The negative knowledge of educational counselors: forms, expertise-related differences, contextualization, and embeddedness in episodes

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The Negative Knowledge of Educational Counselors: Forms, Expertise-Related Differences, Contextualization, and Embeddedness in Episodes

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Abstract

We investigate the negative knowledge of educational counselors, its development over their professional careers, and its contextualization in episodes. As a result of experiential learning, negative knowledge is knowledge about how something is not or which strategies are inappropriate for use in solving certain problems. It is assumed that this kind of knowledge is of particular relevance for the professional development of counselors. Data were collected through using a structured interview technique with 31 educational counselors. Analyses revealed discriminative and self-reflective forms of negative knowledge. In addition, they provide insights into transformations in professionals' knowledge through various stages of professional expertise.

Keywords: educational counseling, negative knowledge, experiential knowledge, learning from errors, counselor expertise
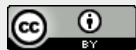
Learning through and from experience accrued over years of professional practice is regarded as a major prerequisite for developing a high level of proficiency in counseling (Rønnestad & Skovholt, 2013; Skovholt & Jennings, 2004). Researchers interested in the nature of counselors' professional expertise are especially interested in the changes that counselors' knowledge undergoes over the course of their professional careers (Dawson, Zeitz, & Wright, 1989; Strasser, 2006; Strasser, 2014). The key questions raised in this line of research concern the forms of counselors' knowledge and the learning processes through which these are acquired. This allows for insights into how counselors' knowledge is reorganized with the accumulation of professional experience, e.g., through the development of cognitive scripts (Schank & Abelson, 1977), and to better understand the cognitive underpinnings of professional competence (Witteman & Tollenaar, 2012). In the present paper, we focus on counselors' *negative knowledge* (Gartmeier, Bauer, Gruber, & Heid, 2008) as a form of knowledge that is tightly connected to experiencing and learning from errors in professional practice. In brief, negative knowledge is knowledge about 1. how something is not (declarative negative knowledge), 2. what the wrong ways to solve certain problems are (procedural negative knowledge), or 3. limitations in one's own knowledge or abilities (self-reflective negative knowledge) (Gartmeier et al., 2008; Minsky, 1997; Oser & Spychiger, 2005; Parviainen & Eriksson, 2006). The theory of negative knowledge plausibly amends existing discussions about how errors can lead to professional counselors' long-term competence development.

Errors in professional practice are a category of experiences that is attracting increasing attention from scholars (Bauer, 2008; Edmondson, 2004; Meurier, Vincent, & Parmar, 1997). This is because errors are, on the one hand, critical incidents that challenge competencies, produce "stress, accidents, inefficient human-machine interaction, quality and performance problems, and a bad climate" (Meurier et al., 1997, p. 528). On the other hand, errors are promising starting points for learning processes. The issue of errors and learning from them is particularly relevant for research on counselors' knowledge and expertise (Casement, 2002; Kottler & Carlson, 2003). Counselors must deal with the often highly demanding problems of their clients, and they are confronted with cases of high complexity and ambiguity (Rønnestad & Skovholt, 2013). Counselors also experience cases and situations in which they make erroneous decisions and fail to improve the conditions of their clients: "We pushed too hard too fast; we misread the situation; we missed crucial information. Our own personal issues were triggered. We were less than tactful. We bungled the diagnosis (…)" (Kottler & Carlson, 2003, p. ix). As such experiences are disappointing, they are often quickly eliminated from the memory, attributed to disadvantageous circumstances, or not taken seriously at all. However, there is a growing consensus that errors also provide valuable chances for professional counselors to engage in constructive learning processes and improve their professional counseling competencies. In researching educational counselors' negative knowledge, we focus on the plausible outcomes of error-related learning processes (Gartmeier et al., 2008; Oser & Spychiger, 2005; Parviainen & Eriksson, 2006). As will be elaborated upon below, the relevance of such knowledge for professional counselors is plausible from several perspectives: First, negative knowledge is helpful in solving common diagnostic problems, such as dis-criminating between diagnoses with similar phenomenologies. Second, it is a plausible indication of a counselor's awareness of his or her own limits and lack of knowledge. Third, it is a plausible outcome of critical self-reflection processes. These might occur informally or be connected to professional supervision in the counseling context.

