.1111/desc.13212

Scott, K., & Schulz, L. (2017). Lookit (part 1): A new online platform for developmental research. *Open Mind*, **1**, 4–14. https://doi.org/10.1162/OPMI_a_00002

Shao, Y., Zhang, C., Zhou, J., Gu, T., & Yuan, Y. (2019). How does culture shape creativity? A mini-review. *Frontiers in Psychology*, **10**, 1219. https://doi.org/10.3389/fpsyg.2019.01219

Shevick, E. (2004). *Great scientists in action: Early life, discoveries and experiments*. Lorenz Educational Press.

Shutts, K., Brey, E. L., Dornbusch, L. A., Slywotzky, N., & Olson, K. R. (2016). Children use wealth cues to evaluate others. *PLoS One*, **11**, e0149360. https://doi.org/10.1371/journal.pone.0149360

Shutts, K., & Kalish, C. W. (2021). Chapter eleven—intuitive sociology. In J. J. Lockman (Ed.), *Advances in child development and behavior* (Vol. **61**, pp. 335–374). JAI. https://doi.org/10.1016/bs.acdb.2021.05.004

Sobel, D. M., & Corriveau, K. H. (2010). Children monitor individuals' expertise for word learning. *Child Development*, **81**, 669–679. https://doi.org/10.1111/j.1467-8624.2009.01422.x

Taghon, M., Maire, H., & Pignault, A. (2024). Exploring Children's representations of work: A review investigating content and influences. *New Ideas in Psychology*, **74**, 101082. https://doi.org/10.1016/j.newideapsych.2024.101082

Teig, S., & Susskind, J. E. (2008). Truck driver or nurse? The impact of gender roles and occupational Status on Children's occupational preferences. *Sex roles*, **58**, 848–863. https://doi.org/10.1007/s11199-008-9410-x

Thomsen, L., Frankenhuis, W. E., Ingold-Smith, M., & Carey, S. (2011). Big and mighty: Preverbal infants mentally represent social dominance. *Science*, **331**, 477–480. https://doi.org/10.1126/science.1199198

Tomasello, M. (2020). The role of roles in uniquely human cognition and sociality. *Journal for the Theory of Social Behaviour*, **50**, 2–19. https://doi.org/10.1111/jtsb.12223

Tsay, C.-J. (2016). Privileging naturals over strivers:The costs of the naturalness bias. *Personality & Social Psychology Bulletin*, **42**, 40–53. https://doi.org/10.1177/0146167215611638

Van Reenen, J. (2011). Wage inequality, technology and trade: 21st century evidence. *Labour Economics*, **18**, 730–741. https://doi.org/10.1016/j.labeco.2011.05.006

Vivaldi, R. A., & Rose, S. E. (2024). A cross-cultural study of children's graphic representations of men- and women-dominated occupations. *The British Journal of Developmental Psychology*, **42**, 461–477. https://doi.org/10.1111/bjdp.12507

Wellman, H. M., & Gelman, S. A. (1992). Cognitive development: Foundational theories of core domains. *Annual Review of Psychology*, **43**, 337–375. https://doi.org/10.1146/annurev.ps.43.020192.002005

Yang, F., Shaw, A., Garduno, E., & R. Olson, K. (2014). No one likes a copycat: A cross-cultural investigation of children's response to plagiarism. *Journal of Experimental Child Psychology*, **121**, 111–119. https://doi.org/10.1016/j.jecp.2013.11.008

Yang, X., & Dunham, Y. (2022). Emerging complexity in children's conceptualization of the wealthy and the poor. *Developmental Science*, **25**, 1–14. https://doi.org/10.1111/desc.13225

Yang, X., Zhao, X., Dunham, Y., & Bian, L. (2024). The development and predictors of a preference for strivers over naturals in the United States and China. *Child Development*, **95**, 593–608. https://doi.org/10.1111/cdev.14012

Zhang, W., Lai, K.-H., & Gong, Q. (2024). The future of the labor force: Higher cognition and more skills. *Humanities & Social Sciences Communications*, **11**, 479. https://doi.org/10.1057/s41599-024-02962-1

Zhao, X., & Kushnir, T. (2023). When it's not easy to do the right thing: Developmental changes in understanding cost drive evaluations of moral praiseworthiness. *Developmental Science*, **26**, e13257. https://doi.org/10.1111/desc.13257

Zhao, X., & Yang, X. (2022). She succeeded despite lack of ability or resources: Children's consideration of constraint in beliefs and reasoning about academic achievement. *Developmental Psychology*, **59**, 594–608. https://doi.org/10.1037/dev0001465

Zuboff, S. (1988). *In the age of the smart machine: The future of work and power*. Basic Books.