

The use of critical speech acts in Psychology and Chemistry research papers

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Abstract

Creating a research space has become increasingly important in today's competitive academic world, where the pressure to publish requires writers to justify publication of their research article (RA) in order to present their new claims to the other members of the academic community. This mainly implies the indication of a knowledge gap and/or the criticism of any weak point in the previously published work by other researchers or the academic community itself. This "academic conflict" (AC) is expressed via a critical speech act whose rhetorical expression ranges from blunt criticism to the use of subtle hedging devices, aimed at an individual or the community in general. In this study we discuss the development of a taxonomy to describe the rhetorical choices writers use when making the critical speech act, and the application of this taxonomy to 50 RAs from two distinct disciplines: Psychology, representing the social disciplines, and Chemistry, the natural disciplines. The application of this taxonomy, which categorises AC according to directness, writer mediation, and the target of the criticism, has yielded the following results: AC was manifested far more frequently in Psychology than in Chemistry, not only in total number of AC units, but also in the research articles themselves: it appears to be an essential rhetorical strategy for writers in the field of Psychology, but not so in Chemistry. The two disciplines showed a surprising degree of similarity with respect to writer mediation, directness and personalization overall; however, when these variables are combined, significant differences emerge: researchers in Psychology favour unmediated, direct and personal criticism, whereas those in Chemistry favour impersonal criticism.

Key Words: research article, academic conflict, critical speech act, rhetorical choices.

Resumen

En la actualidad, la delimitación de un hueco epistemológico ha llegado a constituir un elemento primordial en el mundo académico donde la presión por publicar obliga a los académicos a justificar la publicación de sus artículos de investigación en los que presentan sus nuevas reivindicaciones científicas a los otros miembros de la comunidad científica. Esto se manifiesta principalmente por medio de la indicación de una laguna existente o la confrontación con las ideas que han sostenido otros investigadores en concreto o la comunidad científica en general. Este "conflicto académico" (CA) se expresa mediante el uso de actos de habla críticos cuya expresión retórica oscila desde la

crítica más directa hasta el uso de elementos matizadores. En este estudio presentamos una taxonomía para la descripción de las opciones retóricas que utilizan los académicos para la realización de los actos de habla críticos, y aplicamos esta taxonomía en el análisis de 50 artículos pertenecientes a dos disciplinas de dos áreas diferenciadas: Psicología y Química. Los resultados obtenidos de este análisis han revelado que el CA se manifiesta con mayor frecuencia de uso en Psicología que en Química, no sólo en el número total de casos de CA, sino también en el número de artículos, por lo que el CA parece ser una estrategia retórica importante para los escritores en Psicología, aunque no tanto en Química. Por otra parte, ambas disciplinas muestran un alto nivel de similitud con respecto al uso general de opciones retóricas (explicitación del emisor de la crítica, crítica directa/indirecta y crítica personal/impersonal); sin embargo, al combinar estas variables, se encontraron diferencias significativas: los investigadores en Psicología tienden a expresar la crítica de forma implícita, directa y personal, mientras que en Química se tiende a expresar de forma impersonal.

Palabras Claves: Artículo de investigación, conflicto académico, acto de habla crítico, opciones retóricas.

Introduction

The need to publish scientific papers has become an essential issue in the world of academic writing for researchers who want to promote their careers. In order to justify publication, writers must create a research space which permits them to present their new claims to the other members of the academic community. This mainly implies the indication of a knowledge gap and/or the criticism of any weak point in the previously published work by other researchers. The rhetorical strategies used by writers to convey critical speech acts may range from blunt criticism to the use of subtle hedging devices, and the frequency and type of linguistic strategies used to convey disagreement may vary across disciplines, as has been pointed out by Hunston (1993), Kourilová (1996) and Motta-Roth (1998).

The study of the pragmatic phenomenon of academic conflict (AC) has become an important area of research over the last few years, as can be seen in the increasing amount of work on this topic (see for example Salager-Meyer, 1998 & 2000; Salager-Meyer & Zambrano, 1998; Burgess & Fagan, 2002). In this study we attempt to expand this area of knowledge by comparing the frequency of occurrence and types of rhetorical options used by the writers to express AC in research articles (RAs) from two different disciplines (Psychology and Chemistry), representative of two opposing fields of knowledge: the social sciences and the hard sciences¹.

