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Employed VR Applicants with Visual Disabilities: Factors associated with Timely
Service Delivery

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Abstract

Introduction: Employed applicants for vocational rehabilitation (VR) services need timely services to improve the likelihood of their successful job retention or career advancement. Little research exists examining timeliness of services among employed applicants, particularly for applicants with visual disabilities. This study investigated time from VR application to a signed Individual Plan for Employment (IPE) for employed applicants with visual disabilities.

Method: The sample of 5,096 competitively employed VR applicants from the FY2015 RSA-911 report was combined with survey responses from 51 VR agencies about services to persons with visual disabilities. Multilevel modeling was used to examine effects of state-level and individual-level characteristics and cross-level interactions on the length of waiting time from VR application to signed IPE.

Results: The time from application to IPE was shorter for employed applicants with visual disabilities from separate VR agencies than the time for applicants from combined VR agencies. Employed VR applicants with visual disabilities waited longer if they were younger, non-White, or received disability benefits. Official job retention policies in state VR agencies appeared to reduce the delay of IPE implementation for persons with secondary disabilities, for applicants who received disability benefits, and for persons working more hours per week.

Discussion: Additional research to determine how VR can provide services to employed persons as soon as possible after application is indicated, particularly for persons applying to combined VR agencies.

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Implications for Practitioners: VR providers should explore ways that they can expedite service delivery, particularly to persons who are younger, non-White, or receiving disability benefits. Implementing official VR policies for addressing job retention and advancement cases may be one avenue to expedite services to some employed applicants.

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The public (State/Federal) vocational rehabilitation (VR) system assists individuals with disabilities in maximizing their independence, including providing services to help them secure, maintain, and advance in employment. The chronic under- and unemployment of people with disabilities, including people with visual disabilities, is evident in federal labor market data. For example, according to the 2018 Current Population Survey, the unemployment rate of individuals aged 16 to 64 who had visual disabilities was 7.3%, almost twice that of people without disabilities (3.8%) (National Research and Training Center on Blindness and Low Vision, 2019). Employed persons with vision loss tend to have incomes below their sighted peers (Erickson, Lee, & Schrader, 2017). Thus, there is a considerable need for VR services that assist people with disabilities, particularly persons with vision loss, in not just finding, but also maintaining and advancing in employment.

The Workforce Innovation and Opportunity Act (WIOA), passed in 2014 and implemented in 2016, addressed both job retention and career advancement. Timely VR service delivery is regarded as an important factor in successful job retention and career advancement for persons with vision loss (Crudden, 2002; Sikka & Stephens, 1997) and other disabilities (Koch, Rumrill, Conyers, & Wohlford, 2013; Rumrill, Schuyler, & Longden, 1997). Consequently, this investigation concerns how various individual and state agency characteristics influence timeliness of VR service delivery for employed applicants.

VR agencies are required to determine eligibility for service delivery within 60 days of application (34 CFR §361.41) and then have another 90 days to develop an Individualized Plan for Employment (IPE) (Section 102(b)(3)(F)). In a survey of VR consumers (Ipsen & Goe,

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2016), almost half of the respondents reported that the VR process was too slow. Perceived or actual delays in VR services, either at application or in service delivery, may result in consumers feeling less engaged in the process and exiting the system before their cases can be successfully closed (Rigles, Ipsen, Arnold, & Seekins, 2011; Ipsen & Goe, 2016). In a study of SSDI recipients applying for VR services, Honeycutt and Stapleton (2013) found wide variations in wait times from application to IPE across states. Some VR agencies recognize the importance of timely service delivery in promoting job retention for employees with vision loss by implementing formal or informal policies to expedite service delivery to employed applicants (Crudden & Steverson, 2018). However, it is not known if or how these policies affect time from application to service delivery.

WIOA established job retention services as a priority for VR agencies and reiterated that VR services should facilitate job advancement and promote economic self-sufficiency (U.S. Department of Education, 2014). Job retention services are designed to assist VR consumers and employers in developing strategies and accommodations to help employees with disabilities retain employment and minimize lost wages. Job retention services also reduce the financial and time costs of developing and implementing a job search strategy. Effective job retention services have the potential to benefit consumers, employers, and the VR agencies by reducing job loss and turnover.

