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Title	The reality of reality shock for inclusion: How does teacher attitude, perceived knowledge and self-efficacy in relation to effective inclusion in the classroom change from the pre-service to novice teacher year?
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Highlights

- There is little empirical evidence about how reality shock operates in teacher education for inclusion.
- We measured how attitude, knowledge and self-efficacy change between the pre-service and novice teacher year.
- There was a significant and large drop in these in our sample of 122 teachers.

Title

The reality of reality shock for inclusion: How does teacher attitude, perceived knowledge and self-efficacy in relation to effective inclusion in the classroom change from the pre-service to novice teacher year?

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Title

The reality of reality shock for inclusion: How does teacher attitude, perceived knowledge and self-efficacy in relation to effective inclusion in the classroom change from the pre-service to novice teacher year?

Abstract

There is little empirical attention in the literature to how beginning teacher perceptions in relation to inclusion change as they progress from the pre-service to novice teacher year. This paper reports on a panel study of a cohort of pre-service teachers in the Republic of Ireland, which tracks their transition to the novice teacher year using a new scale. Analysis of the data indicates that this transition results in a significant drop in attitude, perceived knowledge and self-efficacy in relation to inclusion.

Keywords

Pre-service; Novice teacher; Inclusion; Special educational needs; Reality shock; Teacher self-efficacy; Longitudinal

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1. Introduction

This paper reports on a panel study of the perceptions of beginning teachers in the Republic of Ireland about their attitude, self-efficacy and knowledge in relation to teacher education for inclusion, and how these change between the pre-service and novice teacher years. This paper is the first empirical study to measure changes in teacher perceptions in relation to inclusion across the pre-service and novice teacher years.

We also make the argument in this paper that in the evaluation, and practice, of teacher education for inclusion there needs to be more focus on propositional knowledge about particular strategies that may be effective at including children with SEN in mainstream classrooms.

1.1. The Transition to the Novice Teacher Year

The change in professional experience as beginning teachers move from pre-service education to being novice teachers has been characterised as a reality shock (McCormack & Thomas, 2003) and praxis shock (Ballantyne, 2007; Feiman-Nemser, 2001). Both represent the phenomenon whereby when novice teachers are involved in the transition, and for the first time become responsible for their own classrooms with all the challenges that that involves, the extent to which they think they have the ability to be effective in their role as teachers is negatively affected. We know from Veenman's (1987) seminal synthesis of over 100 studies the key factors that challenge beginning teachers in the novice teacher year. The most common of these are classroom management and organization, motivating pupils, assessment, relations with parents, perceptions of insufficient resources, dealing with the problems of individual students and addressing individual differences. These factors continue to predominate in more recent literature (Dicke, Elling, Schmeck, & Leutner, 2015; Liston,

Whitcomb, & Borko, 2006; Schuck, Aubusson, Buchanan, Varadharajan, & Burke, 2018). It has also been noted that novice teachers, as in some other professions, are in many territories often expected to take on the same responsibilities and workload as more experienced colleagues (Schuck *et al.* 2018, OECD 2019).

A number of studies have specifically identified working with and effectively including children with diverse needs in the class as a challenge for new teachers (Anthony, Hunter, & Hunter, 2015; Fantilli & McDougall, 2009; Meister & Melnick, 2003).

Although rarely stated explicitly in the literature, there is an underlying assumption that a) such factors are the underlying causes of reality/praxis shock, and b) that reality/praxis shock could be equated to changes in teacher perceptions such as self-efficacy. If this assumption is allowed, then empirical investigation of how such perceptions change between the pre-service and novice teacher year may provide insights into how we prepare beginning teachers. Yet most studies focus on reports from participants in the novice teacher year alone. It is true that there have been a number of larger scale longitudinal studies focusing on the impact of teacher induction, measuring change in constructs including teacher attitude, which make use of extant national survey databases (Glazerman *et al.* 2010; Ronfeldt & McQueen 2017). However, these studies focus on surveys of teachers in the first few years of teaching in schools and do not encompass data which bridge from pre-service to in-service phases. Yet it seems clear that in order to properly assess the impact of the novice teacher year, ideally measurement should be taken for participants in their pre-service year to establish a baseline, and then repeated in the novice teacher year to be able to confidently assess change. There have indeed been a few studies that have undertaken such evaluations. For example, Hoy and Spero (2005) measured self-efficacy with 29 pre-service teachers at the start and end of their pre-service education, and then again at the end of their novice teacher year. Their results showed a significant drop in self-efficacy from the end of pre-service to the end of the novice

teacher year. With a larger sample (n=362), Dicke *et al.* (2015) measured teacher self-efficacy from the mid-point of the final year of teacher preparation through to the mid-point in the novice teacher year, and their results indicated small increases in self-efficacy over this time span. However, our search of the literature indicated no substantive studies focusing specifically on teacher education for inclusion which had tracked participants from the pre-service through to the novice teacher year. The study reported on here is one of the first empirical studies to do so.

1.2. Teacher Induction in the Novice Teacher Year

The potential importance of induction in the novice teacher year to help beginning teachers deal with the challenges of the transition to novice teacher is well recognised in the literature. Induction can include a variety of approaches – mentoring with more experienced teachers, orientation, professional development workshops, additional assistance in the classroom, meetings with supervisors or leaders in school, reduced timetables and allocated time for reflection and professional development (Ingersoll & Smith, 2004; OECD, 2005). Ingersoll and Strong's (2011) review of fifteen key studies since the 1980s on the impact of induction and mentoring is well known, indicating that in general induction and mentoring have a positive impact on teacher retention, student outcomes and teacher classroom practices.

The pattern, intensity and rate of take up of induction support provided to teachers vary considerably between territories. The OECD (2019) TALIS 2018 study reported on a large scale survey of teachers and school principals across 48 countries, including many in Europe (but not Ireland), which included an element focused on induction and mentoring. Across the study, 74% of teachers worked in schools with formal or informal induction programmes, although the average rates across countries varied considerably, as did the rate

of take up of induction offers. In many territories, teachers have an element of choice in relation to whether or not they make use of the induction support on offer. Uptake for both formal and informal induction and early career professional development was at 51% relative to the availability of programmes across the study.