Hyland (2000), in his study of academic citation, found that writers in the soft knowledge domains (e.g. Humanities and Social Sciences) cited previous research far more frequently than those in the hard knowledge fields (e.g. Chemistry and Biology). A second difference was that the author (the person cited) was not as prominent in the hard disciplines as in the soft. Hyland suggested that these differing discourse practices may be due to differences in social activities, cognitive styles and epistemological beliefs of the specific disciplinary communities. In our study, we expected to find that the softer discipline (Psychology), with a higher frequency of citations, would also have a higher frequency of AC and more personal and direct instances of AC than the hard science discipline (Chemistry).

Corpus and Procedures

The corpus consists of 25 articles from the discipline of Psychology, published in the last decade, that may be considered as representative of the area of the social sciences. The articles were drawn randomly from five of the most influential journals in the speciality, namely *Psychological Bulletin*, *Journal of Applied Psychology*, *Behavioral and Brain Sciences*, *Journal of Educational Psychology* and *Cognitive Psychology*. Similarly, 25 articles published in the last decade belonging to Chemistry, a representative area of the natural sciences, were drawn randomly from five leading journals in this field: *Journal of Organic Chemistry*, *Dalton Transactions*, *Journal of the American Chemical Society*, *Tetrahedron* and *Journal of Physical Chemistry*.

Following Salager-Meyer's (1998, 2000) work on AC, we have established a taxonomy of AC based on *personal* and *impersonal* critical speech acts. In the former, the name of the author who is the target of criticism can be found somewhere in the text, whereas in the latter the criticism is directed towards the scientific community as a whole, as illustrated in the following examples:

- [1] Personal AC- "...we conclude the **Susmann-Korth** case for synergism is weak."
- [2] Impersonal AC- "The **empirical literature** on the relationship between procedural justice perceptions and job performance is sparse."

Salager-Meyer also divides these two types into *direct* and *indirect* criticism. The former refers to those instances in which there is categorical criticism, whereas the latter refers to those cases in which the criticism is mitigated by means of hedges². In our

study, we have termed these two categories as + *hedging* (direct AC) and – *hedging* (indirect AC):

- [3] + hedging: “Despite this interest, **remarkably little** information is available concerning the exact mode of this interaction...”
- [4] – hedging: “Although previous reviews may have succeeded in evaluating media effects in naturalistic contexts, **they did not capture the essence** of the concept of aggression.”

We have also added a new dimension: the presence or absence of writer mediation in the criticism (Burgess & Fagan, 2002). We observed that on some occasions the writers of research articles are explicitly present in the critical speech act. This implies a high level of commitment to the truth value of the proposition expressed, that is, writers take full responsibility for the criticism towards other authors or previous research in general, which is lexically realised by means of the personal pronouns I/We. This has been termed *writer-mediation* following Cherry (1998) and Hyland (2001). Groom (2000), in his study of attribution and averral, notes the important role of writer-mediation in academic argumentation while acknowledging that this is often not transparent to novice writers.

- [5] Writer-mediated AC: “**We** favor this value over that of 96.6 kcal reported by Shum and Benson¹⁸ for CH SCHH because in our work there appears to be little or no difference in the BDEs for ROC-H and RSC-H type bonds ¹²...”

When the writer is syntactically absent from the critical speech act, the criticism seems to result from an outside or unnamed agent, e.g. “some studies have shown that...”, or “it has been found that...”

- [6] AC with no writer mediation: “**This finding** is the opposite of what has traditionally been assumed, and so it seems worthy of further test...”

An in-depth examination of the corpus also revealed that there were cases in which there was not only presence or absence of writer-mediation but in which it was not the author him/herself who made the criticism, but reported the criticism made by other authors. We considered this as being at the opposite end of the continuum from + *writer-mediation* (see Fig. 1), and it was termed *reported* AC. The following example illustrates this strategy:

- [7] Reported AC: “In contrast, **Friedrich-Cofer and Huston (1986)** argued that field experiments most plausibly underestimate effects of exposure to media violence...”

