



# **The Influence of Causal Attributions on Emotional and Behavioral Reactions of Care Workers towards Challenging Behavior among Persons with Deafblindness**

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## **Abstract**

A large quantity of research on Challenging Behavior (CB) has focused on persons with intellectual disabilities. However, individuals with deafblindness also commonly engage in CB. The present study asked 63 staff members of institutions that work with persons with deafblindness in eight countries about their experiences with CB, in which situations CB occurs, and how they react in such situations. Furthermore, we investigated the relationship between staff members' attributions to CB, i.e. the underlying reasons staff members ascribe to CB, and their emotional reactions. The main finding showed that those persons who endorsed communicative difficulties as underlying reason of CB were more likely to experience fear and anxiety than persons who endorsed other causal attributions. This was interpreted as a result from increased feelings of responsibility for the client. Nevertheless, confidence and comfort were the most common emotional responses. The present study is the first one that provides an overview of attributions and emotions to CB among care workers that work with persons with deafblindness. Influence of CB on care workers has been neglected in this field so far. This study is also the first that considered measuring a communicative attribution to CB next to attributions of behavioral processes, stimulation, environmental, emotional and biomedical explanations.

## **Key Words**

Challenging behavior, aggression, communication, attributions, emotions, deafblindness, staff well-being, interventions.

## Introduction

Experiencing challenging behavior (CB), such as aggressive outbursts or self-harm, as a care worker is stressful (e.g. Chung & Corbett, 1998). Appropriate reactions to CB are not only crucial for preventing harm, but also for creating and maintaining a trustful relationship between the care worker and the person who is showing CB. Besides, extreme behaviors like CB may lead to information about the client that may otherwise not be perceivable due to lack of unconditional mutual understanding. There has been a history of research that provides insight to the questions of why such behaviors occur, how to intervene, and how to prevent CB.

The interpretations of CB are depended on our personal attributions that are formed through experiences, education and training. One major aspect of a person's attribution is the causal belief, i.e. the belief of why CB occurs. Hastings (1997) offered a model that covered some of such attributions, such as stimulation, physical sensitivity, or conditioned responses. It is likely that these attributions influence the care workers' strategies on how to intervene and how to prevent CB. Furthermore, different attributions may elicit different emotions, which may not only influence care workers' response to CB, but also their well-being. The literature provides guidelines on how to react in challenging situations from different theoretical approaches. There has been a shift from behavioral methods to methods that focus on qualitatively improving mutual understanding. Research has investigated the benefits of such strategies for the client, but largely neglected the effects on the care workers. Additionally, current service plans have been described as being too simplistic in preventing CB in persons with multiple disabilities (Poppens, Van der Putten, & Vlaskamp, 2014). Poppens, Van der Putten, Ten Brug, and Vlaskamp (2015) claimed that more attention needs to be drawn to intervention strategies targeting CB in order to guarantee an appropriate quality of life of persons with special needs. The present study focuses on the well-being of the care workers that need to implement such strategies, which will provide a further understanding of the consequences of CB.

As part of a larger study on CB, we asked staff members of institutions and schools that work with people with deafblindness to complete an online questionnaire about their experiences with CB, focusing on attributions and emotional responses. The questions of interest were how often CB occurs, and how care workers respond in such situations emotionally, cognitively and behaviorally. Specifically, we were interested in whether attributions to CB, i.e. the underlying reasons staff members ascribe to CB, influence their emotional responses and behavioral reactions. This study is relevant because it provides an overview of how individual factors of staff members that serve as care workers relate to interventional approaches that impacts the clients' well-being. Additionally, it may be advantageous to recognize weaknesses of current approaches to improve current

guidelines. For example, if certain attributions to CB elicit very negative emotions, whereas others elicit rather positive emotions within staff members, either training in re-attributing or emotional counseling may be helpful to improve care workers' well-being, which in turn may have a positive impact on clients.

## Literature Review

### Challenging Behavior and Deafblindness

Research on CB has mostly focused on individuals with intellectual disabilities and autism spectrum disorder. However, persons with deafblindness also commonly engage in CB. In fact, Dammeyer (2010a) reported that about 20% of persons who are congenitally deafblind engage in attacks of anger, crying, or anxiety more than one time per week. Even though the group of people with deafblindness is small compared to other groups with social difficulties, e.g. 1:29000 in Denmark (Dammeyer, 2010b), studies on social behavior within the field of deafblindness are highly relevant, as there is much to learn from persons without or with limited sight and hearing with regard to the development of communication and social behavior.

Individuals with deafblindness share many behavioral characteristics with individuals on the autism spectrum (Hartshorne, Grialou, & Parker, 2005), which is not surprising considering that individuals who are congenitally deafblind do not undergo typical socialization processes due to a lack of, or restrictions in the development of a formal language. Both groups, individuals with autism spectrum disorder and deafblindness, are characterized by difficulties in communication and social interactions as well as by stereotypic behavior in some cases (Boom, Antonissen, Knoors, & Vervloed, 2009). Furthermore, persons with deafblindness commonly show a lack of involvement in activities and social interactions (Prain, McVilly, Ramcharan, Currie, & Reece, 2010). The overlap of these clinical pictures may lead to an over-diagnosis of autism spectrum disorder in persons with deafblindness (Boom et al., 2009).