In the present study, we seek to show how the concept of negative knowledge opens up a promising research perspective in the field of counseling. It is useful as a conceptual framework in order to shed light on how and what professional counselors learn from errors and how they profit from such learning in future practice. Specifi-cally, the present study raises four research questions: First, which facets of negative knowledge can be identified in educational counselors' verbal protocols? With this question, we seek to determine how relevant existing evidence about the facets of negative knowledge from other domains (e.g., Gartmeier, Gruber, & Heid, 2010) is to the counseling context. Second, how do educational counselors with varying professional expertise differ regarding the amount of negative knowledge they verbalize? This research question links the present study to existing research investigating transformations in professional counselors' knowledge relative to their degrees of professional ex-pertise (e.g., Strasser, 2014). Moreover, we seek to shed more light on the nature of professional counselors' negative knowledge by considering how it is embedded in different knowledge contexts (research question three) and how it is connected to episodes (research question four). The empirical evidence relating to these questions is discussed in this paper. We, thus, rely on data from an interview study conducted with educational counselors[i]. Before we turn to describing this study and its outcomes, our argumentation proceeds as follows:

In the following, we apply the concept of negative knowledge to the domain of educational counseling. The account will be structured based on our four research foci, namely the functions of negative knowledge in the domain in focus, its development over the professional career, its contextualization, and its embeddedness in episodes. Then, the emergence of our research questions from the synergy of these ideas will be described.

Theoretical Background

Negative Knowledge in Educational Counseling

The role of negative knowledge as a resource of professionals' competence and practice has been researched and documented for actors from several professional domains, namely for those pre-service teachers (Hascher & Kaiser, 2015), in-service teachers (Gartmeier & Schüttelkopf, 2012), apprentices in culinary vocational education (Jonasson, 2015), and elder care nurses (Gartmeier, Gruber, & Heid, 2010). One commonality among these studies is that they conceptualize negative knowledge as a specific form of experientially acquired knowledge (Kolb, 1984) – an idea that we adopt in the present study. In drawing upon Gartmeier et al. (2010), we differentiate three aspects of negative knowledge – namely declarative, procedural, and self-reflective negative knowledge – and apply them to the counseling domain.

Drawing upon Minsky (1997), actors in any field must have knowledge about how to achieve their goals, but also how to avoid grave errors while doing so. He, furthermore, argues that an effective error-avoidance strategy is not to pursue courses of action that one knows to be error-prone. This description relates to the procedural facet of negative knowledge, or knowledge about what not to do. With respect to the domain in focus, such knowledge relates to counseling strategies that are disadvantageous with respect to certain diagnoses.

Moreover, to avoid errors in knowledge-intensive domains, it is helpful to know what ideas are wrong but tend to be considered right (declarative negative knowledge). In the case of professional counselors, it is helpful to know about common misconceptions related to specific diagnoses.

In addition, it is helpful to know one's own limitations in the sense of being aware of what one does not know. This facet has been described as self-reflective negative knowledge (Gartmeier et al., 2010). It seems especially relevant in educational counseling, a domain characterized by constant changes. As new evidence arises, e.g., about treatment strategies, counselors must know when the routines they follow become outdated. This means they must give up or bracket aspects of their existing knowledge (Parviainen & Eriksson, 2006) – a notion that plausibly relates to the self-reflective aspect of negative knowledge. The facets of negative knowledge and the functions they may serve for counselors will be further elaborated upon below.

In order to further understand how negative knowledge is relevant for counselors, we adopt a widely accepted definition of counselors' professional competence. Strasser and Gruber (2003) conceptualize this competence as "(1) declarative knowledge about facts and the efficiency of interventions and (2) personal resources (that) (3) lead to reflection on experience which (4) enables the individual counselor to apply her/his knowledge adequately and effectively (...)" (Strasser & Gruber, 2003, p. 381). In the following, we show how the concept of negative knowledge ties in with this definition. We focus on two aspects, namely the efficiency of interventions and counselors' personal resources. In brief, we argue that negative knowledge holds information about what interventions are ineffective in a specific situation (Gartmeier et al., 2010). It also relates to individuals' awareness of blanks or deficiencies in their own knowledge or skills (Gartmeier & Schüttelkopf, 2012).

Research question (RQ) 1: Which facets of negative knowledge can be identified in educational counselors' verbal protocols?

As mentioned above, we draw upon the results of an existing study of elder care nursing (Gartmeier et al., 2010) that differentiated various facets of negative knowledge. Some of these facets tie in with Kottler and Carlson's (2003) description of the various ways in which "processing failures constructively is a big part of what makes