Writers have thus several rhetorical options to convey AC: either by being explicitly present in the critical speech act (writer mediation), by remaining uncommitted (no writer mediation), or by reporting the criticism made by another author (reported); the target of criticism can be referred to a specific person (personal) or to the scientific community as a whole (impersonal); and the act of criticising itself can be indirect (with hedging devices) or direct (without hedging devices). This is summarised in the diagram in Figure 1:

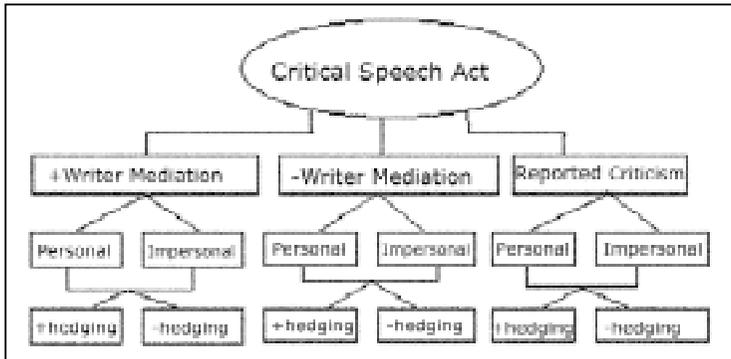


Figure 1. A taxonomy of rhetorical strategies

Results

One of the most striking findings in this study is the sheer quantity of AC units (307) in Psychology when compared to Chemistry (48) (see Table 1). Even when taking into account the fact that articles in Chemistry tend to be much longer than those in Psychology (see the average number of words in Table 1), the total number of AC units in Psychology far surpasses instances of criticism in Chemistry. It would appear that criticising one's peers or the community in general is an integral part of the research article in Psychology, as can also be seen from the fact that all the articles studied provided instances of AC. This, as seen in Table 1, contrasts sharply with research articles in the field of Chemistry, where almost half of the RAs showed no instances at all of AC, and the rest of the articles had relatively few AC units.

	Psychology	Chemistry
No. of RAs with AC	25 (100%)	13 (52%)
Word count: average words/article	1100	3000

Table 1. General data

The overall results when AC units are classified within our taxonomy (see Tables 2, 3 and 4) show, however, surprisingly little disciplinary variation. In Chemistry, the writers would seem to commit themselves somewhat more: a slightly higher percentage of the overall instances of AC were writer-mediated than in the field of Psychology (see Table 2). The analyses of the impersonalization and directness dimensions also revealed that writers in both disciplines tend to opt for similar rhetorical strategies to convey their critical speech acts (see Tables 3 and 4).

	Psychology	Chemistry
Writer Mediated	30 (10%)	7 (15%)
No writer mediation	244 (79%)	37 (77%)
Reported	33 (11%)	4 (8%)
TOTAL	307 (100%)	48 (100%)

Table 2. Total number of AC with and without mediation, and reported AC.

	Psychology	Chemistry
Personal	179 (58%)	27 (56%)
Impersonal	128 (42%)	21 (44%)
TOTAL	307 (100%)	48 (100%)

Table 3. Total number of types of AC: personal/impersonal

	Psychology	Chemistry
Direct	180 (59%)	28 (58%)
Indirect	127 (41%)	20 (42%)
TOTAL	307 (100%)	48 (100%)

Table 4. Total number of types of AC: direct/indirect

However, when the strategies are combined, a more distinct pattern emerges: although the preferred strategy for both disciplines is a shifting of commitment, with the writer absent from the critical speech act (i.e. no writer mediation) writers in Psychology, when expressing direct (- hedging) criticism, tend to be personal, specifically naming the target of their criticism, whereas in Chemistry writers remain impersonal (see Table 6).

WRITER MEDIATED	TOTAL	personal/ direct	personal/ indirect	impersonal/ direct	Impersonal/ indirect
Psychology	30 (10%)	14 (5%)	9 (3%)	4 (1%)	3 (1%)
Chemistry	7 (15%)	4 (8.5%)	3 (6.5%)	0	0

Table 5. Total number of AC with writer mediation, according to personalization and directness.

NO WRITER MEDIATION	TOTAL	personal/ direct	personal/ indirect	impersonal/ direct	Impersonal/ indirect
Psychology	244 (79%)	103 (34%)	40 (13%)	35 (11%)	66 (21%)
Chemistry	37 (77%)	9 (19%)	9 (19%)	12 (27%)	7 (12.5%)

Table 6. Total number ACs without mediation, according to personalization and directness.

REPORTED	TOTAL	personal/ direct	personal/ indirect	impersonal/ direct	Impersonal/ indirect
Psychology	33 (11%)	10 (3%)	3 (1%)	14 (5%)	6 (2%)
Chemistry	4 (8%)	2 (4%)	0	1 (2%)	1 (2%)

Table 7. Total number of Reported ACs, according to personalization and directness.