The fact that acquired as well as congenital deafblindness are often accompanied by a comorbid intellectual disability makes it even more difficult to distinguish behavioral symptoms of deafblindness from those of other disorders. Dammeyer (2011) reported a prevalence rate of intellectual disabilities of 34% among persons with congenital deafblindness. In order to improve diagnostic assessment procedures, Boom et al. (2009) proposed that the quality of reciprocity of social interactions, initiatives to contact, as well as the adequacy of using communicative signals and functions are of special relevance when distinguishing persons with deafblindness and comorbid autism spectrum disorder from those without comorbid autism spectrum disorder.

The most common causes for congenital deafblindness are rubella syndrome, down syndrome and CHARGE syndrome (Dammeyer, 2010b). Many persons who have CHARGE syndrome fall between the clinical picture of autism spectrum disorder and deafblindness (Hartshorne et al., 2005). Interestingly, those individuals with CHARGE who are deafblind received higher ratings on CB and autistic behaviors (Hartshorne & Cypher, 2004, Hartshorne et al., 2005) and show significantly more difficulties in behavioral regulation than those who are not deafblind (Hartshorne, Nicholas, Grialou, & Russ, 2007).

The incidence rates of CB in people with deafblindness are currently unknown. However, it is known that CB occurs in 10-15% of people with intellectual disabilities (Emerson et al., 2001). The most prevalent definition of CB states that:

*‘Challenging behavior is culturally abnormal behavior(s) of such an intensity, frequency or duration that the physical safety of the person or others is likely to be placed in serious jeopardy, or behavior which is likely to seriously limit use of, or result in the person being denied access to, ordinary community facilities’* (Emerson, 1995).

CB can be observed in various groups of developmental disorders and syndromes that cause intellectual disabilities, such as Cornelia de Lange, Riley-Day, Rett Syndrome, Fragile-X syndrome (Harris, 1992) and autism spectrum disorder (e.g., Rojahn, Wilkins, Matson, & Boisjoli, 2009). Additionally, several studies noted that people with auditory and visual impairments as well as people with non-verbality or impairments in receptive and expressive communication skills are at heightened risk for CB (Emerson et al., 2001).

As the clinical picture of persons who engage in CB is very heterogeneous, it has been difficult to investigate its underlying mechanisms. In fact, there may be multiple aspects that contribute to the development of CB. One of the major contributing factors of CB was described by Kevan (2003); he proposed that the mismatch between receptive communication abilities of individuals with learning disabilities and the expressive communication abilities of support staff prevents the satisfaction of communication needs of the individual with a disability. Even though the role of the communication environment has already been identified as a factor that may lead to CB (Hastings & Remington 1994), receptive abilities still seem to be neglected by many intervention guidelines regarding CB (Kevan, 2003).

### **Intervention Approaches**

Even though much effort has been invested in developing and evaluating intervention techniques to improve communication skills and to reduce CB of persons with deafblindness, the influence of CB on care workers has been neglected within this field. As many qualitative intervention studies showed that communicative approaches to reduce

problem behavior and enhance positive forms of communication are very promising, the effects on staff members who apply these strategies become more and more relevant.

For instance, training on recognizing possible signs, attuning to the client's behavior and communication as well as adapting the interactional context did not only show to be effective in improving social interactions between care workers and clients with deafblindness (Janssen, Riksen-Walraven, & van Dijk, 2003a; Janssen, Riksen-Walraven, & van Dijk, 2003b), but are also helpful in regulating emotional responses of the client (Martens, Janssen, Ruijsenaars, Huisman, & Riksen-Walraven, 2014). In addition to those factors, stimulating the client with deafblindness to develop a shared meaning of an interaction through negotiation processes may improve the quality of the communication (Damen, Janssen, Ruijsenaars, & Schuengel, 2015). Furthermore, a focus on the clients needs seem to increase motivation and engagement in a school setting (Haakma, Janssen, & Minnaert, 2016). In regards to CB, Jacobsen, Bjerkan, and Sørli (2009) described a case study of a client with deafblindness whose CB decreased after focusing on the client's emotions, needs and initiatives instead of applying behavioral intervention strategies. Similarly, an older case study (Luiselli, 1992) reported that reinforcement processes showed no effect on incidence rates of CB, whereas physical attention of the care worker towards the client's CB reduced the incidence rate dramatically. Other intervention programs that have been developed from a communicative approach include, for instance, the Functional Communication Training (Durand & Carr, 1991) and the program of Intensive Interaction (Nind & Hewett, 1994). Both programs offer specific guidelines on how to react in challenging situations.

