Rhetorical Patterns of Claim Validation in Qualitative and Quantitative Research Reporting

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Kvalitatiivinen tutkimusote on vallannut alaa kvantitatiivisen tutkimusotteen rinnalla useilla tieteenaloilla viimeisen 30−40 vuoden aikana. Tutkimuksessamme pyrimme selvittämään kvalitatiivisten ja kvantitatiivisten tutkimusraporttien eroja vertailemalla väitteiden perustelun tapoja ja määrää kuudessa kvalitatiivisessa ja kuudessa kvantitatiivisessa tutkimusraportissa, jotka edustivat talous- ja terveystieteitä. Tutkimus perustui perusoletukseen, että kvantitatiivisen ja kvalitatiivisen tutkimusotteen taustalla olevat tiedonkäsitykset, positivismi ja konstruktivismi, vaikuttavat kohdetekstien genre-piirteisiin. Vaikka kvalitatiivisen tutkimusotteen tiedonkäsitys viittaa siihen, että kvalitatiivinen tutkimusraportti olisi tekstityypiltään ensisijaisesti kuvaileva, näyttää siltä, että kvalitatiivisissa artikkeleissa esiintyy enemmän argumentointia tai näennäisargumentointia kuin kvantitatiivisissa tutkimusaineiston runsaasta esittämisestä johtuen. Tämän tutkimuksen tulokset kartuttavat tietoa kvalitatiivisen tutkimusraportin genre-piirteiden kuvaamiseksi kvalitatiivisen tieteellisen kirjoittamisen opetuksen tarpeisiin.

Keywords: qualitative research papers, quantitative research report, claim validation, argumentation

1 Introduction

The quantitative research approach and format of reporting became established at the beginning of the twentieth century (Luukka 2002), whereas the qualitative paradigm emerged in the last few decades of the century, especially in social sciences (Lincoln & Guba 1994). In the course of the institutionalisation of the quantitative paradigm, experts of academic and scientific writing have produced numerous linguistic analyses and subsequent guidelines on quantitative research reporting (e.g. Swales 1990; Myers 1990; Hopkins & Dudley-Evans 1988). Information on the content structure of qualitative research is also available (e.g. Meloy 1994; Denzin & Lincoln 2000; Wolcott 2001). However, writers of qualitative studies as well as teachers of qualitative writing still seem to face a shortage of illuminating linguistic descriptions of the genre features of qualitative research reporting.

Quantitative and qualitative research papers present a particularly interesting set of texts owing to their diverse ideological origins and partly shared textual conventions. Even

though these inquiries can be seen in binary opposition due to their epistemological orientations, the qualitative format of research writing has evolved from that of quantitative research (Richardson 2000). Besides being concerned, as teachers of academic and scientific writing, with the above mentioned shortage in the linguistic description of the genre features of qualitative reporting, we became curious about the possible interference of the epistemological orientations and genre features of quantitative and qualitative research reports (QNRs and QLRs respectively).

The quantitative research approach is rooted in positivism as it was originally formulated by Newton, and several 19th century social scientists, such as Locke, Comte, Mill and Durkheim, whereas the qualitative paradigm is based on constructivism framed by Mannheim (1936), Berger and Luckmann (1967), Lincoln and Guba (1985) and Crotty (1998). According to the positivist epistemology, knowledge is created by finding out about the probable causes of phenomena. Such inquiry is triggered by a theory or hypothesis about a potential causal relationship. The process of knowledge production involves reducing reality into empirically observable and measurable units, such as variables. For the constructivists, on the contrary, knowledge is understanding, and meanings are constructed by human beings as they engage with the world. Constructivist knowledge production involves meanings as understood by multiple participants and constructed in a historical and social context. It uses inductive reasoning and aims at theory generation. (Creswell 2003.)