1.3. Pre-service teacher education and induction in the Republic of Ireland

Primary phase pre-service programmes in Ireland include 4 year undergraduate and 2 year postgraduate programmes. At secondary level, the main route is a two year postgraduate programme. Pre-service student teachers are taught at their university teacher education provider and also have extended placements in school. All programmes are expected to ensure that schools nominate cooperating teachers to support and mentor student teachers when they are on placement, and teacher education provider tutors work closely with schools and cooperating teachers to support student teachers with their development. Tutors will visit and observe student teachers when on placement, providing feedback on progress. Cooperating teachers, working in liaison with university tutors, will usually incrementally increase the level of responsibility student teachers have for teaching the whole class over the course of the placement. Even when taking responsibility for the whole class, the student teacher will typically be able to easily call on the support of the cooperating or class teacher if needed (Teaching Council, 2011).

In line with international trends towards the implementation of more systematic, integrated and intensive programmes to support induction and probation (Ingersoll & Strong, 2011; OECD, 2014; OECD 2019), Ireland introduced a new compulsory induction framework for all newly qualified teachers (Teaching Council 2011, Hyland 2013). The framework incorporates school-based and additional professional learning activities to address the needs of novice teachers. It is led at school level by a Professional Support Team

(PST) consisting of experienced colleagues who have engaged in a programme of mentor professional development led by the National Induction Programme for Teachers (NIPT) (Teaching Council, 2017). The framework, completion of which is linked to registration as a qualified teacher (Teaching Council, 2017), includes school based input as well as online resources and face to face sessions via the NIPT. Novice teachers are also required to attend 24 hours of induction programme workshops in two hour sessions, which take place at Education Centres in various locations (Smyth, *et al.*, 2016). Themes covered include classroom management and organisation, working with parents, assessment, literacy, numeracy, differentiation and inclusion. Novice teachers also have support from a mentor and other members of the PST in a collaborative process of identifying learning needs and planning opportunities to meet these. Activities include the opportunity to observe other teachers and to be observed in their own teaching, as well as regular meetings with mentors. Smyth *et al.* (2016) compared the new framework to approaches in other territories and concluded that it demonstrates the typical features of a modern induction programme such as planned meetings with, and supervision by, principals or experienced teachers, courses or seminars, and networking or collaboration with other new teachers (OECD, 2014).

1.4. Teacher Education for Inclusion at Induction

Florian (2012) conceptualises inclusion in relation to the work of teachers in mainstream classes as involving avoiding marginalisation arising from labelling, avoiding pre-conceived limits about students' abilities, making sure that learning opportunities can be accessed by all students, and a shift to focusing on individual learning needs of all students rather than considering the needs of particular groups such as special educational needs as an "afterthought". Such an approach reflects the broad trend in theory and practice in which inclusive education has increasingly been understood as encompassing all learners,

particularly those seen as marginalised or more vulnerable to exclusion, but not restricted to those with identified special educational needs. (e.g. Kozleski, E., 2018; Waitoller & Artiles, 2013). Such an approach encompasses a range of individual needs, not just in terms of academic ability, but also potentially in relation to factors such as cultural and language background.

There has been some limited empirical consideration in the literature of how to support teachers in achieving effective inclusion in the induction phase, although references are typically tangential to broader discussions about induction in general. A database search on SCOPUS and PsycINFO indicated no substantive empirical studies which have focused on the design and content of induction programmes in relation to the effective inclusion of children with diverse needs. Fantilli and Mcdougall (2009) in their study of 86 novice teachers did identify lack of preparation for working with children with special needs as one of the key concerns identified by teachers in the induction year, echoing a similar pattern in Meister and Melnick's (2003) study of 276 beginning teachers.

As noted, the empirical change in teacher perceptions between pre-service and in-service teacher education for inclusion has received little attention in the literature. A database search on SCOPUS and PsycINFO using combinations of the terms inclusion, pre-service, novice, induction, special educational needs and longitudinal produced no substantive empirical papers that have explored changes in teacher perceptions between pre-service and in-service teacher education for inclusion for teachers working in mainstream settings. Yet it seems reasonable to propose that learning more about if and how such changes occur may facilitate the design of appropriate pre-service education and particularly induction support which may be able to ameliorate the impact of praxis/reality shock on novice teachers in relation to the effective inclusion of children with diverse needs in mainstream classrooms.

1.5. Constructs in Teacher Education for Inclusion – Attitude, Efficacy and Knowledge

Much of the evaluative literature on teacher education and teacher practice for inclusion uses either attitude (O'Toole & Burke, 2013; Sharma, Aiello, Pace, Round, & Subban, 2018; Sharma, Simi, & Forlin, 2015) or self-efficacy (Loreman, Sharma, & Forlin, 2013; Savolainen, Engelbrecht, Nel, & Malinen, 2012; Sharma, Loreman, & Forlin, 2012) as constructs which can be both measured and play a role in mediating the behaviours of teachers in terms of effective inclusive practice. Montano and Kasprzyk (2008) define attitude in simple terms as a person's overall favourableness or unfavourableness towards performing a particular behaviour. They argue that attitude as a construct is closely aligned to beliefs about outcomes, i.e. that someone who has strong beliefs that a particular behaviour will lead to a positive outcome will have a positive attitude in relation to that behaviour. Bandura's (1977) social cognitive theory sets out that self-efficacy is a construct that encapsulates individuals' beliefs about their capabilities to successfully carry out a particular course of action. Self-efficacy beliefs are at least to some extent independent of measures of actual or inherent ability, and in Bandura's (1977) model, influence intention, motivation and engagement in relation to particular task domains.

In this study, we make use of these key constructs, i.e. attitude and self-efficacy, when considering the impact of reality/praxis shock for novice teachers, in the domain of inclusion. However, we are also aware that the social psychology literature has seen an increased emphasis on knowledge as well as attitude and confidence when considering behaviour change (see Riebl et al. 2015). Montano and Kasprzyk's (2008) Integrated Behaviour Model (IBM) has been particularly influential in the last ten years. The authors specifically focus on knowledge in the IBM because they argue that knowledge is a mediating factor for behaviour, because even with intention, lack of knowledge will mean that the desired

behaviour cannot be executed. This coincides with an increasing emphasis on the role of knowledge and skills as well as attitude in teacher education for inclusion as recently argued by Author (2019a) and as demonstrated in the Profile of Inclusive Teachers developed by the European Agency for Special and Inclusive Education (EASNIE) in the Teacher Education for Inclusion project (EASNIE, 2012). However, this emphasis on knowledge and skills, and the focus on knowledge in social psychology, has had little application in instruments used to evaluate teacher education for inclusion.

For this study, we developed an innovative instrument that encompasses not only attitude and teacher efficacy, but crucially as well perceived knowledge in relation to effective strategies for the inclusion of children with diverse needs in mainstream classrooms, based on the Profile of Inclusive Teachers. The initial development and evaluation of this instrument is described in this paper.