The communicative approach stands in contrast to behavioral intervention strategies, which make primary use of reinforcement and punishment processes, as for incidence described by Sisson, Hasselt, Hersen, and Aurand (1993), Sisson, Hersen, and Hasselt (1993) and Bernstein and Denno (2005), who all reported positive effects of behavioral strategies on CB of persons with deafblindness. Even though these studies give valuable insights on how intervention can be applied and ideas of what can be effective, the research methods being used, do not resemble the golden standard of intervention research. Future research on interventions to reduce CB should be longitudinal, quasi-experimental, and using larger groups of clients (Sigafos, Didden, Schlosser, Green, O'Reilly and Lancioni, 2007). However, intervention studies based on single subject designs are highly valuable in that they provide a good overview of what strategies have been applied and which of those seem to be promising (Parker, Davidson & Banda, 2007). Overall, interventions strategies have positive effects on clients with deafblindness across studies (Sigafos, et al., 2007).

## **Emotions and Attributions to CB**

Hastings (1997) alluded that attributions to CB are of special relevance because they do not only influence the way people react to CB, but also interact with other factors, such as staff members' emotions. Handling situations of CB appropriately is crucial in maintaining a trustful relationship between both communication partners. Hastings' study (1997) showed that CB is mostly attributed to learned behaviors, emotions and stimulation. Notably, an attribution to communication problems has been neglected in this area.

CB may not only cause distress within the individual displaying the behavior, its confrontation also elicits distress among care workers. It has been shown that the confrontation of CB mostly results in negative emotions, which are mediated and moderated by several factors, such as self-efficacy and coping strategies (e.g. Hastings and Brown, 2002a). Negative emotions are problematic, because they negatively impact staff well-being. In fact, continuing confrontations with CB can contribute to the development of burnout syndrome (e.g., Hastings & Brown, 2002c; Mitchell & Hastings, 2001).

The most common negative emotions reported in the CB literature are anxiety, fear, depression, and anger (Mitchell & Hastings, 1998). Anxiety at work could partly be explained by the clients' level of CB according to Jenkins, Rose and Lovell (1997). Interestingly, higher endorsement of the belief that reinforcement processes, which are facilitated by the care worker, maintain CB, lead to higher endorsements of negative emotions towards CB (Hastings & Brown, 2002a). The authors argued that feelings of responsibility for the incidence of CB might moderate this effect. The finding that working with individuals who engage in CB elicits negative emotions holds also true in a controlled experimental design (Mossman, Hastings, & Brown, 2002).

The studies mentioned above considered only negative emotional reactions as a response to CB rather than considering a full spectrum of emotional reactions. However, a descriptive study by Bell and Espie (2002) found that 24 staff members in a hospital unit for men with learning disabilities and severe CB, reported high levels of confidence in dealing with CB, high levels of empathy, and feelings of a need to help. Interestingly, sick leave in this unit was considerably lower compared to the rest of the hospital. Distress among the staff members resulted from the lack of support from the management and the lack of training, rather than from challenging situations.

Jones and Hastings (2003) incorporated these results by adding items about positive emotions to the questionnaire of affective responses (Mitchell & Hastings, 1998). Staff members were more likely to report confident and relaxed emotions if the self-injurious behavior was discerned to be in control of the person displaying CB. Although feelings of depression and anger were the most dominant responses towards CB in their validation study (2003), Lambrechts, Kuppens and Maes (2009) could not replicate this finding and reported more positive emotions to CB than negative ones using the same questionnaire.

Intervention strategies that promote positive emotions and reduce negative ones in challenging situations might be helpful in improving staff well-being, which, in turn, may have a positive impact on the client. Furthermore, Bailey et al. (2006) pointed to the fact that training which addresses attributions and reactions towards CB might be beneficial for care workers. They may also benefit from psychological support when dealing with negative emotions. Interventions should aim to reduce negative emotions and reduce behavior that contributes to the maintenance of CB (Bailey et al., 2006)

### **Reactions to CB: Qualitative Studies**

The review of quantitative studies delineates evidence of the negative impact of CB on staff well-being. Qualitative studies need to be considered in building a coherent picture of how care workers react in challenging situations and why. Two studies gave insights into the relationship between attributions and emotions to CB. The first one was conducted by Whittington and Burns (2005), who identified four dilemmas that staff members experience when working with people with intellectual disabilities who display CB: (a) the problem of interpreting the behavior, (b) whether CB is a behavior or a communication problem, (c) boundaries, control and respect, and (d) dealing with the unpleasant feelings evoked by CB.

From the analysis of the open answers from staff members, Whittington and Burns developed a model that distinguishes two pathways of the dilemma. If CB is experienced as a behavioral problem, staff members tended to distance themselves from the situation and set firm boundaries, whereas a communicative approach rather lead to feelings of respect and an open exploration of one's affective state towards the situation. The former position resulted in pleasure from being in a safe position, but also in unpleasantness from being unkind. The latter resulted in pleasure from being kind and in increased sympathy for the client. However, this position was accompanied by fear to worsen the client's behavior.

