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A Study on Effective Assessments and Support from the Perspective of Executive Function

(Research Report No. 178) SUMMARY

[Keywords]

Executive function

Cognitive function

Assessment of executive function

Analysis of vocational support programs

Focus group interviews

[Abstract]

Executive function refers to the cognitive function to regulate one's thoughts and actions to achieve specific goals.

This study was conducted to highlight effective methods of assessment and information that could be used to provide effective support (interventions) to individuals who face challenges related to executive function.

Specifically, by conducting research on support provided to individuals who face challenges related to executive function, as well as an analysis of vocational support programs, the subjects of this study were divided into three subgroups. Points of note regarding assessments and support (interventions) were provided for each subgroup.

The results of this study will help gain an accurate understanding of the actions taken by subjects while assisting the effective formation of hypotheses related to support.

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2 Research period

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3 Composition of the research report

Chapter 1: Background and purpose of the research

Chapter 2 Part 1: Analysis of records related to the implementation of support programs grounded in the concept of executive function

Chapter 3 Part 2: Research conducted at local vocational centers for persons with disabilities

Chapter 4 Part 3: Focus group interviews conducted regarding the support provided to individuals who face challenges with executive functioning

Chapter 5: Summarized results of the study

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4 Background and purpose of the research

Executive function refers to the cognitive function to regulate one's thoughts and actions to achieve specific goals. Difficulties with executive functioning may lead to challenges in the workplace, such as being unable to make satisfactory preparations or arrangements at work, as well as the inability to finish tasks on time or within stipulated deadlines. This study highlights effective assessment methods and information related to the provision of support (interventions) to individuals who face challenges with executive function via an analysis of support programs and research targeting support providers.

In accordance with the BRIEF-A—a standardized assessment for executive function—in this study, the following nine items were defined as subscales of executive function: inhibit, shift, emotional control, self-monitor, initiate, working memory, plan/organize, task monitor, and organization of materials.

5 Method
(1) Analysis of records related to the implementation of support programs grounded in the concept of executive function

To evaluate the specific ways through which support is provided and how assessments are conducted regarding actions taken at work based on the concept of executive function, *behavioral observation sheets*, which are records detailing support provided through the Task Management Support Program—an employment support program for employed or unemployed individuals with developmental disabilities (hereinafter the "Task Management Support Program")—are analyzed quantitatively and qualitatively. The Task Management Support Program provides assessments regarding conditions under which tasks are completed in the workplace, as well as the corresponding results based on the concept of executive function. The program aims to help individuals gain an understanding of their strengths and challenges regarding task management and develop the ability to evaluate, acquire skills related to, and implement practice countermeasures in response to challenges faced. *Task management* refers to the accurate assessment of the process surrounding the basic flow of tasks and completing tasks that have been allocated.

(2) Research conducted at local vocational centers for persons with disabilities

Questionnaire surveys and interviews were conducted to gather information on the realities behind the support provided to individuals who face challenges with executive function, as well as the realities surrounding support that utilized situations where challenges related to executive function could easily be observed. The questionnaire survey targeted the following parties: 52 (including branches) local vocational centers for persons with disabilities (hereinafter "local centers"), 2 wide-area vocational centers for persons with disabilities, and the National Institute of Vocational Rehabilitation. Interviews were also conducted at three local centers where responses to the questionnaire had been obtained.

(3) Focus group interviews conducted regarding the support provided to individuals who face challenges with executive functioning

These interviews were conducted to elucidate specific points of information regarding methods of support provided to individuals who faced challenges with executive function, as well as the effects of and challenges related to the execution of the aforesaid support. The interview was conducted once, with a duration of 120 minutes. Participants were 6 vocational counselors for persons with disabilities who had 10 to 17 years of experience working in vocational support for persons with disabilities.

6 Summarized results of the study

(1) Results and discussion following the analysis of records related to the execution of support programs grounded in the concept of executive function

A. Analysis of effect size

Analysis was conducted on nine *behavioral observation sheets* that had been provided. Three effect sizes were calculated for each individual to measure the effectiveness of the interventions undertaken. Based on the interpretive criteria regarding the degree of effectiveness, should a moderate or higher degree of effectiveness be found for one or more methods of intervention in the case of an individual, a

moderate or higher degree of effectiveness was assumed to be observed for the aforesaid individual. Consequently, for 5 individuals (55.6%, out of 9 individuals), a moderate degree of positive effect was presumed; in 4 individuals (44.4%), no effects were observed.