WIOA amendments also state that VR services may assist eligible, employed consumers in advancing in employment if that employment is in an integrated setting and provides employees with disabilities opportunities for job advancement equal to their nondisabled peers (U.S. Department of Education, 2014). Career advancement services may include assisting employees with disabilities in earning certifications, skills, or other postsecondary credentials to

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attain positions that provide more stable and professional employment. This is consistent with the mandate established by the Rehabilitation Act of 1973, which states that the purpose of the VR program is to “empower individuals with disabilities to maximize employment, economic self-sufficiency, independence, and integration into society” (Rehabilitation Act of 1973, Sec.2(b)). The Rehabilitation Services Administration (RSA, 2014) noted that WIOA emphasized career advancement by facilitating graduate education for “high demand jobs and careers,” particularly those jobs in the science, technology, engineering, and mathematics fields.

Although persons with disabilities tend to seek services from VR after losing employment (Allaire, Niu, & LaValley, 2005), consumers with vision loss are significantly more likely to apply for VR services while already employed (McDonnall, 2017). In a recent analysis of RSA data (Crudden, Giesen, & Sui, 2018), nearly a third of VR consumers with vision loss were employed at the time of application, making them potential candidates for job retention or career advancement services. However, many employers know relatively little about accommodating employees with vision loss (McDonnall, O’Mally, & Crudden, 2014) and thus may need VR assistance to support them in this process. VR services may facilitate job retention or advancement by allowing consumers, VR counselors, and employers to develop collaborative strategies that assist consumers in performing the core functions of their jobs or to advance in their careers.

Purpose and Research Questions

Despite the apparent importance of timely service delivery in job retention, little research has examined the VR consumer and agency characteristics that affect time from application to service delivery for employed applicants. Understanding if and what groups may be more at-risk for delayed progression through the VR system, particularly in cases of job retention and

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advancement, may help agencies develop strategies to promote timely service delivery to at-risk groups. Thus, we combined Rehabilitation Service Administration Case Service Report (RSA-911) data and state-level policy and practices data to investigate the factors that affect the length of time from application to the signing of an IPE. The authors' Institutional Review Board for the Protection of Human Subjects approved this research. Our research questions are as follows:

1. What state- and individual-level factors affect time from application to IPE among employed VR consumers with visual disabilities?
2. How do state- and individual-level factors interact with each other to affect time from application to IPE among employed VR consumers with visual disabilities?

Method

Data Sources

VR agency survey. Prior to this study, a survey of 51 state VR agencies serving persons with vision loss was conducted (Crudden & Steverson, 2018). The survey included separate agencies (agencies serving only persons with vision loss) and combined agencies (agencies serving persons with all disabilities). For combined agencies, responses were limited to services to persons with vision loss. The survey included a series of items concerning policy and service delivery issues associated with job retention (18 items) and advancement (7 items). Data collection commenced in October 2016 and concluded in June 2017. (More detailed information about survey construction, delivery, and results are available; see Crudden & Steverson, 2018.) The following information was derived from the survey: (a) if the agency was separate (i.e., serving only persons with vision loss) or combined (i.e., serving persons with all disabilities); (b) if the agency had an official policy regarding serving employed applicants seeking VR services;

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and (c) if the agency made an effort to expedite services for employed applicants. These variables were used in level 2 of the multilevel model (described below).

VR consumer data. The remainder of the variables came from the Rehabilitation Services Administration Case Service Report (RSA-911) dataset for Fiscal Year 2015. To be included in the present analyses, applicants had to meet the following criteria: (a) primary disability of blind or visually impaired, (b) between 18 and 75 years of age, and (c) competitively employed. Competitive employment was defined as jobs paying at or above the federal minimum wage of \$7.25 per hour, in accordance with RSA (2013) guidelines. Additionally, in order to integrate the RSA-911 data with the agency survey described above, analyses were restricted to applicants from separate and combined VR agencies in the United States and the District of Columbia, excluding U. S. territories. Finally, because the outcome of interest was the length of time from application to signed IPE, we excluded persons who exited the VR system as an applicant, who exited during or after a trial work experience/extended eligibility evaluation, and who exited after eligibility determination but before signing an IPE. The final sample consisted of 5,096 competitively employed VR applicants with complete data on all variables of interest.