1.6. Measuring constructs across the pre-service and novice teacher year

Searches on the SCOPUS and PSYCINFO databases indicated few substantive studies in teacher education for inclusion which have tracked students from their pre-service to novice teacher year, using either the constructs attitude or self-efficacy, although Author (2019a) did explore changes just in self-efficacy for inclusion for a sample of 32 beginning teachers in England, which showed no significant change during the novice teacher year.

1.7. The Teacher Education for Inclusion Project

EASNIE undertook this project from 2010 to 2012, in which it explored how European countries prepared teachers via initial teacher education to be inclusive. The project involved visits to 14 countries to learn about their teacher education system and approach to inclusion as well as a series of round table knowledge generation events involving 55 experts

from 25 countries, which considered what attitudes, knowledge and skills or abilities were needed for beginning teachers to be effective inclusive teachers. It culminated in a series of outputs, one of which was the Profile of Inclusive Teachers (EASNIE, 2012), which is a framework of core values and areas of competence. The profile broadly aligns with Florian's approach to conceptualizing inclusion, having, for example, an emphasis on having high expectations for all learners.

For each area, the attitudes, knowledge and skills required for that competence are enumerated. The Profile made explicit reference to frameworks for considering attitude, and its relationship to knowledge, based on social psychology, such as Bohner and Dickel (2011). In relation to the overall focus on attitude, knowledge and skills, reference was also made to Shulman's categorisation of professional learning in terms of the apprenticeships of the head, hand, and heart (Shulman, 2007)

The profile has, it has to be said, had limited visible impact on policy and practice, although there has certainly been awareness of it by researchers in the field (Deng, Wang, Guan, & Wang, 2016; Engelbrecht, 2013; Watkins & Donnelly, 2012). Nevertheless, the framework was considered a good fit for developing an instrument for a number of reasons. Firstly, it was developed collaboratively by a range of teachers and experts from different professional groups across Europe. Although it is common and indeed recommended to develop measurement scales based on input from experts in the field (Clark & Watson, 1995; Netemeyer, Bearden, & Sharma, 2003), typical logistical and financial constraints usually mean that a much smaller number of professionals contribute to the development of an instrument. The use of the profile offered the opportunity to develop an instrument based on a very large expertise pool. Secondly, its focus on knowledge and skills, as well as attitude, represents, as noted, a growing consensus in teacher education for inclusion that all of these aspects of practice need to be developed if teachers are to become effective at including the

needs of all learners in their classrooms (Florian, Young, & Rouse, 2010; Gerber, 2012; Symeonidou, 2017; Watkins & Donnelly, 2012). Thus, the profile includes a specific focus on propositional knowledge related to effective inclusive strategies. As noted, we were also aware of theoretical developments in social psychology, which have positioned knowledge as a key factor mediating intention to undertake a specific behaviour. Our review of the literature on evaluation methods for teacher education for inclusion indicated that there was no commonly used instrument that included knowledge as a construct in the development of the scale. Accordingly, our research question for the study concerned the change in knowledge, as well as self-efficacy and attitude, as beginning teachers move from the pre-service to the novice teacher year.

2. Methods

2.1. The Study

The study was based on a panel survey of pre-service student teachers completing their programmes in the Republic of Ireland in the summer of 2016, with a follow up survey in their novice teacher year in 2017. In addition, a sample of these beginning teachers participated in semi-structured interviews at the same time points. This paper focuses on the survey data alone; the interview data are reported on elsewhere (Author 2019b).

2.2. Survey Instrumentation

Using the Profile as a basis for instrument development

We first describe how we employed an accepted process for instrument development (Field, 2009) whereby we created item statements derived from the Profile to be included in the survey, to represent the constructs in question.

The Profile outlines a range of attitudes, knowledge and skills in relation to four core values and eight areas of competence, to be addressed in initial teacher education to prepare all new teachers to become more inclusive (EASNIE, 2012). The Profile's four core values and linked areas of competence are shown in Table 1.

Table 1

The EASNIE Profile

Core Value	Necessary Areas of Competence
1. Valuing student diversity – student difference is considered as a resource and asset to education	• Conceptions of inclusive education • The teacher's view of learner difference
2. Supporting all learners – teachers have high expectations for all learner's achievement	• Effective teaching approaches in heterogeneous classes • Promoting the academic and social learning of all learners
3. Working with others – collaboration and teamwork are essential approaches for all teachers	• Working with parents and families • Working with a range of other educational professionals
4. Continuing professional development – teaching is a learning activity and teachers must accept responsibility for their own lifelong learning.	• Teachers as reflective practitioners • Initial teacher education as a foundation for ongoing professional learning and development

These areas of competence are set out in terms of underpinning attitudes, with associated knowledge and skills to be developed in order to be implemented in practice**.** For example, Table 2 shows some of the attributes listed for area of competence *Effective teaching approaches in heterogeneous classes* (within Core Value 2 – Supporting All Learners).

Table 2

Attributes for Effective Teaching Approaches in Heterogeneous Classes

Area	Attributes
Attitude	• learners' abilities are not fixed • all learners have the capacity to learn and develop • effective teachers are teachers of all learners
Knowledge	• differentiation of curriculum content, learning process and learning materials to include learners and meet diverse needs personalised learning approaches for all learners that support learners to develop autonomy in their learning • the possible strengths and weaknesses of the educational system that they work in have to be acknowledged and understood by teachers
Abilities/Skills	• the ability to work with individual learners as well as heterogeneous groups • the ability to facilitate co-operative learning where learners help each other in different ways, including peer tutoring – within flexible learner groupings

We postulated that respondent perceived ability (or skill) in relation to the defined task domains was effectively equivalent to self- efficacy. Thus, for example, the perceived ability to work with individual learners as well as heterogeneous groups was equivalent to a statement relating to self-efficacy.

We also postulated that respondent perceived level of understanding in relation to the knowledge items was equivalent to perceived knowledge. Perceived knowledge as an

established construct in the social psychology literature identifies the extent to which someone feels that they have an understanding of a particular area of declarative or procedural knowledge. The construct has been applied in a range of contexts including teacher perceptions of safety (Koh, Chai, & Tsai, 2014) and teacher knowledge of technological pedagogical content knowledge (Chai, Koh, Ho, & Tsai, 2012).

Logistical limitations in the study design precluded collecting data on actual knowledge. It could of course be argued that it would be preferable to measure actual knowledge in addition to perceived knowledge. There is some debate in the literature on professional education about how these correlate with some studies e.g. (Ackerman, Beier, & Bowen, 2002) indicating a high degree of association. Sitzmann, Ely, Brown, and Bauer's (2010) review of 23 studies concluded that there was a moderate degree of association, a finding replicated in later studies such as Zell and Krizan (2014). However, we also posit that perceived knowledge can be considered as relating to overall confidence to apply knowledge in professional contexts, and thus has considerable merit in and of itself as a measure.