them (i.e., therapists[ii]) good at what they do" (p. 189). One such way is counselors' "recognition that what they were doing was not working" and their readiness "to abandon that strategy in favor of others within their repertoire" (Kottler & Carlson, 2003, p. 190), which is one important outcome of learning from errors. This description relates to the declarative, as well as the procedural, understanding of negative knowledge; the latter understanding describes insights into courses of action that lead to suboptimal outcomes in specific situations. The former declarative understanding describes negative knowledge that is focused on wrong assumptions, e.g., about a particular diagnosis that is at times wrongfully confused with another, seemingly similar one. Both the procedural and the declarative facets of negative knowledge serve discriminative purposes. This is because they may assist an individual in drawing upon correct (and deliberately avoiding incorrect) prerequisites as a basis for any therapeutic intervention and in choosing promising (and purposefully avoiding detrimental) courses of action during this process (Oser & Spychiger, 2005). Pointing out another outcome of counselors' error-related learning processes, Kottler and Carlson (2003) describe an increased acceptance of one's own mistakes and limitations, i.e., a greater willingness to acknowledge one's own fallibility. This relates to what has been described above as the self-reflective function of negative knowledge, that is, addressing one's own limitations or shortcomings, e.g., on the level of one's knowledge (Gartmeier et al., 2010). Various concepts and lines of discussion from the counseling domain fortify our assumption that the described functions of negative knowledge (discrimination/self-reflection) could be relevant in this field: A key challenge in the counseling profession is the complex and ambiguous nature of the cases counselors deal with (Skovholt & Jennings, 2004; Strasser, 2014). Unlike pilots, counselors do not have instruments or devices that can inform them about the current inner conditions of their clients. Instead, their task-specific 'navigation system' mainly consists of their own sensibility, knowledge, and experience. One strategy to develop and refine this system is to reflect upon and draw conclusions from situations in which a course of action led to suboptimal or erroneous outcomes, i.e., to learn from one's errors (Bauer, 2008). Many conclusions that may arise from such situations can be regarded as negative knowledge, e.g., which therapeutic strategies are ineffective under certain circumstances or which assumptions about cause-effect relationships are inadequate. A recent study (Strasser, 2014) indicates that learning from errors is a major source of counselors' professional development. In this respect, experienced counselors emphasize the role of colleagues and supervisors in identifying errors and deficits and in detecting errors' learning potential. This is particularly relevant when faced with critical episodes that entail negative emotions (such as guilt or shame). Supervisors and mentors can prevent counselors from feeling overwhelmed by such emotions. They may enable them to perceive such episodes as opportunities for professional learning (Žorga, 2002). Supervision as a professional means of reflection (Schütze, 2000) may be particularly relevant for the development and transformation of negative knowledge because such knowledge may foster reflective processes (Parviainen & Eriksson, 2006). There is evidence that supervision may help counselors to develop more complex, more extensive, and more coherent knowledge structures (Granello, 2000; Ladany, Marotta, & Muse-Burke, 2001). It is plausible to assume that negative knowledge plays a role in this development. Negative knowledge (pertaining to uncertainties and deficits) may be the starting point for supervision, as well as the result of reflective processes within supervision (in form of more specific negative knowledge pertaining to adequate interventions).

A different line of discussion that relates to the self-reflective form of negative knowledge is currently still viable in the counseling literature and revolves around the concept of *(trainee) impairment* (Elman & Forrest, 2007). This debate focuses on the reasons for the "diminished professional functioning" (Forrest, Elman, Gizara, & Vacha-Haase, 1999, p. 631) of counselors, e.g., due to personal distress, burnout, substance abuse, or incompetence. The concept of self-reflective negative knowledge is relevant here because such knowledge focuses on the limi-

tations of one's own competencies and on the fragile or fragmentary aspects of one's own knowledge. In applying this idea to the counseling domain, one could describe such knowledge as counselors' self-diagnosis of their 'partial impairment'. This is because it represents insights into gaps or uncertainties counselors recognize within their own professional knowledge. Such insights provide reasonable starting points for the closing of such gaps through relevant learning processes and can thus be viewed as a valuable precaution against impairment.

This is particularly important due to what Skovholt and Jennings (2004, p. 20) describe as *premature closure*. This term focuses the tendency of counselors to content themselves with routines and explanations that provide only an inadequate basis for competent counseling, particularly when confronted with non-routine cases. Premature closure may be a challenge that is specifically inherent in counselors' professional development and accounts for research results that examine the notion of expertise in counseling (Lichtenberg, 1997). Given that counselors' may well be in doubt sometimes about whether the way they treat their clients meets the highest and most current standards, negative knowledge can be seen as a step forward, from doubting one's own competencies to acknowledging its deficits and initiating relevant learning processes (Kottler & Carlson, 2003; Strasser, 2014).

Our first research question seeks to confirm and specify the assumptions about the various functions negative knowledge may have for counseling professionals. To answer this question, we analyzed the verbal protocols of educational counselors who reflected on various diagnoses from their field.

RQ 2: How do educational counselors of varying professional expertise differ regarding the amount of negative knowledge they verbalize?