Another qualitative analysis of interviews with care workers of persons with learning disabilities, who experience violence at work, revealed two themes (Lundström, Åström, & Graneheim, 2007). The first one was called "falling apart", which involved negative feelings such as fear, powerlessness, and anger. The composite fear emerged from care workers' insecurity about their own capability of handling the situation, not having control over the situation, and the possibility of disrupting the relationship to the client. A feeling of powerlessness originated from communication difficulties with the clients and the lack of support from the management. Additionally, feelings of anger seemed to arise when the violent behavior of the client was interpreted as intentional, but also when care workers tried to bring control into the situation. Some participants reported to feel the need to cry after an incident, as well as a disruption of orientation in time and place.

The second theme was called "keeping it together", which comprised emotions of pleasure, respect, self-reflection and habituation. Violent situations were sometimes

described as positively challenging. The care workers tried their best to understand the client and to reflect on their actions afterwards in order to improve future interventions. Additionally, some behaviors were reinterpreted as non-violent by viewing the actions as not intentional after a reflection process.

## Methods

### Participants

Sixty-three persons participated in the online study (female = 48, male = 8, non-response for sex = 7;  $M_{age} = 40.62$ ,  $SD_{age} = 11.16$ , non-response for age = 8), that is, they filled in at least one of the provided questionnaires. Eighty-four people dropped out before completing the first questionnaire and were excluded from the study. Details about the

Table 1

*Background information of the participants.*

	N	%
Response Rate		
Full Responses	56	38.10
Partial Responses <sup>1</sup>	7	4.76
Country		
The Netherlands	9	14.29
Denmark	13	20.63
Norway	6	9.52
Sweden	4	6.35
Scotland	7	11.11
Canada	21	33.33
USA	2	3.17
Germany	1	1.59
Training on CB		
No formal training	6	9.52
1-2 short courses	26	41.27
Several courses	16	25.40
Many courses or a professional course	9	14.29
Specialism in the management of CB	6	9.52
Incidences of CB		
Never	2	3.17
Less than once a month	8	12.70
Once a month	8	12.70

2-3 times a month	10	15.87
Once a week	6	9.52
2-3 times a week	12	19.05
Daily	17	26.98

*Note:* <sup>1</sup>Response to at least one questionnaire.

response rate and information on country, years of education, training on CB and experienced incidences of CB are shown in Table 1. The job titles of the participants varied; the majority

indicated to work as a teacher, or intervener. Other job titles included, for example, therapist, pedagogue, manager, and assistant workers. Many reported to be specialized in working in a special needs setting or with deafblind persons in particular. The work experience ranged from 1.5 to 32 years ( $M = 10$ ;  $SD = 7$ ).

### Instruments

**Open questions.** Two open questions were asked about personal experiences with CB. The first asked for specific situations, “In which situations does challenging behavior occur? Please tell us about your experiences!”, whereas the second one asked for reactions of the care worker, “How do you react in such situations?”

**Attribution scale.** The original version of the Challenging Behavior Attributions Scale (CHABA; Hastings, 1997) consists of 33 items, which form five subscales, namely, Learned Behavior (LB, 6 items), Biomedical (BM, 6 items), Emotional (EM, 7 items), Physical Environment (PE, 8 items), Stimulation (ST, 6 items). In order to include the attribution of challenging behavior to communication difficulties, we added four items (“Because she/he is not understood”, “Because she/he wants to say something”, “Because she/he has no other means to express strong emotions”, “Because people do not communicate with her/him very much”), which create together with one other item of the ST scale (“Because people do not talk with her/him very much”) the subscale of Communication (C). The Likert scale ranges from - 2 to 2 (very unlikely, unlikely, equally likely/ unlikely, likely, very likely). The final score is calculated by dividing the sum score by the number of items.

**Emotion scale.** The Emotional Reactions to Challenging Behavior Scale (Mitchell & Hastings, 1998; Jones & Hastings, 2003) lists a range of negative and positive emotional reactions, which might be elicited by experiencing clients' CB. Four subscales have been derived from previous research on CB of persons with intellectual disability. The negative emotions were divided into the factors depression/anger (DA; 10 items; maximum sum score = 30) and fear/anxiety (FA; five items; maximum sum score = 15; Mitchell & Hastings, 1998), whereas positive emotions were divided into cheerfulness/excitement (CE; four item; maximum sum score =12) and confidence/comfort (CC; four item; maximum sum

score =12, Jones & Hastings, 2003). Participants indicate their responses on a four-point Likert scale from 0 to 3 (no, never; yes, but infrequently; yes, frequently; yes, very frequently).

### **Procedure**

The first page of the online survey outlined the purpose of the research project, continued by an informed consent and the definition of CB. Afterwards, participants were asked to report background information about their work (work experience, country, job title, institution, training received on CB, experienced incidences of CB), succeeded by the open questions, the modified CHABA and Emotion Scale and two other questionnaires, which are not subject of the present study. The instructions for each question were the same ones used by preceding studies of the authors of the questionnaires, except that they were adjusted for staff that works with deafblind people, i.e., words such as “autism” or “intellectual disability” were replaced by “deafblindness”. At the end of the study, participants were asked for their age and sex. In addition, participants had the opportunity to leave a comment and to report their e-mail address if they were interested in the results of the project.