The textual manifestation of the epistemological stances of the two paradigms can be illustrated by the following macro-structural representations, derived from Winter's (1986) basic clause-relational patterns:

Table 1. Macro-structural representations of QNRs and QLRs

Quantitative research: HYPOTHETICAL EVALUATION of causal relationship (X) - EVIDENCE (through experimentation) - CONCLUSION (X confirmed/X rejected)
Qualitative research: SITUATION – EVALUATION / INTERPRETATION

The above macro-structural representations suggest that argumentation is inherent to quantitative research, at least on the level of the knowledge production process. In

qualitative research, on the contrary, researchers present the readers with an aspect of reality and communicate their understanding or interpretation of the meaning of the target phenomenon. The assumption therefore is that qualitative researchers do not argue for any predetermined position.

Against this background, we set out to investigate how writers of QNRs and QLRs establish the validity of their claims at the rhetorical level of the text. Argumentative patterns of scientific writing have been the target of considerable research (e.g. Thompson 1993; Brett 1994; Shaw 2000). These studies, however, have not examined the difference between quantitative and qualitative writing.

2 Data and study procedure

We compared the amount and patterns of claim validation in a corpus of twelve research reports, six qualitative and six quantitative, in the fields of economics and nursing science. We chose the above disciplines because both the qualitative and the quantitative paradigms are frequently used in these fields.

Table 2. Corpus

Nursing science		**Economics**	
Quantitative	**Qualitative**	**Quantitative**	**Qualitative**
[1] Corley, Amanda et al. (2009). Nurse determined assessment of Cardiac output. *International Journal of Nursing Science* 46, 1291− 1297	[4] Fox, Fiona F. et al. (2009). Experiencing "the Other Side": A Study of Empathy and Empowerment in General Practitioners Who Have Been Patients. *Qualitative Health Research* 19, 1580− 1588	[7] Steenburgh, Thomas J. (2008). Effort or timing: The effect of lump/sum bonuses. *Quantitative Market Economy* 6, 235−256	[10] Denegri-Knott & Molesworth (2009). 'I'll sell this and I'll buy them that': eBay and the management of possessions as stock. *Journal of Consumer Behaviour* 8, 305−319
[2] Yu, Haibo et al. (2009). Effects of music on anxiety and pain in children with cerebral palsy receiving acupuncture. *International Jour-nal of Nursing Science* 46, 1423−1430	[5] Champlin, Barbara E. (2009). Being there for Another With a Serious Mental Illness. *Qualitative Health Research* 19, 1525−1535	[8] Johnson, Shane A. & Mark B. Houston (2000). A Re-examination of the Motives and Gains in Joint Ventures. *The Journal of Financial and Quantitative Analysis* 35.1, 67−85	[11] Runyan, Rodney C. et al. (2007). A resource based view of the small firm. *Qualitative Market Research* 10.4, 390−402
[3] Hautala, Lea et al. (2009). Uncovering hidden eating disorders using the SCOFF questionnaire. *International Journal of Nursing Science* 46, 1439−1447	[6] Jacobson, Nora (2009). Dignity Violation in Health Care. *Qualitative Health Research* 19, 1536−1547	[9] Clark, Ephraim & Octave Jokund (2006). The role of population and wealth in international capital flows. *Studies in Economics and Finance* 23.1, 4−12	[12] Grace, Debra & Deborah Griffin (2009). Conspicuous donation behaviour: scale development and validation. *Journal of Consumer Behaviour* 8, 14−25

The first procedural steps of the study involved classifying each sentence or proposition of the introduction, results and discussion sections of the articles (the total number of

sentences/propositions being 1678; 877 in the nursing science data and 801 in economics) into the following eight hypothetical categories according to their truth value:

Table 3. Truth value scale

1.	*Statement of fact*: This type of proposition may communicate general truths, common knowledge in the field and states of affairs with existing evidence which is not presented, as well as definitions and past action including procedural description.
2.	*Evaluation-basis*: This is an argumentative sequence either within a sentence, or comprising two or more sentences, where a claim is supported by evidence.
3.	*Evaluation supported by reference*: Reference to previously published research (by other authors or the current author/s) is an established means of persuasion and validation in the scientific community.
4.	*Evaluation supported by concurrent self-reference*: A statement of a finding combined with a reference to the methods or tests, experiments, data, etc. of the study that produced the finding.
5.	*Subjective inferential evaluation*: This subjective evaluation of the relationship between phenomena needs a basis to be established as factual knowledge.
6.	*Interpretation*: subjective evaluation of the meaning of an utterance. It needs a basis to become an established fact.
7.	*Subjective value evaluation*: an opinion whose truth value is not relevant.
8.	*Expression of attitude*: A valid statement of the state of mind of the speaker only. Besides expressions of attitude, questions, directions and metastatements were included in this category in the current study as they were understood to convey the writer's desire to communicate with the readers.