B. Analysis of subscales

Analysis was conducted regarding how frequently behaviors related to executive function occurred (occurrence rate) regarding each of the nine subscales of executive function. During the Task Management Support Program, tasks related to task management are administered twice. In this report, the first (second) administration is addressed using the term *baseline* (*intervention*) *period*. Here, the average occurrence rate during the baseline period was used as a benchmark, and the occurrence rate during each period, regarding the benchmark (in terms of whether the occurrence rate was higher or lower in comparison), was displayed for each case. Whether occurrence rates differed between the baseline and intervention periods was assessed with regard to each subscale. Additionally, cases where the occurrence rate was maintained at a relatively higher level or changed in positive ways were grouped under a single category—*positive results*. Conversely, if the occurrence rate was maintained at a relatively lower level, or the occurrence rate changed negatively, these cases were grouped under a single category—*negative results*.

Results of the analysis showed that the proportion of cases where positive results were seen were relatively higher in relation to the following five subscales: *inhibit*, *shift*, *initiate*, *working memory (WM)*, and *organization of materials (materials)*. Conversely, the proportion of cases where positive results were seen were relatively lower in relation to the following four subscales: *emotional control (emotion)*, *plan/organize (plan)*, *task monitor (task)*, and *self-monitoring (self)* (Table 1). Overall, the analysis showed that positive results were relatively uncommon regarding *emotional control*, *plan/organize*, *task monitor*, and *self-monitor*. Thus, the evaluation of methods to address and complement the said subscales is assumed to be necessary.

Table 1: Results pertaining to combinations of and changes in subscales over both periods for each individual

	Inhibit	Shift	Emotion	Initiate	WM	Plan	Materials	Task	Self
Case 1	▲$_{M→H}$	H➡H	H➡H	H➡H	H➡H	▲$_{M→H}$	H➡H	▼$_{M→L}$	H➡H
Case 2	▲$_{L→H}$	H➡H	H➡H	▲$_{L→H}$	▲$_{L→H}$	▲$_{L→H}$	H➡H	▲$_{L→M}$	▼$_{H→M}$
Case 3	L➡L	L➡L	L➡L	L➡L	L➡L	L➡L	L➡L	L➡L	L➡L
Case 4	▼$_{H→M}$	▲$_{L→M}$	L➡L	H➡H	▲$_{L→M}$	L➡L	M➡M	L➡L	▲$_{M→H}$
Case 5	▲$_{M→H}$	H➡H	▲$_{L→M}$	▲$_{M→H}$	H➡H	M➡M	H➡H	H➡H	H➡H
Case 6	H➡H	H➡H	▼$_{H→L}$	H➡H	H➡H	H➡H	H➡H	H➡H	H➡H
Case 7	H➡H	H➡H	▼$_{M→L}$	H➡H	L➡L	H➡H	H➡H	▼$_{H→L}$	L➡L
Case 8	H➡H	H➡H	H➡H	H➡H	H➡H	H➡H	H➡H	▼$_{H→M}$	▲$_{L→H}$
Case 9	H➡H	H➡H	▲$_{L→H}$	H➡H	H➡H	▲$_{L→M}$	H➡H	▲$_{L→H}$	▲$_{L→H}$

Key: L = low, M = moderate, H = high

(2) Results and discussion following research conducted at local vocational centers for persons with disabilities