The project team constructed statement items for each area of competence, reflecting the concepts in the framework which mapped on to the concepts represented in the list of attributes, choosing attributes which were judged representative of the concepts presented. A group of three project researchers with expertise in the field of teacher education for inclusion worked iteratively together in this selection process, with notes taken indicating how the items were derived from the profile. An example of the derived items for area of competence "Valuing Learner Diversity" is shown in Table 3.

Table 3

Derived Items for Valuing Learner Diversity

Area and Derived Item	Original Profile Text
Attitude: "Categorising and labelling of learners is a positive tool for learning"[1]	"categorisation and labelling of learners can have a negative impact upon learning opportunities."
Knowledge (perceived knowledge): "I understand how to include children with a range of cultural, linguistic and social backgrounds in the classroom"	"understand … essential information about learner diversity (arising from support needs, culture, language, socio-economic background etc.)"
Skills/abilities (self-efficacy): "I feel confident in dealing with the needs of different learners in the classroom"	"identifying the most appropriate ways of responding to diversity in all situations; addressing diversity in curriculum implementation; using diversity in learning approaches and styles as a resource for teaching"

[1] Reverse item

A total of 28 statement items were initially created, broadly equally mapped to the attitude, knowledge and skills categories across the Profile. In order to maintain the brevity of the scale, in four instances where there was an element of conceptual duplication across different profile sections, statement items were created that mapped across those instances.

A 6-point anchor with responses from Strongly Disagree (1) to Strongly Agree (6) was employed. Expert faculty members in London, Manchester and the Republic of Ireland were asked to review the scale as a process of content validation, and asked to comment on the usefulness and clarity of each item in relation to the measurement of the constructs of attitude, knowledge and skills. These reviewers were provided with a draft of the literature review and the profile mapping exercise. Based on these recommendations, and further discussion by the project researchers, 2 items were deleted. The revised instrument was

further piloted for clarity of the items by 32 pre-service students in Ireland, and further minor revisions made based on their feedback.

The final instrument had 26 items and was incorporated into a survey which included a range of questions on demographic attributes, as well as questions on their experience in the university and school placement aspects of their pre-service programme.

2.3. Distributing the Initial Survey

The finalised survey was advertised via teacher education providers in Ireland directly to their students, and via teacher unions, student unions and professional development bodies, as well as a limited social media campaign.

The initial survey was open for responses from April to June in 2016. Following data cleaning, the total sample was 437 responses with 430 complete or near complete responses. Of these 201 responses were from primary students and 229 were from secondary students. There was an element of skewing in terms of the response rate between providers. Responses were received from 22 providers (the full range of providers in Ireland) but two of these represented 23% and 13% of the sample respectively. However, a crosstab analysis of providers to the individual response items in the survey showed no significant variations by provider.

Data from the Irish Higher Education Authority indicated that the population for this cohort overall is primary students 2,011 and post-primary students 1,406. Thus the sample represents 13% of the population.

2.4. The Follow Up Survey

The follow up survey, containing the same 26 item instrument, was distributed to the original cohort via email, using the email addresses that had been supplied in the initial

survey. The follow up survey was open between April and June 2017. One hundred and twenty two respondents who had completed the initial survey completed the follow up survey.

3. Findings

3.1. Technical Development of the Instrument

Exploratory Factor Analysis

When the initial data had been collected, we undertook an exploratory factor analysis (EFA) (Field, 2009) which identifies the underlying relationships between items and how they relate to constructs (i.e. attitude, self-efficacy. EFA of the 26 items using varimax rotation (Field, 2009) was undertaken on the initial survey sample. The Kaiser–Meyer–Olkin value for sampling adequacy was 0.88, exceeding Pallant's (2007) recommended minimum of 0.6. Bartlett's test of sphericity was significant at less than 0.001, indicating that the data was suitable for factor analysis (Field, 2009).

The analysis yielded three factors which explained 52%, 33% and 10% respectively (total 95%) of the variance present in the original item responses. After rotation and removal of all items with a loading less than 0.4 (Hulland, 1999), we arrived at a 3 factor structure. Ten items loaded strongly (i.e. over the 0.4 threshold) on the first factor (between 0.49 and 0.77), 8 factors loaded strongly on the second factor (between 0.43 and 0.61), and two items loaded strongly on the third factor (0.41 and 0.43). Finally, we explored whether simple standardised summative indices of the items associated with each factor were just as effective at representing the factors as the factor scores extracted from the EFA analysis. Such scaled scores have the benefit of being more directly constructed, rather than having to appeal to a more complex analysis. We found that simple standardised summative indices were highly

correlated with their corresponding factors scores (Index/Factor 1 r = 0.96; Index/Factor 2 r = 0.94; Index/Factor 3 r = 0.79), and thus the initial analysis employed the three standardised summative indices, although we continue to refer to them as factors for ease of interpretation.

Although we initially extracted three factors, we chose to exclude the third factor from the analysis. This was done following an exploration of the relationship between the predicted factor scores and the standardised scores in the longitudinal sample. While Factor 1 and Factor 2 continued to perform as expected, with the predicted factor scores correlating well with the standardised scores, this was not the case with Factor 3, where we found a negative correlation between the predicted factor score and the standardised score. As such, it was unclear that we would be reliably measuring Factor 3 in the longitudinal sample. Hence, Factor 3 was excluded from the analysis. The retained items for Factor 1 and Factor 2 are shown in Tables 4 and 5.

Reliability and internal consistency of the first factor via Cronbach's Alpha was 0.85, the alpha reducing if any item was deleted. Inter-item correlations were between 0.15 and 0.63 and the average inter-item correlation was 0.36. Reliability and internal consistency of the second factor via Cronbach's Alpha was 0.78, the alpha reducing if any item was deleted. Inter-item correlations were between 0.17 and 0.58 and the average inter-item correlation was 0.31. Clark and Watson (1995) indicate that average inter-item correlations should fall between 0.15 and 0.50 and individual inter-item correlations between 0.15 and 0.85.