### **Sampling**

The online survey was distributed through a snowball system and by word-to-mouth advertisement. Nine experts from the field of deafblindness were asked for contact details of institutions and schools who work with persons who are deafblind. Seven of these experts provided at least one e-mail address of an institutions or school for people with deafblindness. We sent information about the study to 12 institutions from eight European countries in total. Eight of those agreed to participate, one did not want to participate due to a lack of available time for staff members at work, and three did not respond. All institutions that agreed to participate received a link to the online questionnaire, which they were told to forward to relevant staff. In addition, word-of-mouth advertisement was used to further extend the sample range.

### **Statistical Analysis**

Missing item scores (Emotion Scale:  $n = 18$ ) were imputed by the Two-Way with Error (TW-E) method for each subscale when at least 65% of the questionnaire had been answered. The statistical analysis was carried out in three steps. First, the data were explored by calculating means, standard deviations, and reliability coefficients (Cronbach's  $\alpha$ ) for all subscales. The normality assumption was tested by applying the D'Agostino-Pearson test with an  $\alpha$ -level of .05. If the homoscedasticity assumption was not met as indicated by Levene's test with an  $\alpha$ -level of .05, Kruskal-Wallis tests or t-tests that do not

assume homogeneity of variances were used instead. Second, Pearson's correlation coefficient was used to investigate relationships between attributions and emotions. Third, influences of demographic variables on attributions and emotions were explored by analyses of variance (ANOVA). The  $\alpha$ -levels of follow-up t-tests were corrected for type I errors using the Bonferroni method. The open questions were analyzed for topical categories by a content analysis. The answers to each category were then listed and summarized.

## Results

### Descriptives

The internal consistency of the questionnaires was moderate to strong (Table 2) and comparable to research concerning CB displayed by people with intellectual disabilities and autism spectrum disorder. On average, all explanations for incidences of CB were endorsed as rather likely as indicated by high scores. Detailed results are shown in Table 2. Communication was indicated as the most likely reason, followed by learned behavior and emotional reasons. The likelihood of experiencing negative emotional reactions toward CB was rather low compared to positive emotions.

**Table 2**

*Average scores and reliability of staff attributions and emotions to CB in the field of deafblindness.*

	<i>M</i>	<i>SD</i>	Cronbach's $\alpha$
Attributions <sup>1</sup> ( <i>n</i> = 62)			
Learned Behavior	0.62	0.63	0.62
Biomedical	0.30	0.78	0.79
Emotional	0.56	0.68	0.75
Physical Environment	0.31	0.75	0.80
Stimulation	0.19	0.84	0.81
Communication	0.74	0.68	0.67
Emotions <sup>2</sup> ( <i>n</i> = 59)			
Depression/Anger (max.30)	6.36	3.55	0.67
Fear/Anxiety (max. 15)	3.76	2.63	0.79
Confidence/Comfort (max. 12)	4.83	2.65	0.75
Cheerfulness/Excitement (max. 12)	2.08	2.84	0.84

*Note.* <sup>1</sup>Averaged scores range from -2 to 2; <sup>2</sup>Minimum score = 5.

## Correlations

Three of the four emotion subscales violated the assumption of normality. There was no reason to exclude outliers. Therefore, we used Box-Cox transformations with  $\lambda = .5$  for the DA and FA scales after adding 1 to each item score, whereas the same transformation with  $\lambda = -.5$  was applied to the CC scale.

As shown in Table 3, the correlations within the attribution questionnaire were strong. A communicative attribution to CB was most strongly associated with negative emotions, especially with fear/anxiety, whereas other attributions were only moderately associated with that scale. Feelings of depression/anger were also more likely to be associated with a communicative attribution, however, not in a statistically significant range. Positive emotions such as confidence/comfort were more likely to be endorsed when CB was attributed to biomedical reasons, the physical environment and stimulation. No attribution was significantly related to feeling of cheerfulness/excitement.