A. Information regarding subjects who face challenges with executive function

Information regarding 105 subjects who faced challenges with executive function was obtained; 98.2% of the said individuals had prior experience with receiving support from local centers. The types of disabilities experienced by subjects included developmental disabilities (experienced by approximately half of all individuals, at 47.6%), followed by higher brain dysfunction (26.7%) and mental disabilities (24.8%). Moreover, the most common difficulty experienced by subjects included being *unable to adapt one's behavior and thought process flexibly based on the situation* and being *unable to adjust one's emotional responses appropriately* (both experienced by 56.2% of subjects); these two challenges were selected in over 50% of the observed cases (Figure 1).
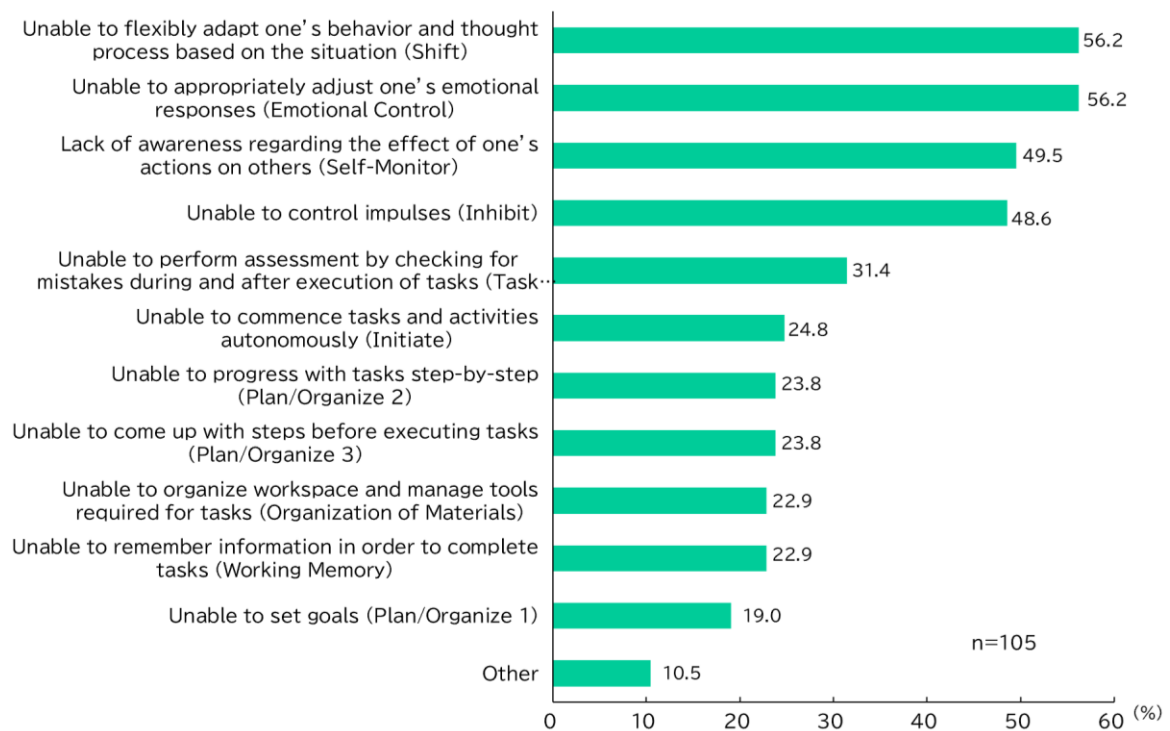

Figure 1: Difficulties experienced by subjects (multiple answer)

Furthermore, following cluster analysis that was conducted to identify similarities between difficulties experienced by subjects, subscales related to executive function were divided into two clusters. The first cluster comprised *shift*, *emotional control*, *self-monitor*, *and inhibit*. The second category comprised task monitor, initiate, plan/organize, organization of materials, and working memory. These clusters were named *behavioral and emotional regulation* and *cognitive regulation*, respectively.

B. Information regarding support provided to subjects

When categorizing the contents of support provided to subjects while paying attention to recipients of the said support, the said support did not exert an effect that was limited to recipients. Rather, support

was also provided regarding environmental adjustments in the workplace and to other involved parties. Furthermore, in approximately 60% of the cases, improvements were seen with regard to the difficulties faced by individuals as a result of the support provided. However, in some reported cases, no improvements were observed regarding difficulties faced. Additionally, contents related to the *acquisition and evaluation of skills or methods that would act as countermeasures* were most frequent in open-ended answers provided regarding struggles related to support received. Some of these subjects opined that *they did not notice any results from the support received*; in such cases, it is assumed that the recipient and provider(s) of support experience a sense of futility. These results show that the difficulty in remedying the difficulties confronted by subjects who face challenges in executive function is apparent.

C. Categorization of subjects: tendencies observed in support provided based on types of difficulties faced

Based on the cluster analysis results, subjects were divided into three subgroups based on difficulties faced: a subgroup facing *challenges with behavioral and emotional regulation*, a subgroup facing *challenges with cognitive regulation*, and a *combined subgroup*. The characteristics of each group, as well as the results of support provided to each group, were evaluated.