Disciplinary differences can also be seen in the distribution of AC in the RA (see Table 8). For comparative purposes, we grouped results, discussion and conclusion sections together due to the differences in the macrostructure of the RA in the two disciplines: Psychology articles tend to present the Results, Discussion, and Conclusions (RDC) under separate headings, whereas Chemistry RAs grouped Results and Discussion under the same heading, with a separate section for conclusions. The most significant difference is in the frequency of AC in the introduction section of the RAs, with nearly half the occurrences of AC in this section in Psychology, while only a third of the total number of AC units occurred in this section in Chemistry.

	Psychology	Chemistry
Abstract	4 (1%)	2 (4%)
Introduction	137 (45%)	16 (33%)
Methods	5 (2%)	0
Results/Discussion/Conclusion	161 (52%)	30 (63%)
Total	307 (100%)	48 (100%)

Table 8. Total number of cases of AC per structural section

The more even distribution between the introduction and RDC in Psychology may reflect the structure of the RA itself: the introductions and discussions in Psychology tended to be roughly the same length, while in Chemistry two-thirds of the paper was taken up by the results and discussion paper, with a relatively brief introduction.

Conclusion

Our study has revealed that when engaging in academic criticism disciplinary differences can be appreciated, primarily as regards the higher frequency of occurrence of critical

speech acts in the Psychology papers. This disciplinary variation, as pointed out earlier, may be due to several factors, such as differences in social activities, cognitive styles and epistemological beliefs of the specific disciplinary communities. The permeability of the discipline (see Becher, 1989) may also account for the frequency and nature of an academic criticism in a discipline. Becher draws a distinction between disciplines that parallels the division of disciplines into hard and soft in that it looks at how permeable they are to values, beliefs, knowledge and practice from outside. This author notes that unrestricted (soft) disciplines tend to use theories or research methodology from other fields as well as citing work from contiguous disciplines, whereas restricted (hard) disciplines tend to draw almost exclusively on their own resources almost exclusively. Thus, writers in unrestricted disciplines (e.g. Psychology) may feel more comfortable engaging in AC of work carried out in other parallel discourse communities. The underlying assumptions concerning the readers' background knowledge (see Bazerman, 1988) may also account for disciplinary variation: in the closeknit framework (see Bex, 1996) of the hard disciplines (e.g. Chemistry) it might be unnecessary to engage in critical speech acts, whereas writers from the looser knit networks in the soft disciplines (e.g. Psychology) cannot rely as much on shared knowledge and tend to target explicitly some other work in order to create a gap for their research.

Although writers in both disciplines prefer to remain uncommitted when expressing criticism rather than being explicitly present (i.e. writer-mediation), the slightly higher percentage of instances of AC in Psychology in the writer-mediated dimension could be attributed to the fact that nearly twice as many of the Chemistry RAs had multiple authors: 24 out of 25, compared to only 13 in Psychology (see Appendix). First person plural forms, although seemingly expressing a more personal commitment to the assertion, are perhaps being used “impersonally” in multiple-author scientific papers. Regarding this point, it would be interesting to study the instances of writer mediation in AC in RAs with regard to multiple vs. single authors.

As stated in the previous section, when combining the rhetorical options of directness and personalization, in the unmediated dimension, another significant difference emerges: although in both disciplines there is a similar preference for conveying criticism directly, i.e. without hedging devices, a higher tendency to use personal ACs in Psychology than in Chemistry was observed. Again, this variation may be due to the nature of the discourse communities: in the closeknit framework of Chemistry, the referent of the criticism may actually be evident to other

researchers without explicit mention, whereas in Psychology the readers may come from a broader background, and the writer has to be more explicit. Discursive practices in Psychology may demand more direct forms of writing when criticising one's peers, in order for the writer's claims to be made more convincing.

The fact that in Psychology the percentage of critical speech acts in the Introduction section of the RAs is higher than in the same section in Chemistry could possibly be explained in terms of the dependence in Psychology on textual devices for gap creation: in Chemistry, the results are the most powerful support of their knowledge claims, consequently writers prefer to dedicate valuable space (hard science journals sometimes charge writers by the page for their contribution) to this section instead of the introduction. Another factor, as Bazerman (1988) has pointed out, is that the assumed background knowledge in hard science fields allows the writer to avoid having to use an extensive system of references to previous work, thus writers may not have to point out any particular conflict to establish their research space in the introduction.