Variables

Dependent variable. The dependent variable—the length of time from application to signed IPE—was calculated as days from the date of application to the date of IPE for each consumer. Both dates were available in the RSA-911 dataset. Date of application records the date the agency received a completed and signed application from the applicant; date of IPE indicates the date that both the agency and individual reached an agreement on a vocational goal. VR agencies offer specific services to each consumer based on the IPE, which is a key milestone in

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the VR process. For an employed consumer, the length of time from application to a signed IPE reflects the length of time the consumer waited to receive individualized VR services.

Independent variables. Independent variables included two categories—12 individual-level (level-1) demographic, disability, and socioeconomic measures from the RSA-911 dataset and three state-level (level-2) policy-related measures from the agency survey. Individual-level demographic variables included age at application, gender (0 = male, 1 = female), minority race (0 = White, 1 = non-White), Hispanic or Latino ethnicity (0 = no, 1 = yes), and education at application (10 levels ranging from 0 = no formal schooling to 9 = Education above a Master’s degree or an occupational credential beyond graduate degree work). Individual-level disability related variables include severity of vision loss (0 = visual impairment, not legal blindness, 1 = legal blindness) and presence of a secondary disability (0 = no, 1 = yes). Individual-level socioeconomic variables are measured at VR application including earnings per week (continuous), hours worked per week (continuous), receipt of SSDI (0 = no, 1 = yes), receipt of SSI (0 = no, 1 = yes), and presence of previous case closure in VR (0 = no, 1 = yes).

Three state-level variables derived from the VR agency survey questions captured administrative policy-based characteristics of state VR agencies across the United States. Those items were: (1) “Are there any policies/procedures/official guidelines, etc. for vocational rehabilitation counselors regarding how to handle job retention cases specifically?” (0 = no, 1 = yes); (2) “Is there any attempt to expedite eligibility determination and proceed with service delivery more quickly for job retention cases than for other cases?” (0 = no, 1 = yes); and (3) “Is your agency a separate or combined agency?” (0 = combined VR agency, 1 = separate VR agency). Of the 51 state VR agencies, 24 were separate agencies serving only consumers with visual disabilities and 27 were combined agencies. Twenty-six agencies had

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policies/procedures/official guidelines regarding job retention (9 separate, 17 combined), 28 agencies reported efforts to expedite service delivery for consumers seeking job retention (14 separate, 14 combined). Additional state-level variables (unemployment rates, population density, and per capita income) were not included as they had no significant impact on time from application to IPE.

Statistical Analysis

VR agency survey data was combined with the RSA-911 dataset and descriptive statistics generated using SAS software Version 9.4. HLM software Version 7.03 was used for multilevel modeling using full maximum likelihood estimation. First, we calculated an unconditional two-level model. This allowed us to establish a baseline for subsequent models and to calculate the intra-class correlation (ICC). Next, we entered the three state-level variables—job-retention policy, unofficial expedited service, and agency structure. We then entered both state-level and individual-level predictors and interaction terms for each state-level predictor with each individual-level predictor. Finally, non-significant interaction terms unrelated to the research questions were removed from the final model. All continuous predictors in the model were used at their grand mean. There was no multicollinearity found among individual-level variables, state-level variables, and interaction terms.

Results

Sample Characteristics

The sample consisted of 2,583 men (50.7%) and 2,513 women (49.3%) with an average age of 48.8 years ($SD = 12.6$). The majority were White (74.2%), followed by African American (21.6%), Asian (2.0%), multiple races (1.0%), Native American (0.8%), and Hawaiian or Pacific Islanders (0.3%). Hispanics or Latinos of any race accounted for 10.9% of the sample. At

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application, 10.3% had less than a high school education, 50.6% had high school or some post-secondary education, 12.1% held associate degrees or vocational or technical certificates, and 27.1% held bachelor's degrees or above. Nearly half of the sample (46.7%) were legally blind. More than a third of the sample (36.8%) had a secondary disability. In terms of benefit support, 18.5% received only Social Security Disability Insurance (SSDI), 6.6% received only Supplemental Security Income, and 1.1% received both SSDI and SSI at application. Less than a quarter of the sample (22.4%) had a previous VR closure. Based on this sample, competitively employed applicants, on average, earned \$498.20 per week ($SD = 452.72$) and worked 31.5 hours per week ($SD = 11.6$).