Existing evidence from various fields (Endsley, 2006; NTSB, 1998; Prümper, 1991) suggests that individuals of high expertise seem to be good at avoiding errors that occur because of deficits in knowledge and be quicker than novices in detecting and fixing errors in routine tasks. One possible explanation for both reported results could be that experts possess knowledge that serves as an inhibitory agent and allows them to avoid errors. This could be explained by experts possessing a larger repertoire of situation-specific negative knowledge, which allows for a better ability to anticipate and avoid errors (Gartmeier, Lehtinen, Gruber, & Heid, 2011). This is in line with existing research on the professional development of counselors, which reveals that novice counselors more explicitly and elaborately refer to recent cases (and the troublesome experiences with these cases) when dealing with new clients (Strasser, 2006).

On the other hand, educational counseling is a dynamic profession in which doctrines about therapeutic strategies and interventions underlie trends and changes in the light of new evidence. Hence, even highly experienced and skilled counseling practitioners are faced with situations in which their knowledge and routines may not be applicable. This relates to an understanding of negative knowledge that Parviainen and Eriksson (2006) described as the need to bracket or unlearn one's own knowledge. This notion closely relates to the self-reflective facet of negative knowledge mentioned above.

To sum up, there is conflicting evidence about how negative knowledge and its various facets develop alongside the growing professional experience of educational counselors. The results of the present study should contribute to formulating more specific hypotheses.

RQ 3: How is educational counselors' negative knowledge contextualized?

We further investigate the contextualization of educational counselors' negative knowledge. For the purpose of the present analysis, we specifically examine various professional knowledge contexts relevant to educational

counseling, following the conceptualization of Strasser (2006). The first group of knowledge contexts is primarily acquired through formal learning processes during counselors' professional education: Firstly, educational counselors' disorder-specific knowledge and, secondly, their knowledge about intervention strategies that are relevant with regard to specific problems and disorders (Boshuizen & Schmidt, 1992). Such knowledge is primarily textbook knowledge in the narrower sense, e.g., definitions of diagnoses, scientific differentiations between diagnoses, and symptoms that are typical of particular diagnoses. A second group of knowledge contexts relates more strongly to the experience-based learning of educational counselors, as was described above. These comprise four contexts, with the first of these being knowledge about the enabling conditions of specific disorders, e.g., the biographical or sociocultural conditions of clients that according to counselors' experience, promote the development of particular problems. Furthermore, we focused on counselors' knowledge about the appearance and symptoms of specific disorders. In this knowledge context, educational counselors described typical behaviors of clients with a specific problem, as well as examples of pertinent situations from their personal experience. A further context is comprised of knowledge about the personal prerequisites for interventions, such as one's own emotional experiences and competencies, including counselors' values, attitudes, and goals. Finally, we investigated the contextual conditions of interventions, which are comprised of the legal, societal, and organizational aspects of a counselor's professional practice. We argue that negative professional knowledge relating to the latter four contexts is primarily acquired through the experiencing of episodes. It is primarily knowledge about the impression counselors get from working with clients with a particular diagnosis, which is difficult to acquire through formal learning processes.

RQ 4: How is educational counselors' negative knowledge embedded in episodes?

Existing theorization suggests strong relationships between negative knowledge and personally meaningful, error-related learning episodes. We hence assume that negative knowledge is contextualized in such episodes to a high degree. This assumption relates to existing theorization stressing the role of critical experience in learning (Boshuizen, Bromme, & Gruber, 2004; Kolb, 1984). Experiential learning means constructing new or modifying existing knowledge through active participation in personally meaningful episodes that take place in an authentic context, e.g., a workplace. This idea is reflected in Kolodner's (1983) concept of dynamic memory, which describes the modification of knowledge structures based on the cognitive processing of critical experiences. A counseling-specific example of such an experience is the deterioration of a client's condition during therapy. Such an experience would surely challenge the knowledge and routines of any professional counselor. At the same time, it could serve as a potent starting point for learning processes that may lead to a refinement of a counselors' knowledge and routines. Such refinements, of course, do not occur automatically. They require insights into the nature of the problem at hand, its reasons, and its genealogy (Bauer, 2008). If a professional counselor, however, manages to make sense of such critical experiences, this may well improve his or her performance in similar situations later. This means that it is theoretically plausible to assume that the experience of critical and challenging episodes is closely intertwined with professional counselors developing negative knowledge.

Methods and Sources of Data

The present analysis relies on data that were collected in the context of an interview study with educational counselors in which the prompting task technique (Brewer, 1986; Crovitz & Schiffman, 1974) was applied. Earlier analyses done with these data focused on the formation of illness scripts (Strasser & Gruber, 2015). These anal-

yses showed that only part of counselors' professional knowledge could be related to illness-script categories. Hence, it seemed promising to re-analyze the data while adopting a different theoretical framework.