Discussion

The identification of the rhetorical options available to writers in their disciplines is an important step towards understanding the mechanisms of the expression of academic conflict in RAs. The patterns that we have observed in this study also emerged when other disciplines were analysed (see Burgess & Fagan, 2002), where a larger sample were used. Considering the importance of specificity in academic discourse, further research could be carried out concentrating on subdisciplines within the fields, certain journals, or even, as MacDonald (1994) suggests, in terms of particular problems the discourse communities address. Myers (1993) too, in his examination of 'boundary setting' in the field of Linguistics, notes that linguists employ a variety of rhetorics because the various sub-disciplines have very different methods and goals.

At this point, we would also like to discuss the limitations of a quantitative approach to academic criticism. The inclusion in this study of the dimension of writer mediation takes into account, as stated above, the critical role of the writer as mediator in the expression of AC. This aspect may indeed need to be more finely tuned, according to disciplines. In this regard, a closer examination of the entities

used as agents and subjects, much as MacDonald (1992, 1994) suggests, may point up differences between the disciplines that simply counting instances of writer mediation does not reveal. Cases in point are the use of the first person plural in papers produced by a single author and the distinction between first person pronoun use *per se* as opposed to possessive adjectives in nominal groups e.g. ‘I’ versus ‘In our laboratory’ (N.B. no instances of first person singular occurred in Chemistry). Whereas Hyland (2001) sees the use of the personal pronoun “we” as a rhetorical tool for bringing the reader into the text as a member of a disciplinary “in-group”, a qualitative examination of the uses of “we” and “our” in the field of Chemistry indicates the use of “we” more as a shift towards spreading the responsibility of the research among two, three or often many more researchers.

The same acknowledgement of the limitations of quantification applies to directness (see Burgess & Fagan, 2002). In this study, critical speech acts are seen as either direct or indirect, and the taxonomy applied here currently makes no allowance for degrees of directness, though few would deny that what is involved is a continuum rather than an either/or choice. This may also result in low levels of interrater agreement for directness, wherein one rater’s outright attack might be another rater’s couched phrase. However, it is worth mentioning that this was not the case in our study, where a high rate of agreement was obtained.

Likewise, personalization may not be entirely amenable to quantification. For Salager-Meyer (1998, 2000), mention of specific individuals is enough to render an AC personal. But how near to the AC in the text does the naming have to occur? Surely there is both explicit and implicit personalization. And where do we mark the bounds of the text? For many of us, responsibility for knowledge making is derivable from the text exophorically almost as readily as it is anaphorically or cataphorically. Members of discourse communities who work on similar problems probably have little difficulty recognising the specific target of a criticism even if not a single mention is made of the individual.

Nevertheless, the establishment of concrete criteria for the rhetorical expression of AC is surely a useful tool for writers in the delicate act of criticising their peers. The analysis carried out in this study has considerably expanded our knowledge of the rhetorics of engaging in academic criticism, and more extensive research should be carried out in order to offer more insights into this socio-pragmatic area of study.

NOTES

1 The results reported in this paper were taken from a broader multidisciplinary study on AC which was carried out by a research team at the University of La Laguna, Spain.

2 In this study we have considered as hedging devices the modal expressions such as *may*, *perhaps*; epistemic verbs (*suggest*, *speculate*); semi-auxiliaries (*seem*, *appear*), and approximators of quantity, frequency, degree and time (*generally*, *approximately*, *most*, *frequently*).