**Table 3**

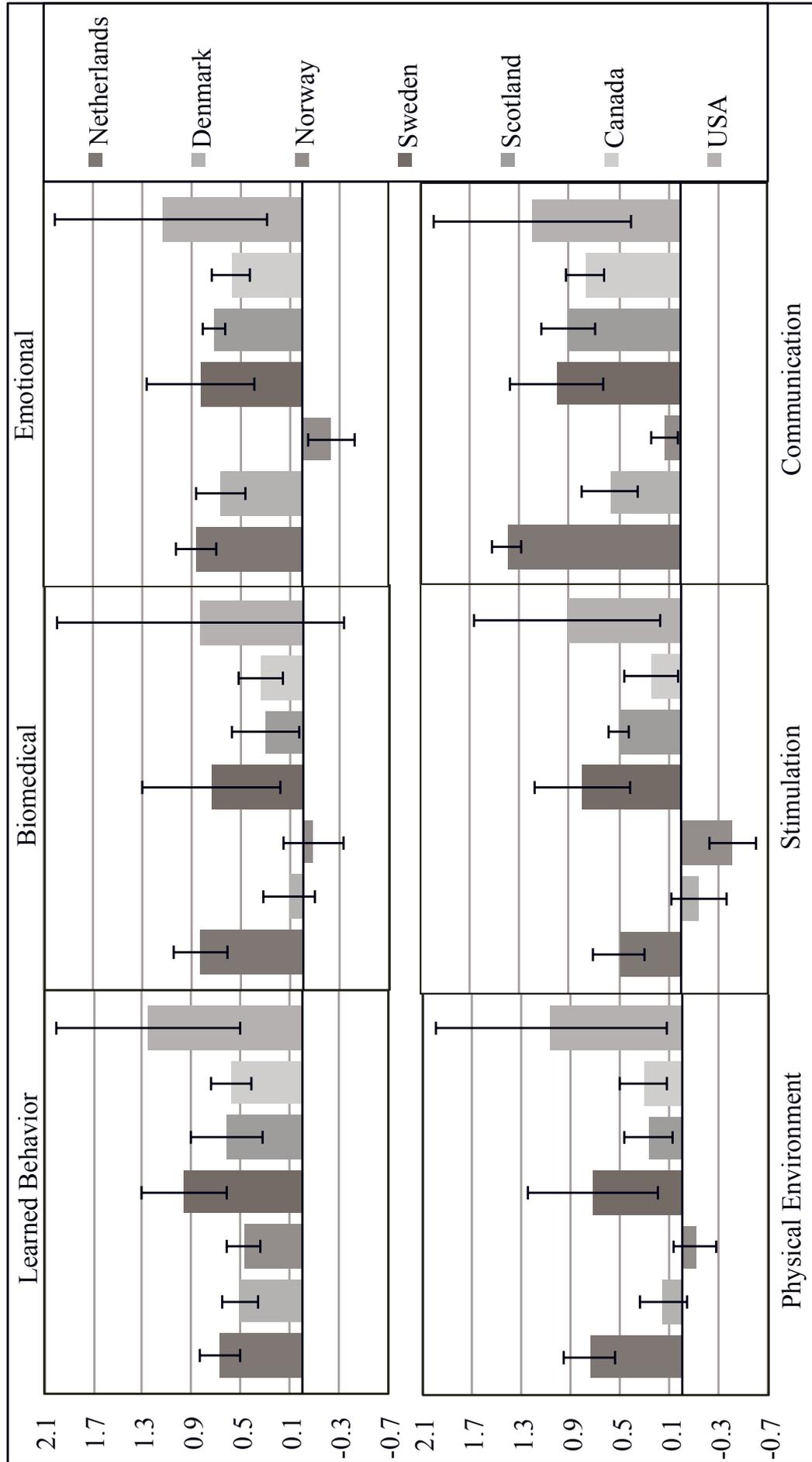
*Pearson's correlation between subscales of the Emotional Reactions to Challenging Behavior Scale and the modified Challenging Behavior Attributions Scale.*

	LB	BM	EM	PE	ST	C	DA <sup>1</sup>	FA <sup>1</sup>	CC
<b>Attributions</b>									
BM	.83***								
EM	.70***	.74***							
PE	.83***	.86***	.81***						
ST	.64***	.70***	.73***	.83***					
C	.72**	.73***	.76***	.83***	.81***				
<b>Emotions</b>									
DA <sup>1</sup>	-.10	-.03	.00	-.02	-.03	.19			
FA <sup>1</sup>	.28*	.24	.27*	.29*	.24	.46***	.63***		
CC	-.01	.14	.19	.21	.26*	.11	-.31*	-.32*	
CE <sup>1</sup>	-.12	-.05	.07	-.04	-.07	-.15	-.09	-.15	.47***

*Note.* LB = Learned behavior; BM = Biomedical; EM = Emotional; PE = Physical Environment; ST = Stimulation; C = Communication; DA = Depression/Anger; FA = Fear/Anxiety; CC = Confidence/Comfort; CE = Cheerfulness/Excitement; Pairwise deletion of missing values leads to variations of *n* from 56 to 62; <sup>1</sup>Transformed values; \**p* < .05; \*\* *p* < .01; \*\*\* *p* < .001.

Figure 1

Mean scores of staff members attributions toward CB among persons with deafblindness by country.



Note. Scoring ranged from -2 (very unlikely) to 2 (very likely); Error bars represent standard errors of means.

## Group Differences

The same transformations were applied as for the Pearson's correlation coefficients. One-way ANOVAs were run to check for group differences between sexes, countries, years of work experience, amount of training received, and the number of experienced incidences of CB. The amount of training and the reported number of incidences had no impact on attributions and emotions. Only significant effects are reported.