Respondents

Study participants were educational counselors (N = 31) whose professional experience ranged from one week to 33 years (M = 10.55; SD = 9.91). The subjects were between 22 and 60 (M = 39.1; SD = 10.9) years old. Three groups of subjects were compared; these were categorized based on their degree of professional experience (Novices: less than 2 years of professional practice, N = 12; Semi-experts: 2 to 10 years of practice, N = 17; Experts: more than 10 years of experience in the field, N = 13). All participants had a master's degree in educational science or psychology, one participant had two degrees (psychology and social work). Sixteen (two of the novices, five of the semi-experts, and nine of the experts) participants had completed at least one additional therapeutic training program. These training programs were based on systemic (11), humanistic (6), or cognitive-behavioral (4) approaches.

Procedure

In the study, the counselors were presented with 20 names for typical problems and disorders from their field of work, e.g., "attempted suicide", "depressive resentment", "anorexia", and "autoaggressive behaviour". The participants were asked to explicate the diagnosis and to verbalize everything they knew about it.

Our main objective in selecting the cases was to guarantee domain-specific authenticity. The selection of cases (the problem names) was based on the documented statistics of counseling centers for the mental health of children and youth. The problems were selected to display 1. relevance to the specific counseling domain, 2. substantial variance in the seriousness of the problem, 3. and variety in terms of frequency of occurrence in counseling practice. 4. Additionally, all problems could be described through reference to theoretical concepts (not only by practical experience). This does not mean that problems could be explained on the basis of practical experience but that they were problems that all participants could have had experience with; thus, they could refer to their experiences when talking about the problems. Six professionals with differing levels of experience in the field (ranging from 2.5 to 30 years) were involved in the process of selecting the diagnoses. They rated the selected problems as cases that are common for practitioners. In the main study, subjects had to indicate how many cases from a given category they had already dealt with. The number of cases per year ranged from two (for social incompetence) to 25 (for phobia) per year. We interpreted this as a good indication of the authenticity of the selected cases and their relevance to the domain in focus (child guidance). This is confirmed by current statistics indicating that the selected problems are among the most relevant with regard to educational counselors' professional action and everyday practice (Statistisches Bundesamt, 2016).

In alphabetical order, the problem names were aggressive behavior, anorexia, auto-aggressive behavior, body dysmorphic disorder, depressive mood, disobedience, enuresis, generalized anxiety, hyperactivity, insomnia, lack of learning motivation, lack of self-esteem, learning disability, mental retardation, parental divorce, sexual abuse, social anxiety, specific phobia, substance abuse, and suicidal attempt.

Analyses

The counselors' statements, after being collected in the described way, were audio-recorded and transcribed verbally. The resulting written protocols were content-analyzed by means of a categorical scheme that was developed deductively, as well as inductively. The deductive categories were based on the theorization of Gartmeier

et al. (2008), Oser and Spychiger (2005) and Parviainen and Eriksson (2006), as well as on the categories developed by Strasser (2006). To answer the research questions regarding the contextualization and embeddedness of negative knowledge in narrative structures, additional categories were created. Regarding contextualization, the various knowledge contexts described above were implemented as categories and coded by the raters. Furthermore, the raters coded whether each statement of negative knowledge was related to an episode or not.

In order to ensure the quality of the analytic process, a second rater was trained to apply the coding scheme to the material. After this person had rated a random selection of interviews, a Cohen's Kappa-value of 91.7% was calculated, indicating the high reliability of the ratings. In order to compare different groups, univariate ANOVAS were calculated, with expertise as the dependent variable. If the homogeneity of variances was detected by means of a Levene test, a Bonferroni post-hoc test was used (Field, 2013).

Results

The reporting of the outcomes of our study follows the research questions posed.

Results for Research Question 1 (RQ 1)

Which facets of negative knowledge can be identified in educational counselors' verbal protocols?

We were able to differentiate two general uses of negative knowledge that tie in with existing theorization on the issue: Firstly, as hypothesized, negative knowledge served a discriminative function in the interviews, e.g., to point out the non-identity of two diagnoses. On average, $M = 13.55$ ($SD = 6.22$) relevant statements per interview could be identified. Secondly, negative knowledge was used in the context of self-reflective statements, e.g., in order to express deficits in educational counselors' professional knowledge, at a frequency of $M = 3.45$ ($SD = 0.52$) per interview. In addition, a small number of the statements that were labelled as negative knowledge could not be clearly assigned to either of the two described knowledge facets. These were, however, were included in the overall analysis (see Table 1). In the following, the two functions of negative knowledge will be elaborated upon in greater depth.