BIBLIOGRAFÍA

- Bazerman, C. (1988). *Shaping Written Knowledge*. Madison: University of Wisconsin Press.
- Becher, T. (1989). *Academic Tribes and Territories: Intellectual Enquiry and the Cultures of the Disciplines*. Milton Keynes: SRHE/OUP.
- Bex, T. (1996). *Variety in Written English: Texts in Society*. London: Routledge.
- Burgess, S. & A. Fagan (2002). "(Kid) gloves on or off?: academic conflict in research articles across the disciplines". *Revista Canaria de Estudios Ingleses* 44: 79-96.
- Cherry, R. D. (1998). "Ethos versus persona: self-representation in written discourse". *Written Communication* 15: 384-410.
- Groom, N. (2000). "Attribution and averral revisited: Three perspectives on manifest intertextuality in academic writing" in P. Thompson (ed.), *Patterns and Perspectives: Insights into EAP Writing Practice*, 14-25. Reading: CALS, The University of Reading.
- Hunston, S. (1993). "Professional conflict: Disagreement in academic discourse" in M. Baker, G. Francis & E. Tognini-Bonelli (eds.), *Text and Technology. In Honor of John Sinclair*, 115-133. Amsterdam: John Benjamins Publishing.
- Hyland, K. (2000). *Disciplinary Discourses: Social Interactions in Academic Writing*. Harlow: Pearson Education.
- Hyland, K. (2001). "Humble servants of the discipline? Self-mention in research articles". *English for Specific Purposes* 20: 207-226.
- Kourilová, M. (1996). "Interactive functions of language in peer reviews of medical papers written by non-native users of English". *UNESCO ALSED-LSP Newsletter* 19,1: 4-21.
- MacDonald, S. P. (1992). "A method for analyzing sentence-level differences in disciplinary knowledge making". *Written Communication* 9: 533-69.
- MacDonald, S. P. (1994). *Professional Academic Writing in the Humanities and Social Sciences*. Madison: University of Wisconsin Press.
- Motta Roth, D. (1998). "Discourse analysis and academic book reviews: A study of text and disciplinary cultures", in I. Fortanet, S. Posteguillo, J. C. Palmer & J. F. Coll (Eds.), 29-59. *Genre Studies in English for Academic Purposes*. Castelló: Universitat Jaume I.
- Myers, G. (1989). "The pragmatics of politeness in scientific articles". *Applied Linguistics* 10,1: 1-35.
- Myers, G. (1993). "'Linguists', 'Linguistics', 'Linguistics Departments', and 'Language'. Boundaries and centres in disciplinary discourse". Paper delivered at the Annual Conference of the *Linguistics Association of Great Britain*.
- Salager-Meyer, F. (1998). "The rationale behind academic conflict: from outright criticism to contextual 'niche' creation". *UNESCO ALSED-LSP* 21,2: 4-23.
- Salager-Meyer, F. (2000). "Rhetorical evolution of oppositional discourse in French academic writing". *Hermes* 25: 23-48.
- Salager-Meyer, F. & N. Zambrano (1998). "Professional conflict in French and English medical discourse". Paper presented at the *6th International Congress of Pragmatics*. Reims (France).

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area of interest. He has published a number of articles in national and international journals on the rhetorical strategies used by academics in English and Spanish research paper abstracts.