The above truth value scale originates from the Searlian speech act theory (Searle and Vanderveken 1985) as a starting point. It was assumed that the predominant propositional speech act type of a research report is *the assertive* speech act with the illocutionary point of 'saying how things are'. Assertive speech acts may, however, be variably positioned on a truth value or modality (for the notion of modality see Enkvist 1975: 116−117) scale ranging from statements of objective facts to subjective value evaluations. Moreover, to complete the scale in the subjective dimension *expression of attitude*, derived from the Searlian *expressive* speech act, was added as a left-over category for speech acts more marginal for the purposes of the present study (see Table 3, item 8).

Table 3 above shows that, according to our hypothesis, argumentation (described as an evaluation-basis sequence) reference and concurrent self-reference, constitute the prevalent means of claim validation in scientific texts. As defined by Toulmin (1958), *argument* is manifested in the movement from accepted data to a claim through a warrant. According to van Dijk (1997) the term *argumentation* denotes a textual structure where a proposition is semantically supported by others. In natural language, as opposed to logic, rhetorical patterns of argumentation do not always follow the complete sequence of syllogism, described by Toulmin (1958). This is because the generally accepted premise, i.e. the warrant, is often only contextually implied. The occurrence of incomplete

argumentative chains in scientific writing has been explained by the shared knowledge of the members of the discourse community, which eliminates the need for completing the argument (Shaw 2000). Accordingly, argumentative sequences were described in the present study using modifications of the basic formula '*evaluation-basis*' or its converse '*evidence-conclusion*', which both originate in Winter's (1986) work on clause relations (See Table 3, item 2). A number of adjacent sentences/propositions were identified as an argumentative sequence if they presented a rhetorically adequate argumentative pattern. The logical soundness of the basis or evidence provided was not examined here since such an assessment falls outside the linguistic focus.

Reference to previously published studies has been regarded an acceptable means of claim validation in the scientific community (Hyland 2004). However, criticism has also been presented against the assumption that research findings published in a respectable journal of a target discipline automatically become knowledge upon which further scientific knowledge may be based. Gross (1990) claims that 'scientific knowledge itself cannot be seen as an idealized ground of knowledge', because 'scientific knowledge is produced rhetorically, meaning that it has special epistemic authority only insofar as its communal methods of verification are trustworthy'. Since this study, however, focuses on the linguistic and rhetorical aspects of claim validation rather than on its epistemic considerations, reference was included in the current analysis as a means of claim validation.

To study reference as a persuasive means, we used the following modification of a typology of references introduced by Weissenberg and Buker (1990):

1. ***author prominent reference*** which refers to a source of knowledge by the name of the author (e.g. 'Lefrant et al. (2000) reported that …'),
2. ***information prominent reference*** which uses previously stated information as an integral part of the target text but refers to the source in brackets, or topicalizes in the reporting sentence an indefinite reference to the respective study/studies or author(s) (e.g., 'Although CW Doppler technology is known to be accurate in measuring CO (Vandenbogaerde et al. 1986), its use has been limited …'; 'A recent animal study has demonstrated that ... (Critchley et al. 2005).'

Based on a previous pilot study (Sallinen & Braidwood 2009) we include '*concurrent self-reference*' in the means of claim validation to be currently observed. We used this

term to denote an observed phenomenon in research reporting, where researchers include, in a statement of research finding, a reference to the currently described study itself or to the data, method, test, analysis or experiment within the study (e.g. '*Our study found that* music had no significant effect on pain in children with cerebral palsy undergoing acupuncture …'. See source in Table 2 [2]).