**Sex.** Significant differences were found between males and females in the DA scale,  $F(1, 54) = 5.52, p = .023, \eta_p^2 = .093$ . However, the number of men who participated in the study was very low. Due to unequal group sizes, the difference between sexes has to be interpreted with caution.

**Countries.** Germany was excluded for the statistical analysis because there was only one participant who reported to be from Germany. There were significant differences between countries within the attribution questionnaire (Figure 1) on the ST scale,  $F(7, 54) = 5.12, p < .001, \eta_p^2 = 0.399$ , and C scale,  $F(7, 54) = 2.39, p = .033, \eta_p^2 = 0.237$ . Post-hoc tests revealed that significant differences were found between Canada and Denmark on the ST scale,  $t(31) = 5.12, p < .001$ , Canada and Sweden on the ST scale,  $t(22) = 3.51, p = .019$ , and Canada and Denmark on the C scale,  $t(31) = 3.19, p = .05$ .

**Work experience.** The amount of work experience was coded into five approximately equally sized groups: 0-3 years, 3.5-5 years, 5.5-9.5 years, 10-15 years and above 15 years. Significant differences for work experience were found on the CE scale,  $H(4) = 18.71, p = .001$ . The following differences were significant after a Bonferroni correction: 0-3 years and 3.5-5 years,  $t(19.39) = -4.2, p < .01$ , 0-3 years and 5.5-9 years,  $t(18.38) = -7.85, p < .01$ , 0-3 years and 10-15 years,  $t(20.22) = -3.18, p = .05$ , and 5.5-9 years and above 15 years,  $t(13.98) = 3.45, p = .04$ .

## Open Questions

The answers of 61 participants to the first question were divided into two categories after a content analysis: situations and interpretations. The answers to the second question provided a third category: reactions. The order of the listings is random.

**Situations.** CB can occur during the day- and nighttime, in school, at home, in the residency or in public. It has been observed during group sessions, physical examinations, consulting sessions, home visits, and during times of contact and communication in general. It may also occur when the environment is unfamiliar, changed or unorganized, when staff changes or flex workers are present, or when an activity begins, ends or changes. CB was also reported in times of no activity and during transitional times. Other examples were situations in which staff explains house rules or when something, such as an object or activity, is denied.

**Interpretations.** Staff reported that CB appears to be an emotional reaction when the client is, for example, frustrated, bored, embarrassed, insecure, angry, tired, homesick, ill, excited or happy. It may also be an escaping behavior or a form of stress regulation, when wanting or not wanting something, when hearing sounds, when the room is too hot, or when something moves unexpectedly. It was very often interpreted as a problem of miscommunication or as a result of a lack of communication. Furthermore, CB might occur when the environment is perceived to be unsafe or unpredictable, when the routine is interrupted, when staff is making demands, or when the activity is unpleasant for the client. It may also be an expression of internal pain, or a social or personal crisis, such as when one's disabilities become apparent. Furthermore, a minority of participants interpreted CB as attention seeking behavior.

**Reactions.** The intuitive reaction that most participants reported to show was staying calm. However, staff responses varied on how to react in challenging situations after this initial reaction. Depending on the client, many care workers' primary focus lies on preventing harm. However, a few reported to leave the situation and to strictly ignore CB. Others described a comforting process, where the care worker seeks bodily contact to the client by holding the client's arm or hugging the client, or by singing a song. Redirecting the client's attention seems also common. Some care workers prefer to stay in a communicative interaction and explain to the client how they feel about the confrontation with CB, and also by asking about the clients' well-being. In cases where the environment is too overwhelming, care workers guide the client to a quiet place.

## Discussion

The present study investigated CB among people with deafblindness as experienced by care workers emotionally and cognitively. One of the major findings was that applying a communicative approach, as indicated by causal attributions of communication difficulties, to CB lead to a higher likelihood of developing emotions of fear and anxiety. This is most likely due to the perceived risk of worsening the client's state when applying a communicative venture, as the care worker might then feel especially responsible for the outcome. Communication training might possibly reverse this relationship. Interestingly, the majority of participants indicated to feel confident when facing CB.

Insights of interactions between staff's attributions and emotions to CB may help in the process of developing interventional approaches that do not only reduce CB, but also improve staff well-being. It is alarming that half of the participants reported to experience CB at least 2-3 times per day, which demonstrates two important aspects. First, even though most care workers are specialized in working with people with special needs, and also receive training on CB, CB remains a frequent concern, which provides evidence for the

claim of Poppens et al. (2016) that guidelines for preventing or reducing CB need to be improved. Second, care workers' well-being should, therefore, be particularly considered, as CB may contribute to the risk of developing burnout syndrome (Mitchell & Hastings, 2001). This point becomes especially apparent by contemplating reported emotional responses of staff members towards confrontations of CB. Even though feelings of confidence and comfort were endorsed to 40%, depression and anger were endorsed to 21% and fear and anxiety to 25%, which is a serious amount presuming that no negative emotions should be experienced in an ideal work setting.