Preliminary Models

The unconditional two-level model did not include any predictor variables. The only estimation in the model is the intercept, indicating that the estimated average length of time from application to signed IPE was 95 days with a standard error of 9.1 days across the 51 states. This coefficient differs significantly from zero, $t(50) = 10.57$, $p < 0.001$. The unconditional two-level model also estimated two variance components—the variability within states ($\sigma^2 = 11,675.05$) and the variability among states ($\tau_{00} = 3,861.88$) and yielded a significant amount of variability in length of time from application to signed IPE among states, $\chi^2(50) = 1158.68$, $p < 0.001$, $ICC = \tau_{00} / (\tau_{00} + \sigma^2) = 0.249$. This result indicated that 24.9% of the total variance in the length of time from a VR consumer submitting an application to a signed IPE was attributed to differences among states. This finding supported the application of a multilevel model with more robust significance tests.

Final Model

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Statistical results of the final model, including all state-level variables, individual-level variables, and significant cross-level interactions, are in Table 1. Multilevel modeling is essentially a regression technique and regression coefficients of fixed effects can be interpreted in the same way as multiple regression. Among three state-level factors, only agency structure had a direct influence on the length of time from application and signed IPE ($\gamma_{01} = -55.97, p < 0.001$). Concerning individual-level factors, older consumers ($\gamma_{20} = -0.57, p < 0.001$) tended to wait a shorter period from application to signed IPE; however, SSDI recipients ($\gamma_{40} = 18.21, p = 0.003$), SSI beneficiaries ($\gamma_{50} = 17.31, p = 0.047$), and consumers who were non-White ($\gamma_{70} = 8.78, p = 0.014$) tended to wait significantly longer from application to signed IPE.

In addition, individual and state cross-level interactions indirectly influenced the outcome. For example, working with an agency with an official job-retention policy decreased the length of time from application to signed IPE with respect to SSDI recipients ($\gamma_{41} = -23.41, p = 0.012$), people with a secondary disability ($\gamma_{91} = -12.86, p = 0.023$), and consumers who worked more hours at application ($\gamma_{121} = -0.61, p = 0.046$). Agencies that attempted to expedite services for employed applicants had longer wait times from application to IPE for persons with secondary disabilities compared to agencies that did not make specific efforts to expedite service delivery for employed applicants ($\gamma_{92} = 14.69, p = 0.014$).

Discussion

Data from the RSA-911 dataset and results from a previously conducted survey of VR state agencies serving persons with visual disabilities were used to examine how both state- and individual-level variables affect timeliness of service delivery for competitively employed applicants with visual disabilities. Employed applicants, on average, had a 95-day interval between application and signing an IPE. While this timeline is well within the established

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parameters for VR service delivery, it may still present an obstacle to employed applicants seeking speedy resolution to job retention or career advancement issues. There is significant variation among the state agencies in the length of time it takes employed applicants to get IPEs developed.

Additional analysis investigated potential sources of the variation among state agencies. Agency structure influenced the interval from application to IPE. Employed applicants with visual disabilities from separate VR agencies waited an average of 65.9 days, compared to 123 days for employed applicants at combined agencies. Potentially, exclusive focus on issues associated with vision loss allows separate agencies to assess eligibility and move forward resolving employment issues in a more timely way. The effectiveness of separate versus combined VR agencies arises periodically and results typically indicate that for VR consumers with vision loss, separate agencies tend to produce as good as or better outcomes than combined agencies, with VR consumers at separate agencies generally more likely to achieve competitive employment and earn higher wages (Cavanaugh 2010; Giesen & Cavanaugh, 2013; Giesen & Lang, 2018). Combined agencies may consider examining these timelines and investigating opportunities to reduce wait times for employed applicants with visual disabilities.

When examining individual-level characteristics, older applicants tended to wait shorter periods from application to IPE. When there is a 10-year increase in age, the time from application to IPE is reduced an average of 5.7 days; when an employed applicant is 20 years older, the time is reduced an average of 11.4 days. Older workers presumably have more work experience and may have well-defined employment goals, thus making it easier to generate an IPE and respond to their service requests in a more timely way. Younger workers, who may be employed in entry level, part-time, or temporary positions, may require more time to explore

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employment goals or plan career advancement activities, which would delay the implementation of the IPE.