First, correspondence analysis was applied to evaluate the relationship between each subgroup and the *recipients of support*, as well as the *reasons for which support was provided*. The layout diagram derived from the analysis allowed for the following interpretations: for individuals facing *challenges with behavioral and emotional regulation*, *involved parties* were notable as recipients of support, while *reducing inappropriate reactions* was notable as a reason for which support was provided. For individuals facing *challenges with cognitive regulation*, *the environment* was notable as a recipient of support, while *obtaining appropriate responses and actions* was notable as a reason for which support was provided. For the *combined subgroup*, *assessments* were notable as a reason wherefore support was provided.

Furthermore, when evaluating relationships between participant subgroups and improvements in difficulties faced, many cases of subjects experiencing *challenges with behavioral and emotional regulation* saw *no improvements*, whereas several of those experiencing *challenges with cognitive regulation* saw *partial improvement*. This suggested that the conditions surrounding improvements experienced differed based on the type of difficulties subjects faced.

(3) Results and discussion following focus group interviews conducted regarding support provided to individuals who face challenges with executive functioning

A. Methods by which the focus group interviews were conducted

A table detailing three sample cases that corresponded to each of the three subgroups, respectively, in relation to difficulties faced by subjects as found during the research conducted at local centers was

created (Table 2). These three sample cases were shown to respondents beforehand, and the following was asked regarding each example on the day of the interviews: "With regard to the following examples provided, please recall similar situations you have dealt with in the past. If there have been cases where you were employed, returned to work, or experienced employee retention—whether these situations worked out well or if you experienced difficulties but saw improvements, even if partially—how were you involved, and how did you deal with the situation? Please try to answer regarding specific details, as well as what you paid attention to or were careful about, in as much detail as possible."

Table 2: Sample cases that were provided to participants before focus group interviews were conducted

Sample Case No.	Details
1	**[The following examples were brought up by the interviewee as well as other individuals (family members, colleagues, support organizations, etc.) during the first interview]** · Uses one's smartphone repeatedly while at work, although the tasks were not urgent and unrelated to one's tasks at work. · Continued using old methods for a certain period, although procedures had been simplified for efficiency. · Had been told to "stop making excuses" while explaining one's situation (to superiors, etc.) when one's mistakes were pointed out. · Would have moments where, when irritated, would express one's thoughts as is while arguing, irrespective of who the other party was.
2	**[The following examples were brought up by the interviewee as well as other individuals (family members, colleagues, support organizations, etc.) during the first interview]** · In many cases, could not remember what was discussed during morning meetings. · Could not get started on tasks when not in the mood for it. · Finds it challenging to set goals or priorities. · Requires more time than initially anticipated when designating own schedule. · Finds it challenging to think about steps needed in making progress with tasks. · Does not look back on the conditions surrounding one's tasks or the results of one's tasks while the task is being conducted and after tasks are completed.
3	**[Examples from Sample Cases 1 and 2 were brought up by the interviewee as well as other individuals (family members, colleagues, support organizations, etc.) during the first interview]**

B. Sample Case 1 (subgroup: *challenges with behavioral and emotional regulation*)

Many subjects from this category were noted to be emotional, affective, and impulsive in taking action. Subjects from this category were also noted to face difficulties in having self-awareness. Two main patterns were identified in the actions taken by support providers in response. First, providers of support would try to influence the self-monitoring abilities of the recipient by intervening in the following ways: encouraging realizations in the recipient regarding how others were affected and how the recipient

viewed their own actions while increasing (decreasing) the amount of desirable (undesirable) behavior. Second, support providers would also attempt to influence other individuals and the surroundings; this was conducted in tandem with the first response pattern.

C. Sample Case 2 (subgroup: *challenges with cognitive regulation*)

Subjects from this category were noted to find the allocation of goals or priorities difficult, and they often found themselves fully preoccupied with necessary tasks. There were cases where this led to mental health issues; in some cases, although work had piled up or was not progressing as expected, individuals would accept more work, resulting in work being incomplete, following which mental health issues occurred as a result of being reprimanded. In cases where subjects faced challenges with cognitive regulation, many support providers responded by helping the recipient in learning and skill acquisition or introducing complementary measures in working toward the autonomous completion of tasks.

D. Sample Case 3 (*combined subgroup*)

Subjects from this category were noted to face challenges with cognitive regulation—they could not estimate the time required and would work overtime for long periods. Simultaneously, they faced difficulties with behavioral and emotional regulation—they would react aggressively, as if the other party was at fault, when this was pointed out. Moreover, if the individual had intellectual disabilities or higher brain dysfunction or in cases or relatively younger individuals without much working experience, it was assumed that challenges not observed in structured support environments, such as local centers, became more apparent after employment.