In the second step, the frequencies of each category and of the argumentative patterns identified through the analysis were compared in the respective chapters of both nursing science and economics QNRs and QLRs. The frequencies were calculated as a percentage of the total number of the propositions of the data in each field. Finally, we conducted a closer linguistic scrutiny of the argumentative patterns and other relevant means of claim validation found in the data.

The 'Materials and methods' sections were left out of this comparative study on the assumption that, irrespective of the research orientation, this section shows a predominantly narrative and descriptive character.

3 Findings

Our research question suggested an inquiry into how quantitative and qualitative researchers tend to establish the validity of their claims. Here, we discuss three claim validating procedures, i.e. reference, concurrent self-reference and argumentation.

3.1 Reference: The first reference-related observation from the data was that while some references serve a clear claim-validating function, others have an informative function which, however, still constitutes an integral element of the more general persuasive system of scientific writing. Examples 1 and 2 below illustrate the claim-validating and generally persuasive functions of reference, respectively:

(1) **Claim-validating references:** **(A)** Despite more than 30 years of clinical use, there remains no clear evidence of outcomes benefit associated with PAC use (Bellomo and Uchino 2003; Bernard et al. 2000; Connors et al. 1996; Sandham et al. 2003; Shah et al. 2005). (see source in Table 2 [1]) **(B)** A recent field survey (Joseph and Kalwani 1998) finds that 72 % of firms use bonuses in their sales incentive contracts. (see source in Table 2 [7]) **(C)** … PAC has many clinical and technical efficacy limitations, specifically

> in this type of cohort (Binaway et al. 2005; Renner et al. 1993; Shah et al. 2005). PAC has been demonstrated to have significantly diminished accuracy in subjects with tricuspid regurgitation (Balik et al. 2002; Heerdt et al. 1992), … Furthermore, ... (see source in Table 2 [1])

In Examples 1(A)–1(C), the reference in the brackets provides evidence for the validity of the preceding claim and thus forms an argumentative sequence with it. As illustrated by Example 1(C), claim-validating references may also separately validate each member of an argumentative sequence. For the main claim of the sequence this leads to double validation.

In Example 2 below, reference specifies the information provided in the preceding background-creating proposition but does not provide a logical basis to support it. Persuasion in scientific writing may also be understood more broadly as an all-pervasive effort by the author to create trust in the readership not only in the validity of the paradigms, methods and results of the study, but also in the researcher's professional competence and credibility. Törrönen (2002) refers to the above effort as 'entering in a confidence agreement with the readership'. The process includes, among other things, manifesting familiarity with the canonized and recent knowledge of the field, which at the textual level is realized in the form of referencing.

(2) **Generally persuasive references:** Additional studies focused on things such as information sharing concerning schizophrenia (Main, Gerace, & Camilleri 1993), and phases in the families' progress in dealing with mental illness (Muhlbauer, 2002) (see source in Table 2 [5])

In the current corpus, the study of the incidence of references (see Table 4 below) led to the observations presented in sections 3.1.1. and 3.1.2. below:

3.1.1 Information-prominent and author-prominent types of reference (Table 4): The choice of either the information-prominent or author-prominent type of reference seems to be more strongly determined by the discipline than by the research paradigm. Information-prominent reference was the prevailing type of claim-validating reference in the introductory sections of nursing science QNRs (43 %) and QLRs (43 %). Surprisingly, author-prominent reference was non-existent in the introductions of all nursing science research reports. In the discussion sections of nursing science QNRs and QLRs, information prominent reference also showed a higher incidence than author-prominent

