

# LT Seating position (2)

by Steve Draper

## Preface

Triggered by Perkins & Wieman 05. This TM started 2009(?).

N.B. TM "SeatingPos" is about persistence of people to use the same seat every time in a given meeting e.g. tutorial.

Xrefs (for my theory of it, at least): 2partMotivation; neoVyg?. A few notes originally in "situativity.notes".

## ToDo

Read and note all lit.

Write TR for web

Any interesting enough conclusions for a publication? e.g. can we favour social OR physical OR what theory?

Go over each lit. entry: is it enough for now?

Go over list of pts established: add any?

Go over list of pts established: carefully argue each: be thorough about the evidence for (and against) each.

## Introduction

They showed that some causality flows from seat position (in first part of a course) to student performance.

This effect is indep. of Mazur effect (but much smaller).

My tentative int. of their data is that it shifted the whole mark distribution by group; and equally attendance and pre/post change of score on CLASS quaire. It is NOT time in seat position, but position in first half of term (or first week?). My int. is that this shifts an attitude (to effort?) in L that affects everything.

## What causes it?

"Engagement": I guess that being near the T somehow makes students feel personally engaged in the course.

## Main research issues

- Direction of causality.
- What matters: location, loc rel. to group, T attn?, ...
- Personality measures and their interaction with seat pos.

## Report

Same T or mixed?

Same room (LT) or mixed?

If mixed, then crossed or random noise that undermines drawing conclusions?

## Notes on the papers

### Perkins & Wieman 2005

Class size: 201

Level: 1

Subject: Physics

Effect size: Info to calculate it is not given

Effects on: final grade (marginally sig); Attendance in 2nd half of the term (84-76%); fraction in bottom 10% (4% vs. 14%); fraction in top 20% (25% vs. 19%); and beliefs about nature of physics [CLASS quaire]: got better in group 1, worse in group 4).

Stat sig. ?: ?

Seating (randomly) allocated into groups (sets of rows; nearest front best).

Reversed at half term: but effects are for how near the front at the start.

### Griffith 21 (see also Knowles82)

Class size: 5 LTs, many classes, about 60-400 per class.

(20,000 grades collected (12-100 classes). Deliberately a contrasting set of ped. styles.)

Level: xx

Subject: ? probably sci (lab. classes)

Effect size: 5-10% of marks.

Effects on: grades

Stat sig. ?: -

All T-assigned (alphabetically).

Middle do 5% better than the front and 10% better than the back.

It isn't about absolute pos, but about pos. rel. to rest of students.

In rooms with aisles, these mark a drop in grades.

Possibly it is feeling in the middle of the group keeps attention highest; being on the edge makes you restless, distracted, ... Definitely it is not abs. loc, because contrast large and small classes in same rooms showed the effect was rel. row, not abs row.

He notes that the factor is partly overcome during the term (because, he suggests, of fbck from quizzes: they had 2 quizzes before final exam). Effect is bigger with bigger class size; and with more lecturing (less labs, less quizzes).

He suggests it is due to the "kind of instr." Ls give themselves i.e. how much effort they think they need to make. The bimodal grades in back row support this: half have woken up to compensate, others haven't.

He says it is "social integration".

### Knowles82

A trumpeting of Griffith' work and its superiority (except for stats. methods).

Commentary on Levine80 and Stires80

### Farnsworth 33

Class size: 510 from 4 classes

Level: xx

Subject: ??

Effect size: Info to calculate it not given

Effects on: Preferred seat location.

Stat sig. ?: yes

Most students wanted the best seats, so perhaps they just are the best seats.? They often believed it was because T directed his attention to those seats, and Farnsworth thinks this likely for several reasons.

He asked students to put on a seating plan their preferred seat and got same pattern as Griffith.

He didn't do it at Griffith's HEI.

**Kalinowski 07**Class size: 45Level: 2 (sophomore)Subject: Biology (most for hons; majority for med school)Effect size: 0Effects on: xxStat sig. ?: Definitely no effect. Multiple regression of test scores against a) seat row; b) GPA.

PBL lectures i.e. each lecture organised around a problem qu. Lots of small group discussion, plus plenary. Students randomly put in groups of 3, and each group in a single row; 2 groups per row; 11 rows of 11 seats each in the room. They learned Ls' names and addressed them by name.

They also found a highly sig. small correlation of prior GPA and chosen row: before they were reseated. ?As if habitual seat DID have an effect on grade in other classes?

Does regression analysis assume linear effect, contrary to curvilinear?

**Gur75**Class size: 74/90Level: ?Subject: multipleEffect size: Info to calculate it not given: chi sq; no SD given/relevant.Effects on: Seating preference L/R (cf. Farnsworth)Stat sig. ?: 0.05

Tested eye directionality under questioning  $\approx$  brain laterality; and handedness. About 2:1 L/R pref in line with laterality.