Table 4

Factor 1 Self-Efficacy and Perceived Knowledge[1]

Item	Loading	Item text
1	0.7639	I feel confident in dealing with the needs of different learners in the classroom (SE)
2	0.7316	I understand how to identify different barriers to learning and how to tailor teaching to address these (PK)
3	0.7252	I understand how to include children with a range of cultural, linguistic and social backgrounds in the classroom (PK)
4	0.6592	I understand how to work effectively with other professionals involved in education (PK)
5	0.6241	I feel confident in implementing positive behaviour management approaches that support social skills development in the classroom (SE)
6	0.6096	I feel confident in communicating and collaborating with Special Needs Assistants (SE)
7	0.5906	I feel confident in communicating with and engaging parents and families in supporting their child's learning (SE)
8	0.5204	I am confident that I can engage in personal learning about effective inclusion (SE)
9	0.514	I understand the opportunities that are available for me to develop my knowledge and skills in inclusive practice as my career progresses (PK)
10	0.4893	I understand about typical and atypical child development in relation to social and communication skills (PK)

[1] Items classified as Perceived Knowledge are marked PK and items classified as Self-efficacy are marked as SE.

Table 5

Factor 2 Attitude and Perceived Knowledge[1]

Item	Loading	Item text
11	0.5418	I understand the concept of a reflective practitioner and how it relates to my work as a teacher PK
12	0.5687	Reflection on practice is a key part of achieving effective inclusive practice A
13	0.534	I understand that there are debates about the use of language to label or categorise learners PK
14	0.5268	Inclusive education is about equality for all learners not just those with special educational disabilities A
15	0.6096	Effective collaboration with parents and families is important in ensuring that children learn well in class A
16	0.4757	Effective inclusive education requires all teachers to work in teams A
17	0.4408	I understand that some schools are better than others in supporting inclusive education PK
18	0.4272	The work that teachers do in the classroom should be strongly informed by evidence A

[1]Items classified as Perceived Knowledge are marked PK and items classified as Attitude are marked as A.

Dropout Analysis

To explore whether the longitudinal sample was representative of the sample initially recruited during the pre-service phase, we conducted a simple dropout analysis. This involved specifying a binary outcome logistic regression model. Predictor variables were characteristics collected in the pre-service questionnaire so that they were present for all individuals regardless of their presence at follow-up. The results are shown in Table 6.

Table 6

Logistic regression model of an individual's presence in the follow up survey conditional on their presence in the ITE survey[1].

Characteristic	Present at follow-up	t (* p < 0.05, ** p < 0.01, *** p < 0.001)
Postgraduate	-0.192	(-1.07)
Secondary	-0.199	(-0.87)
Special/Psychol.	-0.152	(-0.55)
Creatives	0.0635	(0.28)
Sci/Maths/Tech.	-0.119	(-0.71)
24-26	0.245	(1.18)
27-30	0.0750	(0.28)
30+	0.488	(2.03)*
Male	-0.245	(-1.36)
No friend with SEN	0.119	(0.89)
No SEN	0.186	(0.57)
Observations	421	

[1]Omitted categories for categorical variables are as follows: Course type: Undergraduate; Phase: Primary; Subject specialism: Humanities; Age: 20-23, Gender: Female, Have friend with SEN, Have SEN themselves.

All but one of the associations in the drop-out model are small and statistically insignificant. The exception is individuals who are aged 30 or more, which is just significant at the 5% level. Institution was also included in the model and individual binary outcome comparisons by institution did not show any significant associations. As such, this suggests that our

longitudinal sample is broadly representative on most of the characteristics available for this model.

In addition, we used this model to generate inverse probability weights, which attempt to restore the representativeness of the longitudinal sample on the characteristics included in the model. This was done by inverting the predicted probability (based on the drop-out model) of being in the longitudinal sample among those who are in that sample and using these to adjust modelling within this sample. We replicated our longitudinal analysis taking into account these weights but it made minimal difference to our results.

3.2. Interpretation of the Factors

Factor 1 included predominantly self-efficacy items, with some perceived knowledge items. Factor 2 included predominantly attitude items, with some perceived knowledge items. It is fairly common to have construct items which map across factors in the literature and this is usually suggestive of previously unidentified aspects of the conceptualization of the constructs in question (Parker, Bagby, & Taylor, 1991; Taylor, 2003; Thompson & Waltz, 2007). This is particularly interesting as this is the first time that perceived knowledge has been included as a potential construct in developing a scale for teacher education for inclusion. None of the perceived knowledge items on either factor had significant loadings on the other factor.

In the wider literature on social psychology, there has been discussion about how perceived knowledge may be related to both self-efficacy and attitude. Some authors (Fedina, Lee, & de Tablan, 2017) have suggested that self-efficacy and perceived knowledge may have elements of conceptual overlap, the argument being that a person's level of confidence in being able to apply actual knowledge in solving problems or applying knowledge to particular situations is as important as possessing relevant knowledge in the

first place. This is closely resonant with the definition of self-efficacy as belief in one's ability to carry out a task, independently of measures of actual ability (Bandura, 1977). Some theorists (Abbitt, 2011; Park, Gardner, & Thukral, 1988) have argued that higher levels of perceived knowledge are associated with increased self-efficacy. Such an association has been shown in a number of empirical papers (Emmerson, John, Faulkner, Lancastle, & Roderique-Davies, 2017; Lipson, Speer, Brunwasser, Hahn, & Eisenberg, 2014). In their meta-analysis of 166 studies on self assessment of knowledge, Sitzmann, *et al.* (2010) concluded that there was evidence for a strong correlation between perceived knowledge and affective outcomes. Based on this, we argue that strong perceived knowledge may correlate to positive motivational state, which Bandura (1994) identifies as a psychological process through which self-beliefs of efficacy affect functioning, particularly via the moderation of anxiety arousal.

Links have also been made between perceived knowledge and attitude (An, 2007; Berger, 1992; Berger, Ratchford, & Haines, 1994). The theoretical argument here is that being more confident that one has good understanding about a particular domain is likely to either a) increase positive attitude in relation to that domain, or b) make it more likely that an extant attitude will translate in to actual behaviour. For example, An (2007) demonstrated that independently of strength of attitude, consumers with higher perceived medical knowledge had an increased likelihood of inquiring about an advertised medicine.

The distribution of perceived knowledge items across the 2 factors in this study might indicate that a) perceived knowledge has conceptual overlaps, although not identity, with both self-efficacy and attitude in relation to teacher education for inclusion, and b) as a consequence the current approaches to defining these constructs in instruments used in teacher education could be improved through the addition of scale items relating to perceived knowledge. Further support for this argument can be taken from the IBM, in which it is

explicitly argued that knowledge needs to be included in models that seek to explain intention towards behaviours. Having said that, we of course acknowledge the context-sensitive nature of learning to teach, and the complex ways in which knowledge is mediated in rich social fields such as the classroom. It could be argued that social psychology takes an overly reductionist approach which is not applicable to fields such as education and the type of behavioural change which is the focus of research on teacher education for inclusion. However, this argument is hard to sustain as this risk of reductionism is a feature of all standardised instruments used in the evaluation of teacher education, and we would argue that having a wider range of relevant constructs, such as knowledge, included in such instruments, could, in fact, allow them to better capture the complexity of the field.