Appendix

PSYCHOLOGY TEXTS

- Barrett, J. & F. Keil (1996). "Conceptualizing a nonnatural entity: Anthropomorphism in God concepts". *Cognitive Psychology* 31: 219-247.
- Brainerd, C. & V. Reyna (1995). "Autosuggestibility in memory development". *Cognitive Psychology* 28: 65-101.
- Cacioppo, J., R. Petty, J. Feinstein & W. Jarvis (1996). "Dispositional differences in cognitive motivation: The life and times of individuals varying in need for cognition". *Psychological Bulletin* 119,2: 197-253.
- Crone, D. & G. Whitehurst (1999). "Age and schooling effects on emergent literacy and early reading skills". *Journal of Educational Psychology* 91,4: 604-614.
- Dunbar, R. (1993). "Coevolution of neocortical size, group size and language in humans". *Behavioral and Brain Sciences* 16: 681-735.
- Ekman, P. (1994). "Strong evidence for universals in facial expressions: a reply to Russell's mistaken critique". *Psychological Bulletin* 115,2: 268-287.
- Geary, D. (1996). "Sexual selection and sex differences in mathematical abilities". *Behavioral and Brain Sciences* 19: 229-247.
- Gerrard, M., F. Gibbons & B. Bushman (1996). "Relation between perceived vulnerability to HIV and precautionary sexual behaviour". *Psychological Bulletin* 119,3: 390-409.
- Gray, J. (1995). "The contents of consciousness: A neuropsychological conjecture". *Behavioral and Brain Sciences* 18: 659-722.
- Hart, P. (1999). "Predicting employee life satisfaction: A coherent model of personality, work and nonwork experiences, and domain satisfactions". *Journal of Applied Psychology* 84,3: 564-583.
- Jurden, F. (1995). "Individual differences in working memory and complex cognition". *Journal of Educational Psychology* 87,1: 93-102.
- Konovsky, M. & R. Cropanzano (1991). "Perceived fairness of employee drug testing as a predictor of employee attitudes and job performance". *Journal of Applied Psychology* 76,5: 698-707.
- MacNeilage, P. (1998). "The frame/content theory of evolution of speech production". *Behavioral and Brain Sciences* 21: 499-546.
- Mandler, J. & L. McDonough (1998). "Studies in inductive inference in infancy". *Cognitive Psychology* 37: 60-96.
- Mattys, S. & P. Jusczyk (1999). "Phonotactic and prosodic effects on word segmentation in infants". *Cognitive Psychology* 38: 465-494.
- Newman, R. (1998). "Students' help seeking during problem solving: influences of personal and contextual achievement goals". *Journal of Educational Psychology* 90,4: 644-658.
- Ouellette, J. & W. Wood (1998). "Habit and intention in everyday life: The multiple processes by which past behavior predicts future behaviour". *Psychological Bulletin* 124,1: 54-74.
- Schommer, M., C. Calvert, G. Gariglietti & A. Bajaj (1997). "The development of epistemological beliefs among secondary students: A longitudinal study". *Journal of Educational Psychology* 89,1: 37-40.
- Shafir, E. & A. Tversky (1992). "Thinking through uncertainty: nonconsequential reasoning and choice". *Cognitive Psychology* 24: 449-474.
- Spector, J. (1992). "Predicting progress in beginning reading: dynamic assessment of phonemic awareness". *Journal of Educational Psychology* 84,3: 353-363.
- Talaga, J. & T. Beehr (1995). "Are there gender differences in predicting retirement decisions?" *Journal of Applied Psychology* 80,1: 16-28.
- Tepper, B. (1994). "Investigation of general and program-specific attitudes toward corporate drug-testing policies". *Journal of Applied Psychology* 79,3: 392-401.
- Tsotsos, J. (1990). "Analyzing vision at the complexity level". *Behavioral and Brain Sciences* 13: 423-469.
- Wanberg, C. (1997). "Antecedents and outcomes of coping behaviors among unemployed and reemployed individuals". *Journal of Applied Psychology* 82,5: 731-744.
- Wood, W., Wong, F. & J. Chachere (1991). "Effects of media violence on viewers' aggression in unconstrained interaction". *Psychological Bulletin* 109,3: 371-383.