Our model predicted that employed applicants who were non-White waited longer from application to IPE than White applicants. For the present sample White applicants, on average, waited 72.6 days from application to IPE compared to 78.5 days for other races. Some research (Dutta et al., 2008) has indicated that VR consumers with sensory impairments from minority groups fared less well in the VR system. Other researchers (Giesen, Cavanaugh, & Sansing, 2014) found that some minority populations access VR at a higher percentage rate than their percentage in the population of persons with visual disabilities, but attribute that overrepresentation to preexisting socioeconomic disadvantages. This analysis is the first to examine potential racial differences in length of time from application to IPE for employed applicants and suggests that additional research concerning potential racial disparities is warranted.

Individuals receiving SSDI or SSI benefits are typically presumed eligible for VR services unless there is evidence that their disabilities are so significant that they cannot reasonably benefit from the services (OSERS, 2017b). In this sample, SSDI and SSI recipients waited an average of 85.9 and 96.3 days, compared to non-recipients, who waited 71.2 and 72.2 days, respectively. Potentially, the delay is occurring between determination of eligibility and initiation of the IPE. SSDI and SSI recipients may need career counseling and exploration of employment goals that yield enough earnings to recoup potential loss of benefits. Persons receiving SSDI and SSI may need more detailed counseling and guidance to examine how increases in earned income could affect their benefits.

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In general, official job retention policies in state VR agencies did not appear to influence the time from application to IPE development. However, the official policies appeared to reduce the delay of IPE implementation for three subgroups: persons who received SSDI, persons with secondary disabilities, and persons working more hours per week. When state agencies had an official job retention policy, employed applicants receiving SSDI waited 83.5 days, or 5.1 days less from application to IPE, than SSDI recipients in states without an official policy. Official job retention policies also benefited employed applicants who had secondary disabilities as the time from application to IPE was reduced by 13.5 days. The number of hours worked per week also appeared to influence time from application to IPE development. In a state with job retention policies, for each hour a person worked the wait time for IPE was predicted to decrease by just over one-half day. For example, if two persons in a state had the same personal characteristics, one working 40 hours per week would wait 12 days less than a person working 20 hours per week. Differences of this magnitude are impressive and indicate official job retention policies may facilitate timely job retention or career advancement for these three subgroups. Reasons for why policies may influence these subgroups are unclear and further investigation of this issue is warranted.

Twenty-eight state agency respondents stated that VR staff attempted to expedite service delivery for employed applicants. In agencies that reported making this effort, employed applicants with secondary disabilities waited longer than employed applicants did in agencies that did not report attempting to expedite service delivery (81.6 vs. 59.6 days). Agency efforts to expedite service delivery may not be well known or be implemented uniformly across the agency. Agencies with informal policies should consider evaluating their timeframes for service

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delivery and consider potential benefits of implementing formal policies to expedite services for employed applicants.

It is very positive that employed applicants are, on average, moving from application to IPE development in a much shorter time period than the regulations allow. This is evidence that the VR agencies are aware of the importance of timely service delivery to employed applicants. However, state agency administrators may want to examine the emphasis the agency policies and procedures place on job retention and career advancement services. Giving attention to these important services may further decrease the average 95-day interval from application to actual service delivery.

Limitations

The data from the RSA 911 case services report documents information about VR consumers. This research was limited by the parameters of that dataset. Unfortunately, the dataset does not contain variables that permit distinguishing between employed applicants seeking job retention and those seeking career advancement services. Those two groups may have important differences that are not evident in this analysis. There may also be additional individual-level variables, such as age of onset of vision loss, that are not available that could influence these results. Additional state-level variables, such as counselor caseload sizes or complexity, are also not available and could influence results. This analysis was based on a relatively large sample, which may lead to high power and thus find small effects as statistically significant.

Data from the state agencies concerning their job retention policies was derived from dichotomous responses in a telephone survey. Information about the specifics of those policies is not included in the analysis, although variation in the specificity and implementation of those

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policies may influence the results. Alternatively, the presence of an official policy addressing job retention may cause VR staff to be more attuned to the needs of employed applicants. As state agency administrators become more familiar with WIOA requirements they may create or revise agency policies concerning job retention and career advancement and it will take some time before those changes can influence service delivery practices and consumer outcomes.