3.3. Characteristics of the Survey Sample

In the longitudinal sample the characteristics were as follows:

81.8% of responses were from female novice teachers, and 18.2% from males. In their pre-service phase, 45.9% had been on a primary training programme, and 54.1% on a secondary training programme. The age range and areas of specialism are shown in Tables 7 and 8. Table 9 shows the range of experience/identity relating to SEN.

Table 7

Age Range

Range	%
21-24	54.1
25-27	19.7
28-31	8.2
31+	18.0

Table 8

Subject Specialism

Subject	%
Humanities	40.2
Special/Psych	8.2
Creatives[1]	17.2
Science(s)/Maths/Tech	34.4

[1]Creatives includes Art, Design, Music, Drama and Physical Education.

Table 9

Experience/Identity with SEN or disability

Attribute	%
Experience working with children with SEN prior to starting programme	41.0
Significant Interaction with a friend or relative with an SEN or disability	44.3
Consider themselves to have an SEN or disability	4.2

3.4. Experience of Working with Diverse Groups of Children

In the initial and follow up surveys respondents were asked to indicate their experience of teaching children from diverse backgrounds, as shown in Table 10.

Table 10

Experience of Teaching Children from Diverse Backgrounds on school practicum pre-service and as novice teachers[1]

To what extent have you had experience in the school at which you work now of teaching…	Very significant extent (%)		Significant extent (%)		Limited extent (%)		Very limited extent (%)	
	Pre.	Nov.	Pre.	Nov.	Pre.	Nov.	Pre.	Nov.
Children from diverse cultural and ethnic backgrounds	36.1*	33.0*	38.5	26.2	20.5	25.2	4.9	15.5
Children with different levels of social disadvantage	41.8	35.9	29.5	24.3	24.6	26.2	4.1	13.6
Children with English as an Additional Language	27.9	21.4	27.0	14.6	39.3	37.9	5.7	26.2
Children with Special Educational Needs	25.4	28.2	32.0	37.9	36.1	27.2	6.6	6.8

[1]Pre. stands for pre-service and Nov. for novice teacher.

The data show that nearly 60% of novice teachers had significant or very significant experience of teaching children from diverse cultural and ethnic backgrounds and with different levels of social disadvantage, while nearly 70% had significant or very significant experience of teaching children with SEN. Experience of teaching children with EAL was far less both as novice teachers and in the pre-service phase.

3.5. Induction Experiences

Fifty four percent of respondents attended all the NIPT workshops, and 20 percent attended some. Of those who attended, 37% of respondents indicated that they found the workshops helpful to a significant or very significant extent in terms of preparing them for effective inclusion, and 63% found them helpful to a limited or very limited extent.

When asked about what else they found helpful in effective inclusive teaching as a novice teacher, almost 90% cited their experience of teaching pupils in school as significant or very significant. Similar proportions indicated advice from other teachers (92%) or senior teachers in school (88%). Other sources of support that were cited as helpful to a significant or very significant extent for inclusive teaching were: advice from senior staff including the SENCO (84%); on-line resources (71%); advice from other novice teachers (70%); and advice from the school principal (67%).

3.6. How do self-efficacy, attitude and perceived knowledge change between the pre-service and novice teacher year?

Technical Analysis

The factor scores are standardized, i.e. the mean of the pre-test was subtracted and divided by the standard deviation of the pre-test distribution. Thus, the pre-test score of zero is arbitrary and one point on the scale equals a change equal to one standard error of the pre-test distribution.

For change over time by characteristics, a conditional multiple regression analysis was used to indicate differences in the factor scores. In order to help interpret the findings of the multiple regression analyses, we plotted the change in the factor scores associated with different levels of key characteristics. This allows for the identification of whether there is evidence of differential change in the scores associated with these characteristics, holding the other characteristics in the model constant.

As this was a post-hoc test, in order to minimise Type 1 errors, we selected a limited range of factors based on both theoretical grounds and an initial analysis of the pre-service student data which gave an indication of which attribute items may correlate with significant variations in Factors 1 and 2.

Our model included the following variables: age, gender, phase (primary or secondary), programme type (undergraduate or postgraduate), institution, subject area, overall experience of teaching children with different characteristics on school placement in pre-service and in class as novice teachers, experience of working with children with SEN prior to starting their pre-service programme, significant interaction with a friend or relative with an SEN or disability, whether they consider themselves to have an SEN, and the extent to which participants engaged with the NIPT induction programme.

We estimated additional models restricted to the sub-sample who did engage with the NIPT induction programme, also including the extent to which they valued the input provided as part of that induction.

For each comparison, we calculated a statistical significance test (t-test of significance, in the case of two categories; F test of joint significance, in case of the presence of more than two categories) of the null hypothesis of no interaction between the characteristic variable(s) and the time variable. We calculated the p-value from the relevant test, which provides evidence about the statistical significance of differential change conditionally associated with this characteristic.

Change over time

We plotted the changes in mean levels of Factor 1 and Factor 2 over time among the cohort in Figure 1 and Figure 2.

<Figure 1 Change in Factor 1>

<Figure 2 Change in Factor 2>

For Factor 1, the initial (pre) score was 0.02, and the follow up (post) score was -1.37, a difference of 1.379 ($t=-19.77$, $p<0.01$). For Factor 2, the initial (pre) score was 0.20, and the follow up (post) score was -3.33, a difference of 3.53 ($t=-45.11$, $p<0.001$).

Overall, there was a significant and large drop of over one standard deviation in Factor 1 and over three standard deviations in Factor 2 scores for the longitudinal sample between the end of the pre-service and novice teacher years. This indicates that attitude, self-efficacy and perceived knowledge, as represented in these two factors, fall significantly between the pre-service and novice teacher year.

3.7. Change over time by characteristic

Our analysis indicated that most of the characteristics that we tested for had no interaction with Factor 1 or 2 and time. In other words, the drop in Factor 1 and Factor 2 between the two time points does not differ in accordance with these characteristics. However, there was a significant difference in the rate of change of factor scores for some characteristics. These were as follows:

For Factor 1:

Respondents with SEN experience prior to starting their pre-service programme had a greater reduction in Factor 1 scores over time when compared to student teachers with no prior SEN experience ($p=0.03$, difference in differences in the standardised means = 0.37).