CHEMISTRY TEXTS

- Anantanarayan, A. & H. Hart (1991). "Reduction of DMAD-anthracene adducts. Synthesis and conformations of substituted cyclodecadienes". *Journal of Organic Chemistry* 56: 991-996.
- Armstrong, E. M., D. Collison, R. J. Deeth & C. D. Garner (1995). "Discrete variational Xá studies of the electronic structure of Amavadin". *J. Chem. Soc., Dalton Transactions* Issue 2: 191-195.
- Assmus, R., V. Böhmer, J. M. Harrowfield, M. L. Ogden, W. R. Richmond, B. W. Skelton & A. H. White (1993). "Alkal-metal ion complexes of the calixarenes. Part 1. Caesium bonding in calix[4]arene systems". *J. Chem. Soc., Dalton Transactions* Issue 16: 2033-2037.
- Banfi, S., F. Montanari, G. Pozzi & S. Quici (1994). "Dimeric Mn(III)-Tetraarylporphyrins as Catalysts for H₂O₂-Promoted Olefin Epoxidation". *Tetrahedron* 50,30: 9025-9036.
- Bordwell, F. G., X.-M. Zhang & M. S. Alnajjar (1992). "Effects of adjacent acceptors and donors on the stabilities of carbon-centered radicals". *Journal of the American Chemical Society* 114: 7623-7629.
- Chaban, G. & M. S. Gordon (1996). "Structure and stability of M – H₂ complexes" *Journal of Physical Chemistry* 100: 95-99.
- Eto, M., O. Tajiri, H. Nakagawa & K. Harano (1998). "Correlation of thione-to-thiol rearrangement rates of xanthates with solvent scales. analysis of the reaction behavior by the Kamlet-Taft parameters". *Tetrahedron* 54: 8009-8014.
- Frontier, A. J., S. Raghavan & S. J. Danishefsky (2000). "A highly stereoselective total synthesis of hispidospermidin: derivation of a pharmacophore model". *Journal of the American Chemical Society* 122: 6151-6159.
- Gabriele, B., G. Salerno, F. De Pascali, M. Costa & G. P. Chiusoli (1999). "An efficient and general synthesis of furan-2-acetic esters by palladium-catalyzed oxidative carbonylation of (Z)-2-En-4-yn-1-ols". *Journal of Organic Chemistry* 64: 7693-7699.
- Ho, C.-W., W.-C. Cheng, M.-C. Cheng, S.-M. Peng, K.-F. Cheng & C.-M. Che (1996). "Preparation and reactivities of chiral manganese (III) and copper(II) complexes of binaphthyl Schiff bases". *J. Chem. Soc., Dalton Transactions* Issue 4: 405-414.
- Hoekstra, W. J., S. S. Sunder & R. J. Cregge (1992). "Large-scale synthesis of anticoagulant decapeptide MDL 28050". *Tetrahedron* 48,2: 307-318.
- Hughes, D. L., M. Jimenez-Tenorio, J. G. Leigh, A. Houlton & J. Silver (1992). "Iron complexes with polythioether ligands: the relation of unusually large Mössbauer quadrupole splittings to structure". *J. Chem. Soc., Dalton Transactions* Issue 13: 2033-2037.
- Jirsák, T., V. Nikolajenko & Z. Knor (1995). "Interaction of carbon monoxide with Pd/Nb and Pd/NbO_x/Nb systems". *Journal of Physical Chemistry* 99: 15470-15472.
- Maltese, M. (1995). "Relative reactivity in piperidino-dechlorination, 2,4-Diamino-6-chloropyrimidine, 2,4-Diamino-6-chloropyrimidine (3)-Oxide, and their acetylamino analogues". *Journal of Organic Chemistry* 60: 2436-2442.
- Meagher, T. P. & H. Schechter (1998). "(E)-1-(Phenylsulfonyl)-4-(trimethylsilyl)-1-butene: An advantageous synthetic equivalent for the 1-(1,3-Butadienyl) anion and the 1,1-(1,3-Butadienyl) dianion". *Journal of Organic Chemistry* 63: 4193-4198.
- Miranda, L. P., A. Jones, W. D. F. Meutermans & P. Alewood (1998). "p-Cresol as a reversible acylium ion scavenger in solid-phase peptide synthesis". *Journal of the American Chemical Society* 120: 1410-1420.
- Netz, A. & T. J. J. Müller (2000). "Electrophilic reactivity of the (Phenyl)Cr(CO)₃-substituted á-Propargyl Cation". *Tetrahedron* 56: 4149-4155.
- Pavlik, J. W., P. Tongcharoensirikul, N. P. Bird, C. A. Day & J. A. Barltrop (1994). "Phototransposition chemistry of phenylisothiazoles and phenylthiazoles. 1. Interconversions in benzene solution". *Journal of the American Chemical Society*: 116: 2292-2300.
- Plater, J. M., M. R. Foreman & M. B. Hursthouse (2000). "Synthesis and characterisation of infinite di- and tr-nuclear zinc co-ordination networks with flexible dipyrlyd ligands". *J. Chem. Soc., Dalton Transactions* Issue 13: 1995-2000.
- Rasset, C. & M. Vaultier (1994). "Diels-Alder cycloaddition of 3-borylpropenoic acid derivatives and their use as synthetic equivalents of E-á-hydroxy vinylamine". *Tetrahedron* 50,11: 3397-3406.
- Sneh, O. & O. Cheshnovsky (1991). "Dynamics of triplet states in beam-isolated benzaldehyde". *Journal of Physical Chemistry* 95: 7154-7164.
- Tagge, C. D. & R. G. Bergman (1996). "Synthesis, x-ray structure determination, and reactions of (pentamethylcyclopentadienyl)(nitrosyl)ruthenium *n*-arene complexes". *Journal of the American Chemical Society* 118: 6908-6915.
- Uchiyama, Y., I. Tsuyumoto, T. Kitamori & T. Sawada (1999). "Observations of one process in a phase transfer catalytic reaction at a liquid/liquid interface by using the quasi-elastic laser scattering method". *Journal of Physical Chemistry* 103: 4663-4665
- Zamadis, M., X. Chen & L. Kevan (1992). "Solid-state ion exchange in H-SAPO-34: Electron spin resonance and electron spin echo modulation studies of Cu(II) location and adsorbate interaction". *Journal of Physical Chemistry* 96: 5488-5491.
- Zhao, S., J. P. Freeman, C. G. Chidester, P. F. VonVoigtlander, S. A. Mizsak & J. Szmuskovicz (1993). "Regioselective and stereoselective synthesis of 1,2,3-Triaminocyclohexane derivatives". *Journal of Organic Chemistry* 58: 4043-4048.