Self-Reflective Negative Knowledge

Statements that were characterized as self-reflective negative knowledge focused on limitations or deficiencies the counselors' self-perceived, e.g., concerning fragmentary or outdated aspects of their knowledge. Here are two examples[iii]: 1. "I would have to check the literature first to find out about the psychodynamic background of the phenomenon" (Int. #1-3), and 2. "I don't yet have an appropriate concept for the problem of bedwetting" (Int. #1-4). In these statements, the educational counselors address aspects of their own knowledge that are fragmentary, regarding which they feel that they do not have a sound enough understanding of the phenomenon they are confronted with. A slightly different but closely related use of negative knowledge indicated an awareness of outdatedness, especially that of practices or therapeutic interventions: "This would be a classic case of behavior therapy, but this is not done any more today" (Int. #1-5).

Discriminative Negative Knowledge

As could be expected from the theory, the educational counselors used negative knowledge for discriminative purposes, either with respect to certain concepts (declarative) or regarding therapeutic procedures or strategies

(procedural): "This is not incidental bad mood anymore; this is actually depression" (Int. #3-15; Declarative). "Some parents think that's just private lessons, but the kids are taught alternative learning strategies" (Int. #3-2) (Declarative). In discriminating between similar phenomena, knowledge about what something is not or which attributes do not belong to something seems to be a useful cognitive resource for the educational counselors in our study. The examples given above highlight discriminations the respondents made between certain conceptions. One reason for this was the similarity of concepts; another was the difficulty of identifying the point of transition from one concept to another. A similar focus was overt in terms of procedure: "The pace is critical here. You must not push the client towards a clinical treatment; this often causes reactance" (Int. #4-2) (Procedural). With regard to many counseling practices, it seems important for a professional counselor to be aware of certain caveats in order to avoid a negative development in the counseling process, such as in the latter example, where a strategy to avoid a client's reactance is described.

Results for Research Question 2 (RQ 2)

How do educational counselors of varying professional expertise differ regarding the amount of negative knowledge they verbalize?

Overall Negative Knowledge

First, we compared the overall levels of negative knowledge that emerged in the interviews across the three expertise levels (novices: M = 14.08, SD = 7.27; semi-experts: M = 18.06, SD = 9.55; experts: M = 22.38, SD = 19.87). A one-way ANOVA, $F(2, 39)$ = 1.24, MSE = 2.05, p = .30, η^2 = .06, showed no significant differences. However, a tendency towards an increase in educational counselors' negative knowledge over time is apparent.

Self-Reflective Negative Knowledge

Regarding the educational counselors' self-reflective and discriminative negative knowledge, we calculated ANOVAs only for the overall levels, not the levels of the sub-facets. This was due to the small numbers of statements that emerged regarding the sub-facets. This is not surprising given that negative knowledge was not deliberately targeted in the interviews. Interestingly, regarding the level of self-reflective negative knowledge (novices: M = 4.83, SD = 3.22; semi-experts: M = 4.24, SD = 3.15; experts: M = 1.15, SD = 2.08), we found that novices and semi-experts made significantly more statements than experts (one-way ANOVA, $F(2, 39)$ = 6.13, MSE = .50, p < .05, η^2 = .24). It seems that reflecting about own knowledge and those areas in which it is still fragmentary and possibly insufficient is an issue for a substantial period of a counselor's professional career and only decreases after reaching a higher level of proficiency.

Discriminative Negative Knowledge

For discriminative negative knowledge (novices: M = 7.50, SD = 5.87; semi-experts: M = 13.00, SD = 7.84; experts: M = 19.85, SD = 17.92), a one-way ANOVA, $F(2, 39)$ = 3.59, MSE = 1.89, p < .05, η^2 = .16, showed a substantial difference, with experts verbalizing significantly more discriminative negative knowledge. This result fortifies the assumption that with prolonged experience in educational counseling, knowledge about differential diagnoses increases.

Table 1

Prevalence of Negative Knowledge in the Various Knowledge Contexts and Expertise-Related Differences

	Overall		Novices		Semi-Experts		Experts							
														Groups
Negative knowledge	M	SD	M	SD	M	SD	M	SD	F	df	MSE	p	η²	post-hoc
Diagnosis-related	9.03	5.87	8.17	4.76	8.53	5.69	10.38	7.17	0.52	2, 39	0.91	.60	.03	-
Intervention strategy	5.17	1.73	2.83	4.24	4.71	3.31	7.92	8.05	2.84	2, 39	0.88	.07	.13	3 > 1
Contextual conditions	2.12	1.34	1.00	1.48	2.59	2.53	2.54	8.05	2.24	2, 39	0.34	.12	.11	-
Personal prerequisites	1.21	1.50	1.33	1.88	1.82	1.88	0.31	0.75	3.29	2, 39	0.26	.05	.14	1,2 > 3
Enabling conditions	0.55	1.18	0.42	0.67	0.12	0.33	1.23	2.55	2.21	2, 39	0.23	.12	.10	-
Appearance and symptoms	0.26	0.66	0.33	0.65	0.29	0.77	0.15	0.56	0.25	2, 39	0.10	.78	.01	

Note. SD = Standard deviation; SE = Standard error; F-Test for comparison of means; Post-hoc procedure for all facets: Bonferroni and Tamhane for enabling contextual conditions; 1 = Novices; 2 = Semi-experts; 3 = Experts.