Respondents with more experience of teaching children with EAL on school placement in their pre-service programme had a greater reduction in Factor 1 scores over time when compared to student teachers with less experience of teaching children with EAL ($p=0.05$, difference in differences in the standardised means = 0.56).

For Factor 2:

Respondents with SEN experience prior to starting their pre-service programme had a greater reduction in Factor 2 scores over time when compared to student teachers with no prior SEN experience (p=0.03, difference in differences in the standardised means = 0.23).

NIPT Attendance:

There were no significant differences in the rate of change of either factor by the extent to which respondents attended NIPT sessions. There was also no association between the rate of change for factor 1 and the extent to which participants agreed that attending NIPT sessions supported them in developing an understanding of inclusion. However, for Factor 2, NIPT participants who more strongly agreed that its sessions had supported them in developing this understanding had a smaller reduction in Factor 2 scores over time (p=0.01, difference in differences in standardised means = 0.54).

4. Discussion and Conclusions

The factor analysis indicated that perceived knowledge items were distributed across the 2 factors we derived in this study, and this may suggest that perceived knowledge has conceptual overlaps with both self-efficacy and attitude for teacher education for inclusion. Consequently, the current state of the art in the use of these constructs on instruments in teacher education for inclusion could be improved through including scale items related to perceived knowledge. These empirical results could also be considered as providing support for the trend in the literature on teacher education for inclusion which argues for an emphasis on knowledge and skills in teacher development programmes.

We do recognise that the addition of a measure of actual knowledge could increase the force of this argument, and further research building on this study should include this.

However, the main finding was that, for the sample, there was a considerable drop in attitude, self-efficacy and perceived knowledge in relation to inclusion, from the end of the pre-service to the end of the novice teacher year. We believe that this study is the first substantive empirical evaluation that has tracked changes in teacher perceptions about the effective inclusion of children, in the same participants, across the pre-service and novice teacher year. These results show the significant extent to which beginning teachers, when they experience the transition have more negative attitudes to inclusion, reduced perceived knowledge about effective strategies for inclusion and reduced self-efficacy about their ability to include children with diverse needs in mainstream classes. Previous studies such as Fantilli & McDougall (2009) and Meister & Melnick (2003) have indicated that when asked in the novice teacher year, teachers report that including children with diverse needs in mainstream classes are one of the key challenges of being a new teacher. Our empirical results indicate a reduction of 1.38 standardised units for Factor 1 and 3.35 for Factor 2. These results suggest that the scale of the impact of this particular challenge on novice teachers, the impact of this aspect of reality shock when they are taking responsibility for classes for the first time, may be considerable.

It is also the case that the analysis of change of over time by characteristic indicates that the large reduction in factor scores over time is generally not affected by identified demographic or attribute factors. There was a medium sized effect for Factor 2 of the perceived impact of NIPT training on supporting understanding of inclusion, but no effect of actual attendance at these induction sessions for either Factor 1 or Factor 2. Given, for example, Ingersoll and Strong's (2011) review, one might have expected to see a much stronger relationship between level of induction support and changes in the factor scores. Thus, we might have hypothesized that poor induction support for some students was the source of a significant drop in attitude, self-efficacy and perceived knowledge across the

sample. It could be, of course, that the level and type of induction support provided was generally ineffective in terms of supporting them with inclusion. It was the case that 63% of the sample found the NIPT content on inclusion of limited help. There is, as noted, very little literature that has focused on the design or content of induction programmes from the perspective of inclusion. However, Smyth et al.'s (2016) review of the whole induction framework in Ireland indicated that it matches typical extant approaches in other territories. Although data on overall satisfaction with the NIPT programme as a whole is not publicly available, we have no a priori reason to think that the quality of the content on inclusion received by the beginning teachers was particularly inadequate when compared to programmes in other territories. International data does indicate that there is a mismatch between beginning teacher perceptions of the effectiveness of induction programmes in supporting them with content and pedagogical knowledge in relation to subject teaching, and how well such programmes supported them in working with diverse groups of children. The TALIS 2018 (OECD 2019) study results indicated that only 35% of teachers reported that teaching in culturally or linguistically diverse classrooms was included in professional development activities, and only 26% felt well prepared for teaching in such classrooms. Similarly, the TALIS results indicated that only 43% of teachers had participated in professional development activities related to teaching children with SEN, and it was the professional development topic with the highest percentage (22%) of teachers indicating a need for it. In contrast, 80% of teachers had participated in professional development activities related to knowledge and understanding of their subject field, and 60% felt well prepared for teaching specific subject knowledge.

It was also the case that on average across the OECD, attending professional development related to SEN made no difference as to whether respondents identified a need for further development in that area.

The results of this study indicate that reality shock in relation to effectively including children with diverse needs is both real and significant. Taking the OECD data in to account, this study, in line with international trends, indicates that current approaches to induction for inclusion are not yet sufficient to properly assist beginning teachers in dealing with this shock. Our results, indicating the extent of reality shock for novice teachers in relation to inclusion, throw into stark relief the lack of current understanding about what delivery methods and content beginning teachers would find effective and useful in induction programmes in relation to the effective inclusion of children with diverse needs in mainstream classrooms. This study highlights, therefore, the real need for further research on what constitutes effective support in this area for beginning teachers.