The ways through which individual challenges were addressed did not differ significantly from Sample Cases 1 and 2. Similar to Sample Cases 1 and 2, challenges were dealt with individually. Nevertheless, as the challenges faced by this group of subjects were diverse and overlapping, opinions were gathered where prioritizing the issues faced before responding, starting from issues with high priority, was suggested to be important. Additionally, in the case of younger individuals without much working experience, the importance of providing basic education, such as corporate training, and imparting knowledge before responding to characteristics resulting from the individual's disability was considered significant.

E. Summary and discussion regarding the three abovementioned sample cases

(a) Commonalities

Regardless of the sample case, the degree to which involved individuals could objectively assess the situation was important. Support providers would respond in ways where they encouraged realizations in involved individuals through means such as explaining the situation to evoke adaptive behavior and transform maladaptive behavior. However, this does not guarantee realizations in the involved individuals and the subsequent attainment of adaptive behavior. When adaptive behavior does not occur, support providers will provide support in ways that encourage realizations in the involved individuals while making adjustments to the social and physical environment in the workplace, attempting to
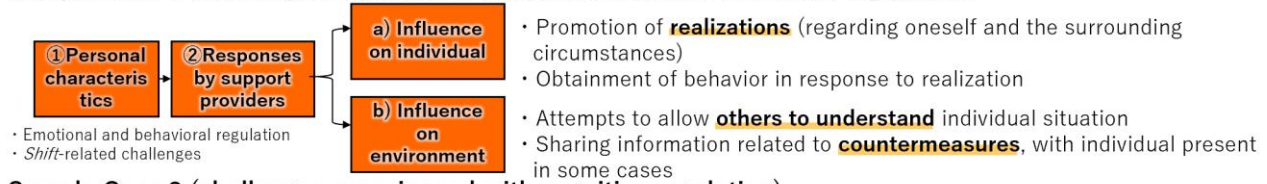
structure the environment.

While the details of support provided may have differed slightly with each individual, the purpose of support provision was to "reduce the feelings of discomfort experienced by the recipient and other individuals, allowing for work to be conducted comfortably, as well as evoke behavior that would lead to this end." Thus, the goal that support providers strive for is the same, especially regarding all three sample cases. In the provision of support, attempts to influence the affected individual and the environment are conducted in usual cases. Nevertheless, the extent to which support providers attempted to influence each factor differed depending on the degree to which the involved individual could assess the situation.

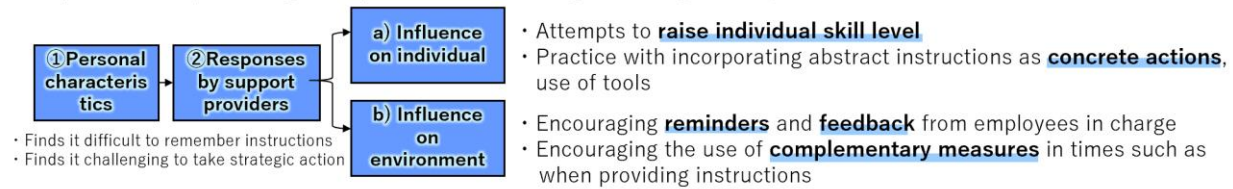**(b) Differences between sample cases**

A characteristic of challenges confronted by and realizations of subjects from Sample Case 1, where challenges were faced with emotional and behavioral regulation, was that, often, *other individuals would first feel uncomfortable* before the affected individual caught on. However, many subjects from Sample Case 2, where challenges were faced with strategic action implementation, would *feel uncomfortable*; some degree of awareness was present in the involved individuals. Furthermore, in Sample Case 3—a combination of Sample Cases 1 and 2—some individuals were observed where pedagogical responses were necessary, irrespective of the challenges faced.