Results for Research Question 3 (RQ 3)

How is educational counselors' negative knowledge contextualized?

We drew on the classification scheme described above, which differentiates diagnosis-related knowledge, intervention strategy, the contextual conditions of the intervention, personal prerequisites for the intervention, enabling conditions, appearance, and symptoms. For an easier overview, the outcomes of these analyses are displayed in Table 1. What is obvious from the overall means column is that most negative knowledge directly concerns the various diagnoses, as well as the intervention strategies relating to these. Because the diagnoses were used as prompts in the study, it is plausible that most statements revolved around them. Also, the higher number of statements concerning intervention strategies makes sense given that they directly relate to the professional mission of the educational counselors. In context of the latter factor, the post-hoc procedures detected a difference between expert and novice educational counselors, with experts making more statements of negative knowledge than novices ($p < .10$). Interestingly, a significant difference in the opposite direction was detected between novices, semi-experts, and experts in terms of the level of personal prerequisites for educational counseling.

Results for Research Question 4 (RQ 4)

How is educational counselors' negative knowledge embedded in episodes?

Overall, 19.6% of negative knowledge was embedded in episodes. The results of the comparison of expertise levels in terms of episodic statements (one-way ANOVA, $F(2, 39) = 2.58$, $MSE = .93$, $p = .09$, $η^2 = .12$) showed a difference between novices and experts ($p < .10$). This result indicates that experts possess a significantly higher amount of negative knowledge that is embedded in episodes than both novices and semi-experts.

Discussion

In the present paper, we argue that educational counselors possess a differentiated repertoire of negative knowledge and utilize it in their professional work. As is evident from the existing theorization and research, such knowledge is closely interrelated with learning from errors at work and is a valuable but poorly researched aspect

of professional knowledge. In the present study, we collected verbal protocols through prompting-task interviews, which were then content-analyzed with a high level of reliability. The guiding question was whether the usage of negative knowledge changes with growing professional experience among educational counselors. Firstly, the results of the present study showed that the theory of negative knowledge is useful in obtaining a more differentiated understanding of professional counselors' competence. Beyond showing negative knowledge to be embedded in the subjects' professional knowledge structures, our results are in line with existing theorization regarding its functions because we could identify discriminative and self-reflective negative knowledge in the present interview data. Moreover, the results allow for more differentiated insights into professional counselors' knowledge restructuring and expertise development.

Our results show that negative knowledge is used in discriminating between phenomena (Oser & Spychiger, 2005). Thus, it can be seen as a useful element of diagnostic processes, especially when differential diagnostic strategies are applied (Schmidt et al., 1996). What needs to be stressed, however, is that the study participants were not diagnosing in the present study. Rather, they were asked to freely elaborate upon various diagnoses and to verbalize their knowledge about these (Strasser, 2006). This means that our results do not provide detailed insights into the role negative knowledge plays in diagnostic processes. However, they suggest that future research in this direction is promising. The experts in the present study showed significantly more discriminative negative knowledge than novices did. This could be related to the ability of the experts to quickly rule out diagnoses based on their declarative negative knowledge; a hypothesis that could be confirmed in future research. This line of reasoning is in line with Boreham (2013), who pointed out that diagnosis involves a very broad array of knowledge-based differential assessments, e.g., of normal vs. abnormal system states and of context-based vs. system-based causal conditions. Further, he argues that future research should adopt a broader view of the various forms of knowledge involved in diagnostic reasoning processes. We argue that our results open up a promising research perspective.

Regarding the self-reflective notion of negative knowledge, we could identify relevant examples focused on deficits in the counselors' own knowledge or skills. Regarding differences in knowledge and expertise level, experts verbalized substantially less self-reflective negative knowledge than novices and semi-experts. This is in line with Parviainen and Eriksson (2006), who stress that a contemporary conception of expertise must incorporate experts' awareness of deficits in their own skills and knowledge, as well as their ability to unlearn outdated aspects of their knowledge. Surely, educational counseling is a dynamic domain in which standards and practices change, which can plausibly be related to knowledge being outdated and the need to unlearn. However, this seemed to affect the experts in our study to a lesser extent than the other participants. Another explanation for this outcome could be that highly tenured experts are more likely to be well-established in their profession and to be sought out for advice by colleagues and clients. This means that they have advanced to a level of proficiency at which they have developed their own style of working and their own perspectives on diagnoses, which is, of course, based on a large repertoire of cases and a highly coherent and differentiated knowledge. In verbalizing this knowledge, the experts in the present study utilized comparatively few statements of self-reflective negative knowledge.