reference (15 % as opposed to 2 %, and 9 % as opposed to 7 %, respectively). The above findings may be due to the fact that nursing science QNRs and QLRs are influenced by the practices of medical papers, which tend not to rely on authorities. Economics QNRs and QLRs, on the contrary, showed more diversity as they used both author-prominent and information-prominent reference in the introductory sections of both types of research reports. In the current corpus, economics QLRs showed a 36 % incidence of information prominent reference, and a 14 % incidence of author-prominent reference in the introduction, while in the introductory sections of the QNRs author-prominent reference was more frequent (23 % as opposed to a 14 % incidence of information-prominent reference). The above distributions of the two types of reference in the economics QNRs and QLRs may point to paradigm-specific preference. However, this hypothesis should be tested with a more extensive corpus. On the other hand, the frequency of author-prominent reference in the introductions of economics papers may result from a disciplinary tendency of indicating a school of thought by reference to the name of the respective scientist. We also observed that the both types of economics research reports showed a fairly low incidence of reference in the discussion section, which may be due to a discipline-specific feature to be tested at a later stage.

The fact that the writers of nursing science QLRs still use, in spite of a greater preference for information prominence, some author-prominent reference (7 %) for claim validation in the discussion section, may relate to the established requirement of the qualitative paradigm for research to contribute to theory development (Creswell 2003). The presentation of the theory in the discussion part may involve a comparison of the emerging theory with the work of canonized authors.

The finding that both economics and nursing science QLRs used some reference also in the results section, while in QNRs they were either non-existent or extremely rare, may be explained by the fact that commenting on the findings in the results chapter may be specific to the paradigm of qualitative papers.

3.1.2 Concurrent self-reference (Table 4): As pointed out earlier, the term '*concurrent self-reference*' was used in this study to denote a statement of finding which incorpo-

rated a reference to some element of the study being described that produced the finding. Thus, in Example 3 below the claim 'Disordered attitudes towards eating and weight are more common than the actual behaviours suggesting an ED' is communicated embedded within a validating evidence-suggesting frame, i.e. 'Itemspecific response-option distributions showed that…'. Such a validating frame typically uses the past tense, as it refers to a research process completed by the time of reporting. It also seems that the past tense alone in a statement of finding has a similar validating effect. This seems to be the case in Example 4 below:

(3) "Item-specific response-option distributions showed that disordered attitudes towards eating and weight were more common than the actual behaviours suggesting an ED (eating disorder) (Table1)." (see source in Table 2 [3])

(4) "Sometimes taking action meant staying with the other in challenging situations, and sometimes even entailed temporarily "playing along" with ill person's psychiatric symptoms." (see source in Table 2 [5])

Table 4 below shows that concurrent self-reference is a much more dominant feature in the QNR result sections, of both nursing science and economics (76 %, 26 % respectively), than in those of QLRs (18 %, 6 %). This tendency may reflect the fact that in qualitative research the final findings tend to be produced through the medium of human understanding and interpretation rather than through experiments, tests and statistical analyses. The method in qualitative study seems to focus on identifying the target phenomenon in the data, while the final findings seem to be distilled by means of a descriptive or interpretative process.

Table 4. Use of reference presented as percentage of the number of propositions

		QNR			**QLR**		
		Reference		**Concurrent self-reference**			**Concurrent self-reference**
		Author-prominent reference	**Information-prominent reference**		**Author-prominent reference**	**Information-prominent reference**	
INTRO	*Nur Sc*	0 % 0/68	43 % 29/68	0 % 0/68	0 % 0/70	43 % 30/70	0 % 0/70
	Econ	23 % 26/113	14 % 15/113	1 % 2/113	14 % 23/161	36 % 58/161	6 % 11/161
RESULTS	*Nur Sc*	0 % 0/70	0 % 0/70	76 % 53/70	0 % 1/361	6 % 20/361	18 % 64/361
	Econ	2 % 3/176	1 % 2/176	26 % 45/176	2 % 5/209	9 % 19/209	6 % 14/209
DISCUS-SION	*Nur Sc*	2 % 4/169	15 % 26/169	15 % 25/169	7 % 9/139	9 % 13/139	35 % 48/139
	Econ	0 % 0/45	1 % 1/45	22 % 10/45	3 % 3/97	7 % 7/97	12 % 12/97

3.2 Argumentation: As shown in Table 5 below, argumentation seems to have an established role in the introduction and discussion sections of QNRs and QLRs across the two disciplines. This could be expected since in qualitative reporting, the introduction and discussion chapters still largely follow the conventions of quantitative writing, with argumentation for the significance of the study in the introduction, and comparison-based reasoning for the validity of the results in the discussion section.