The differences observed in tendencies related to *sources of discomfort* and *realizations*, as seen in each sample case, are important factors that will affect the ways support provision commences. In Sample Case 1, where a situation occurs such that other individuals experience discomfort, the goal would be for the affected individual to realize this. Conversely, in Sample Case 2, discomfort is experienced by the affected individual rather than others, and self-awareness already exists regarding the discomfort one is experiencing. Thus, in Sample Case 2, the goal would be to figure out solutions to the challenges one is facing; conversely, for Sample Case 1, in many cases, there is a need to first allow the affected individual to assess the situation and realize that others are experiencing discomfort. As for Sample Case 3, in addition to the situations faced in Sample Cases 1 and 2, there are situations where support must first be provided in the form of basic and pedagogical responses, such as the transfer of knowledge, including that which is related to work ethics. Therefore, ideal support processes, which include goal setting, may differ based on each sample case.
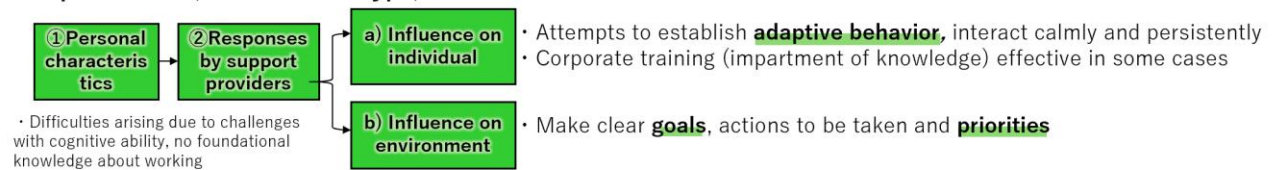
Sample Case 1 (challenges experienced with behavioral and emotional regulation)

① Personal characteristics → ② Responses by support providers

· Emotional and behavioral regulation
· *Shift*-related challenges

a) Influence on individual
· Promotion of **realizations** (regarding oneself and the surrounding circumstances)
· Obtainment of behavior in response to realization

b) Influence on environment
· Attempts to allow **others to understand** individual situation
· Sharing information related to **countermeasures**, with individual present in some cases

Sample Case 2 (challenges experienced with cognitive regulation)

① Personal characteristics → ② Responses by support providers

· Finds it difficult to remember instructions
· Finds it challenging to take strategic action

a) Influence on individual
· Attempts to **raise individual skill level**
· Practice with incorporating abstract instructions as **concrete actions**, use of tools

b) Influence on environment
· Encouraging **reminders** and **feedback** from employees in charge
· Encouraging the use of **complementary measures** in times such as when providing instructions

Sample Case 3 (combined subtype)

① Personal characteristics → ② Responses by support providers

· Difficulties arising due to challenges with cognitive ability, no foundational knowledge about working

a) Influence on individual
· Attempts to establish **adaptive behavior,** interact calmly and persistently
· Corporate training (impartment of knowledge) effective in some cases

b) Influence on environment
· Make clear **goals**, actions to be taken and **priorities**

Summary

Can objectively assess situation? → Provide realizations
· Goals currently established differ across sample cases
· The end goal in each case is finding solutions to discomfort experienced by the individual and others
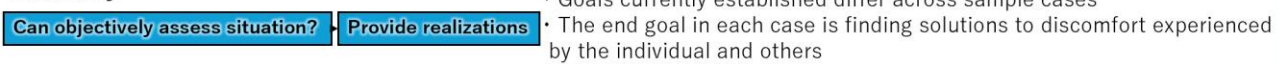
Figure 2: Summary of focus group interviews

(4) Significance of this research and future challenges

This study is significant because, first, analysis was conducted on support programs with high ecological validity. Quantitatively evaluating the effect of support programs that take place in close proximity to actual working environments is difficult, and such studies have been limited in number. While this study did not return consistent results regarding the effect of the Task Management Support Program, perspectives were gained concerning how to conduct the said program more effectively. Furthermore, these results are assumed to form basic data that will inform improvements made to the Task Management Support Program.

Second, the significance of this study lies in how subjects facing challenges with executive function were divided into three subgroups; points of information related to assessments and support (interventions) for each subgroup were provided in detail. In this study, a typology of subjects was constructed based on the results of quantitative research. By combining this with a detailed evaluation of the support provided, through qualitative research, the researchers could perform evaluation that utilized multiple perspectives. The results gleaned through this process are assumed to allow for a more accurate understanding of the behavior of subjects and the effective generation of support-related hypotheses. Nonetheless, this is only a single perspective; the issue must be evaluated comprehensively while considering other related information.

Moving forward, support methods that consider the results of assessments grounded in the concept of executive function must be examined in greater detail. In particular, it will be necessary to further examine the ways through which feedback can be provided to and shared with subjects in response to

challenges related to executive function that become apparent following assessments, specifically in ways that lead to realizations in subjects. Furthermore, methods to remedy challenges that occur in the workplace must be evaluated.

7 Relevant research products

・Research study on the assessment process for work management support; Research Report No.106, 2023