Regarding the various knowledge contexts, the interviews showed that most statements relating to negative knowledge were in the diagnosis-related and intervention-related contexts. In the latter context, experts showed more negative knowledge than novices ($p < .10$). This outcome could be related to the observation that "as practitioners feel more confident and assured as professionals with the passing of time, also they generally see more clearly the limitations in what they can accomplish" (Rønnestad & Skovholt, 2003, p. 38). What is interesting here

is that in the study by Strasser (2006), the result was the same for positive knowledge in the intervention-related context. The current focus on the negative aspect of such knowledge did not uncover any unusual patterns.

Moreover, both novices and semi-experts showed more negative knowledge on the level of personal prerequisites. This is an interesting reversal of the results of Strasser (2006), who found that a group of expert educational counselors reported more positive knowledge in terms of personal prerequisites. This knowledge facet strongly relates to the very personal and idiosyncratic style a professional counselor may develop after a very long period of professional practice; Rønnestad and Skovholt (2003) specify a time period of more than 15 years in this respect. The larger number of statements in this knowledge context on the part of novices and semi-experts indicates that these groups of respondents are well aware of their need to develop further competencies in these areas. Overcoming one's personal deficits, as well as accepting and integrating one's weaknesses into a coherent professional identity, is a major target for their further development. Because such a development involves difficult emotional processes, external support is needed. Various forms of supervision may thereby be helpful in fostering one's professional learning (Žorga, 2002).

This outcome helps to clarify a potential misunderstanding regarding the conception of the self-reflective facet of negative knowledge as we have adopted it here. Such negative knowledge could be described as a form of self-awareness on the part of a counselor, that is, a focus on lacks, deficits, or weaknesses in one's own knowledge. In that sense, it could be assumed that a novice in a field, with absolutely no previous knowledge, would possess a maximum of such knowledge. However, this is not the case, because negative self-reflective knowledge is related to the knowledge a person already has in a certain domain. In that sense, negative self-reflective knowledge is a sort of metacognitive-knowledge (Pintrich, 2002). This means that an absolute novice in a domain not only does not have any relevant knowledge in this field but is also unaware of this lack of knowledge. In that sense, having negative self-reflective negative knowledge represents an "informed" way of not knowing and relates to a person's awareness of specific lacks or deficiencies that exist in his or her knowledge (Parviainen & Eriksson, 2006).

Moreover, experts showed more negative knowledge embedded in narrative, episodic structures than novices ($p < .10$). This result is plausible because experts have experienced a greater range of relevant situations and are therefore better able to relate general diagnoses to narrations of particular cases they have experienced. In this way, they also use negative knowledge. Summing up, very different patterns emerged for the different facets of negative knowledge in the present study, but they are all in line with existing research results.

In terms of limitations, three critical points must be addressed with respect to the present study: First, one limitation is that the study was a secondary analysis of data. This means that the study did not purposefully target negative knowledge. Future research should use a more specific approach, e.g., designing prompts so that participants focus their reflections upon their error-related and negative knowledge (cf. Strasser, 2014). Second, if calculated conservatively, the present study seems to suffer from a somewhat low statistical power of $\beta = .45$ (assuming a medium-sized effect and 5% α-error probability), indicating a risk of producing false negatives, i.e., of not identifying actual effects. However, we designed this experimental study to partly compensate for this deficit in that we allowed each of the $N = 31$ educational counselors to reflect upon a rather broad range of 20 diagnoses. By using such a large variety of diagnoses, we sought to compensate for the different focal points of the knowledge of the counselors in our sample. Because this aspect of our study could not be reflected in the *a priori* power calculation, we argue that this estimate is potentially too conservative in the present case. Thirdly, an important factor that is

not targeted in the present study is how the respondents' negative knowledge relates to the degree to which they act successfully. This, however, would be a very promising goal for future investigation.

Notes

i) This is a literal translation of the German term "Erziehungsberater", describing specialized counselors who work on all questions related to educational, family, or school-related issues. The institution that has the greatest similarity in the US system is often labeled "child guidance".

ii) Despite the fact that Kottler and Carlson (2003) mostly speak of therapy and therapists in their book, many of the examples they report (e.g., from family therapy) are very relevant to the context at hand, i.e., educational counseling. That is why we felt safe in relying on this literature.

iii) All statements are translated from the original transcripts.

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Competing Interests

The authors have declared that no competing interests exist.

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