The finding that feelings of confidence and comfort were by far the most common ones, contradicts research on staff's feelings to CB in other fields (e.g. Hastings and Brown, 2002a). It is, however, in line with the results of Bell and Espie (2002) and Lambrechts, Kuppens and Maes (2009). Since we used a correlational design, we can only speculate about causal explanations. According to the model of Whittington and Burns (2005), positive emotions can emerge either from applying a communicative approach due to being kind to the client or from applying a behavioral approach due to being in a safe position. The results of the present study partly contradict this idea. CB was most likely to elicit confidence and comfort if it was attributed to stimulation. The most reasonable explanation for pleasant feelings towards CB is, therefore, that staff feels capable of dealing with the situation appropriately, confirming staff in their status of being a care worker. An experimental design using measures of self-esteem in relation to intervention approaches and emotions may lead to a causal understanding of this effect. Moreover, habituation and self-reflection may also contribute to positive feelings (Lundström, Åström, & Graneheim, 2007).

Additionally, Whittington and Burns (2005) proposed that negative emotions emerge from the fear to do the client wrong. Our findings pointed indeed to the same direction; fear and anxiety were positively related to a communicative attribution of CB. In fact, this was the strongest relationship we found between all tested variables. The finding that behavioral attributions lead to more negative emotions, as proposed by Hastings and Brown (2002a), could not be confirmed. We speculate that fear and anxiety may arise from feelings of personal responsibility, which remains higher in a communicative setting than in a behavioral one, where responsibility is yielded to reinforcement processes. Measurements of feelings of responsibility and control in regards to a communicative approach may be helpful in explaining this relationship in the future.

Interestingly, responses to the open questions indicated that participants' conception of intervening effectively varies. A few persons reported to ignore CB, whereas others preferred to stay active communicative partners during the situation. If CB is physically harmful, the focus was mainly reported to be on stopping the behavior. Of course, the reactions towards CB depend on environmental circumstances as well as on the client's

personal characteristics. However, characteristics of care workers are similarly important to recognize, as the behavior and communication efforts of the care worker influence and interact with the ones of the client.

Strikingly, the majority of participants reported to stay calm in a challenging situation. Care workers hereby counteract clients' unpleasant aggressions emotionally and behaviorally, although they may apply communication forms such as imitations, which are paralleled to the client's utterances in amicable situations. Contrasting staff member's behavior in different situations may offer valuable clues to understanding interventional behavior in challenging situations. Furthermore, most participants initially started to interpret CB when asked for situations in which CB occurs. In fact, the interpretations of CB seem to be the primary focus of care workers. Methods such as the Six Spacer (Ask Larsen, 2006) might help staff members to distance themselves from the initial interpretation, which may help them to understand CB comprehensively.

### **Limitations**

Lack of interest, English proficiency and available time are likely reasons for non-responses and the dropout rate. Furthermore, unequal group sizes might have concealed differences in attributions and emotional reactions between countries, sexes, age groups, and groups of work experience. The present study did not control for response biases, such as social desirability. Even though anonymity and confidentiality were guaranteed, handling CB at work can be a very sensitive topic as it might be an indication of one's ability as a careworker. Consequently, participants might intentionally or unintentionally manipulate their answers, which is generally a risk that is entailed by self-report measurements.

All self-reported information on emotions and attributions were already processed, interpreted and maybe also re-interpreted. Additionally, some people might not have access to this information, that is, they might not know what they feel and think in such situations. Additionally, the subscales of the CHABA highly correlated with each other, which means that they possibly tap into the same underlying variable. Future studies need to test whether or not the results hold true when using a different measurement.

In order to increase the sample range of the study, a definition of deafblindness was not provided to the participants. Therefore, staff members were very likely working with a heterogeneous group of persons with deafblindness, which makes comparisons to other studies difficult (Ask Larsen & Damen, 2014). For instance, distinguishing persons with congenital deafblindness from persons with acquired deafblindness may have lead to different results, as both groups show differences in areas of impairments, which has been shown in a study by Dalby et al. (2009). In particular, individuals with congenital deafblindness showed more prominent impairments in cognition, activities of daily living, social interactions and communication. Additionally, there is also a considerable

heterogeneity within the group of congenital deafblindness (Dammeyer & Ask Larsen, 2016). Furthermore, different forms of CB, e.g. self-injurious behavior and aggression towards staff members, elicit different emotions and behavioral reactions (Bailey, Hare, Hatton, & Limb, 2006; Mossman, Hastings, & Brown, 2002).

Future research needs to test whether or not mediating and moderating variables such as self-efficacy, coping strategies, self-esteem, initial attributions (Cudré-Mauroux, 2010), training on communication influence attributions in challenging situations when working with persons with deafblindness, which in turn affects staff's emotional well-being. An experimental design in which staff members are randomly allocated to a behavioral and communicative intervention approach may additionally shed light on causal relationships.

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