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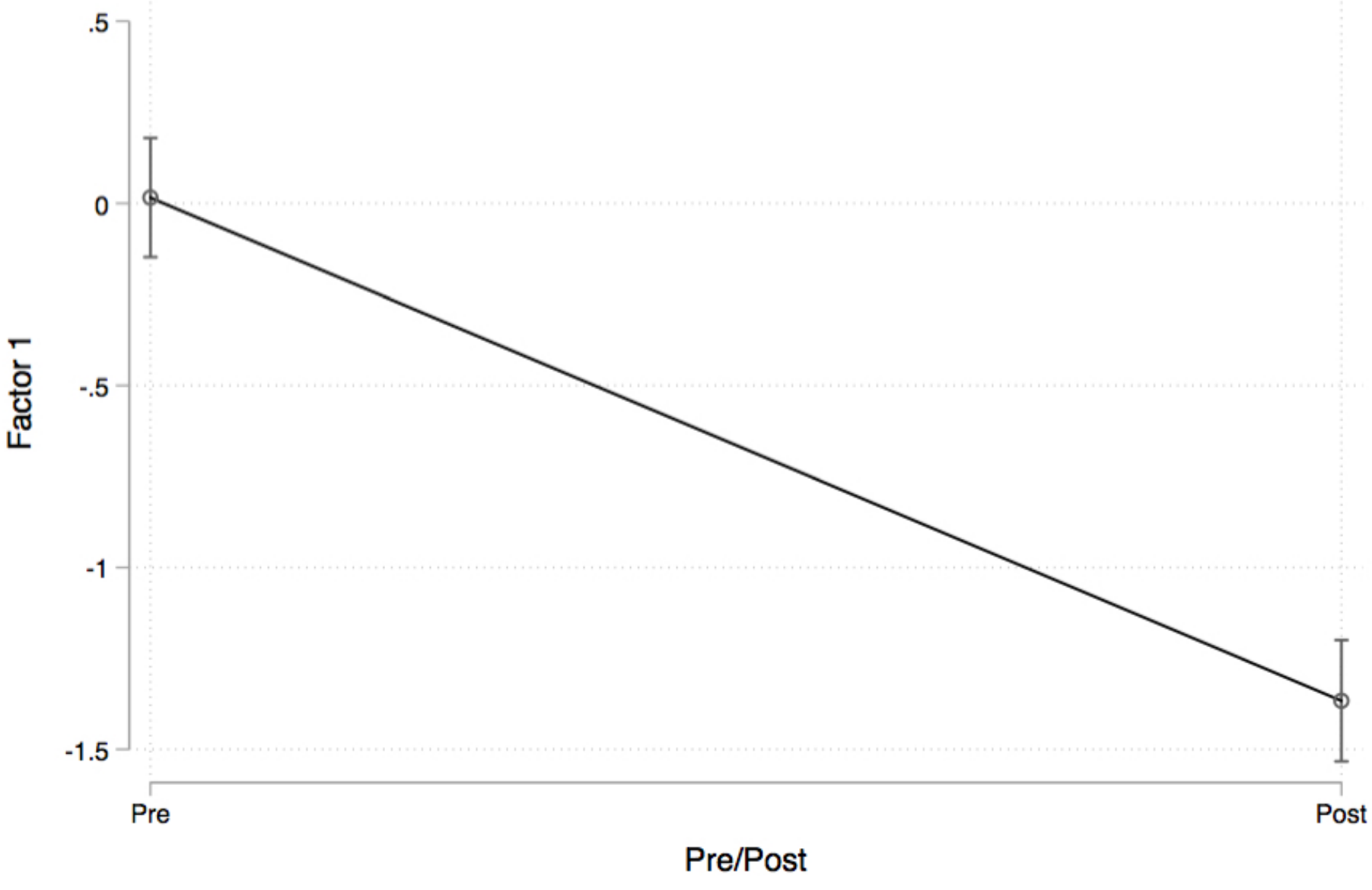
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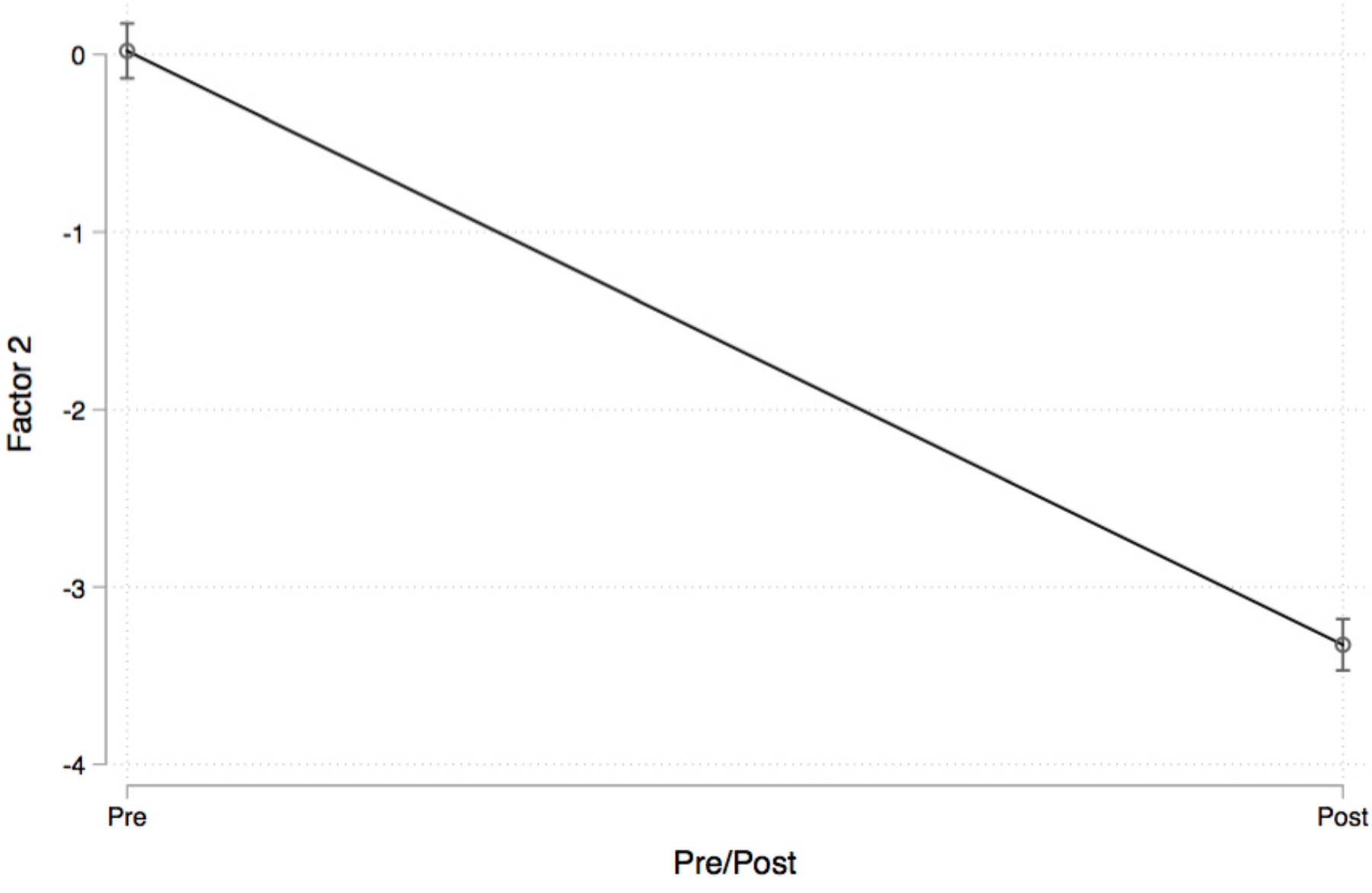
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Pre/Post

Author Statement

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