Conclusion

Employed VR applicants with visual disabilities waited longer from application to signed IPE if they were younger, non-White, or received disability benefits. Agency structure directly affected the length of time from application to IPE. On average, applicants in separate agencies waited almost two months less than applicants in combined agencies. Although neither official agency job retention policies nor unofficial efforts to expedite services for employed applicants had a direct effect on time from application to IPE for the total sample, official job retention policies reduced the waiting time for applicants who received SSDI, those with secondary disabilities, and those working more hours per week, indicating that these policies may be beneficial to some applicants. Additional research to investigate how specific policies influence timeliness of service delivery, particularly for employed applicants seeking job retention or career advancement services, would be helpful in identifying ways to expedite service delivery. Additionally, researchers may wish to examine how counselors implement both formal policies and unofficial agency efforts. Policy makers and administrators should examine their agency policies and procedures, as well as the priority staff place on job retention and career advancement services, to determine whether policy revisions or staff training might increase timeliness of service delivery for employed applicants.

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Table 1

Final model for predicting length of time of B/VI consumers from application to signed IPE

Final estimation of fixed effects (with robust standard errors)	Coefficient	Standard error	t-ratio	df	p
For INTRCPT1					
INTRCPT2, γ_{00}	96.39	15.40	6.26	47	<0.001
Agency structure, γ_{01}	-55.97	14.08	-3.98	47	<0.001
Job-retention policy, γ_{02}	19.56	15.39	1.27	47	0.210
Expedite service, γ_{03}	20.11	16.11	1.25	47	0.218
For Hispanic slope					
INTRCPT2, γ_{10}	-7.31	5.02	-1.46	5029	0.146
For age slope					
INTRCPT2, γ_{20}	-0.57	0.10	-5.90	5029	<0.001
For gender slope					
INTRCPT2, γ_{30}	-0.12	3.37	-0.04	5029	0.972
For SSDI slope					
INTRCPT2, γ_{40}	18.21	6.11	2.98	5029	0.003
RETOFF, γ_{41}	-23.41	9.31	-2.51	5029	0.012
For SSI slope					
INTRCPT2, γ_{50}	17.31	8.71	1.99	5029	0.047
For blindness slope					
INTRCPT2, γ_{60}	0.24	5.44	0.04	5029	0.965
For minority slope					
INTRCPT2, γ_{70}	8.78	3.56	2.47	5029	0.014
For education slope					
INTRCPT2, γ_{80}	0.95	0.84	1.13	5029	0.258
For secondary disability slope					
INTRCPT2, γ_{90}	-0.66	4.03	-0.16	5029	0.869
Job-retention policy, γ_{91}	-12.86	5.65	-2.28	5029	0.023
Expedite service, γ_{92}	14.69	5.97	2.46	5029	0.014
For previous closure slope					
INTRCPT2, γ_{100}	-1.97	3.43	-0.58	5029	0.565
For earnings slope					
INTRCPT2, γ_{110}	0.00	0.00	0.19	5029	0.854
For hours at work slope					
INTRCPT2, γ_{120}	0.14	0.13	1.02	5029	0.309
Job-retention policy, γ_{121}	-0.61	0.30	-2.00	5029	0.046

Note. Analysis of FY 2015 RSA-911 database. Multilevel model: $APP2IPE_{ij} = \gamma_{00} + \gamma_{01}*(Agency\ structure)_j + \gamma_{02}*(job-retention\ policy)_j + \gamma_{03}*(expedite\ service)_j + \gamma_{10}*(Hispanic)_{ij} + \gamma_{20}*(age)_{ij} + \gamma_{30}*(gender)_{ij} + \gamma_{40}*(SSDI)_{ij} + \gamma_{41}*(job-retention\ policy)_j*(SSDI)_{ij} + \gamma_{50}*(SSI)_{ij} + \gamma_{60}*(blindness)_{ij} + \gamma_{70}*(minority)_{ij} + \gamma_{80}*(education)_{ij} + \gamma_{90}*(secondary\ disability)_{ij} + \gamma_{91}*(job-retention\ policy)_j*(secondary\ disability)_{ij} + \gamma_{92}*(expedite\ service)_j*(secondary\ disability)_{ij} + \gamma_{100}*(previous\ closure)_{ij} + \gamma_{110}*(earnings)_{ij} + \gamma_{120}*(hours\ at\ work)_{ij} + \gamma_{121}*(job-retention\ policy)_j*(hours\ at\ work)_{ij} + u_{0j} + r_{ij}$. For random effect, variance components of u and r are 2,567.72 and 11,531.40, respectively; $\chi^2(47) = 757.76, p < 0.001$.