Table 5. Incidence of argumentative patterns as a percentage of the total number of propositions

		QNRs	**QLRs**
INTRO	**Nursing science**	7 % (5/68)	11 % (8/70)
	Econ	13 % (15/113)	11 % (18/161)
RESULTS	**Nursing science**	*5 % (4/70)*	*19 % (69/361)*
	Econ	*9 % (17/176)*	*12 % (26/209)*
DISCUSSION	**Nursing science**	19 % (32/169)	18 % (26/139)
	Econ	13 % (6/45)	6 % (6/97)

However, contrary to the macrostructure-based presumptions presented in Table 1, argumentative sequences were more frequent in the result sections of QLRs of both disciplines (see Table 5) than in the result sections of QNRs. It seems that the result sections of QNRs rather focus on the narrative of the research process that produced and validated the findings, and accordingly, rely more often on concurrent self-reference as a means of claim validation (cf. Tables 4 and 5). In qualitative writing, on the contrary, the convention of using extracts of participant narrative to present findings frequently creates argumentative or quasi-argumentative patterns when the researchers (1) generalize based on their analysis of data, (2) make participant-related inferences, (3) transcribe participant narrative into the language of the discipline, or (4) introduce extracts of participant narrative by interpreting its meaning. This major difference in quantitative and qualitative writing (marked in Table 5), on one hand, is in contradiction with the epistemological premises of the two paradigms: quantitative research reports, owing to the epistemology that informs the enquiry, argue for a predetermined view of a phenomenon, while qualitative reports set out to describe a phenomenon as it evolves from the researcher's and the participants' understanding. On the other hand, the above finding conforms with the observation that the writer of the qualitative paper is expected to rely purely on verbal means, while the author of the quantitative article draws upon both numbers and words (Glesne & Peshkin 1992; Golafshani 2003).

One aim of this study was to find out about the distinctive ways of claim validation in QLRs. Example 5 below illustrates some typical modifications of the basic argumentative patterns previously discussed and some of the argumentation-related cognitive procedures enumerated above:

(5) (1) "In particular, the GPs became aware that nonmedical patients lack power within the medical system, in contrast to their own position as an insider. (2) One GP described her own anxiety about having to wait for a medical procedure, and her subsequent efforts to be seen more quickly. (3) '*I was ill and I was having to fight my case, and if I had been a patient without any status I'd have had to have waited, and I felt very sorry for my patients, that's why I kept thinking, how impotent they feel.*' (4) This indicates that although GPs who are unwell might get a taste of the vulnerability experienced by their patients, their own experience of disempowerment might be reduced because of their medical status." (see source in Table 2 [4])

The passage presents a semi-argumentative sequence that can be represented as follows: *evaluation (sentence 1)-basis (=evidence) (sentences 2-3)-conclusion (sentence4)* where the initial evaluation (sentence 1) and the final conclusion (sentence 4) are complementing interpretations of the quotation (sentence 3). The claim in sentence (1) is a generalization which is supported on the textual level by one illustrative case. In the conclusion the researcher transcribes an aspect of the meaning of the participant quote into the language of the discipline '*... [GPs'] own experience of disempowerment might be reduced because of their medical status*' as opposed to the participant's wording '*… I kept thinking how impotent (my patients) feel.*' Sentence (2) provides an introduction to the quote, and accordingly forms part of the supporting participant narrative even though in a reported form.

4 Summary

Even though our study elucidated only a narrow aspect of persuasion found in scientific writing, the findings illustrate the multiplicity of the linguistic devices which contribute to establishing the credibility of the results as well as that of the researchers. The analysis of the present corpus led to the observation that persuasion is a pervasive phenomenon with diverse manifestations which show a confluent effect. A wider analysis of the same type would be needed to provide a more substantial basis for producing pragmatic genre-descriptions for qualitative writing.

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