**Benedict 04**Class size: xxLevel: xxSubject: EconomicsEffect size: Info to calculate it not givenEffects on: Seating pref  $\rightarrow$  grades, regardless of actual seat; and also actual seat  $\rightarrow$  grades regardless of pref. And in another study actual seat  $\rightarrow$  personality measures.Stat sig. ?: xx

Some have run same course twice, once with assigned seating, once with free/voluntary; and compared.

Being forced forwards from preferred loc. increased grades.

**Levine80**Class size: 209/159 after dropouts etc.Level: 1Subject: PsychEffect size: No SD given. 4.3% test score shift.Effects on: Participation, test scores.Stat sig. ?: yes

First self-selection; then T-assigned (random).

Location (distance to front) affected exams whenn self-selected NOT when Tassigned.

Location (distance to front) affected participation whenn T-assigned NOT when self-selected.

Location was a front/rear binary split.

Exam scores (of one L across the 2 phases) were sig. correlated; but participation not at all. Test scores and participation not correlated.

So seems to disprove main effect of loc BUT

- Order effect: as Wieman showed, only the first (T-assign) will be active here.
- their binary chop of position may be the problem.

**Stires80**

Class size: 279 in 2 subgroups

Level: 1

Subject: psych

Effect size: 8% of score for side-middle and for choice-no choice.

Effects on: tests

Stat sig. ?: yes

One class T-assigned alphabetically (but don't know if by col. or by row); one class told to choose carefully then had to stick to it. MCQ test scores (six of them).

If they got to choose, then higher scores.

Front-back there but non-sig.

Side-centre sig.

Because the room was much bigger than each class, they forced students away from the real back: collapsed front-back dim BUT had extended side-middle dim.

22/300 was diff. of means.

Not just test scores but ratings by Ls of instructor, of course;

Absences, went with front/back. (Esp. front, middle, and self-chosen had v. low absences.)

Extra credit ditto.

Difficulty in seeing and hearing did NOT go with test scores but with distance.

Here, the new effect was whether they got to choose: whether self-efficacy or match to needs.

Binary front/back; side/centre.

They looked at personality, but no interesting to me effects.

I think his study is good; but his commentary/conclusions are not because he tries to discuss everything as env. vs. self-selection. But his results, and Levine's, show some effects are one, some the other.

**Stires82**

Commentary trying to reconcile Levine80 and Stires80.

**Levine82**

Commentary trying to rebut Knowles82 and Stires82.

But generally: they found seat pref. predicted grades; but sometimes assigned seating can predict grades, but not always. They discuss order effects: and whether early location has a persistent effect: which Perkins too found. Levine may have done the opp. of Perkins: choice first, then forcible.

**Holliman 86**

Class size: 141 from 2 classes

Level: 1

Subject: Psy, intro

Effect size: Info to calculate it not given

Effects on: xx

Stat sig. ?: xx

Self-selected seating; location affected marks.

Sig better if nearer T. Those with As were nearer on av. than other grade groups. Tested, but no results, for centrality; and density (occupancy of neighbour seats).

**Pedersen 94**

Class size: 50

Level: xx

Subject: Psy

Effect size: Info to calculate it not given

Effects on: xx

Stat sig. ?: xx

Seat pref vs. personality. Shows some correlations.

**Weinstein 79 School not HE. A review**

See her comments, which seem sensible. Both dirs of causality may be important. And it may not depend on Q&A interaction (in HE).

**Wulf 76**

Class size: 44 + 37

Level: L4

Subject: EdPsych

Effect size: Info to calculate it not given

Effects on: Discussion / Responses (answering T); prefs for seating; exams.

Stat sig. ?: yes

Both self-selected and T-assigned (reverse alphabetic) seating.

Horseshoe room seating plan (not grid).

Here, self-selected seating did affect responses, didn't affect grades.

So no location effect here (in L4 students).

Like Farnsworth, a majority preferred middle front row; but if lower grade, less pref.

T-assigned seating didn't affect grades. But higher achievers would have preferred front row.

Found only effect of action zone on participation when self-selected seating.

**Totusek 82**

Class size: 285 from 2 sections.

Level: L1

Subject: Communication

Effect size: Info to calculate it not given

Effects on: chosen seat of personality

Stat sig. ?: yes

Personality and seat loc: both forcible and self-selected.

She cites past work showing that interaction higher with front and center locs.

Some sig. effect of personality vs. choice of action seat. And more for the personality scores of those assigned to action seats vs. choosing them.

**Walberg 69**

Class size: Sample 817

Level: high school

Subject: Physics

Effect size: Info to calculate it not given

Effects on: xx

Stat sig. ?: xx

Location and personality: or rather, attitudes to school (and life plans). correlation found.

**Koneya76**

Class size: 138 from 7 "sections".

Level: HE

Subject: communication studies

Effect size: Ratio of >3 times in nmb. of utts from central:non-central locs.

Effects on: Verbal utterances, GPA, test scores

Stat sig. ?: yes

About, loc., "participation" i.e. dlog. propensity.

Looked at discussion in a 5X5=25 (actually 23) person group in row/col arrangement. Tabulated and looked a lot like Griffith for nmb., of contribs per person. But biggest diff in about in/out of "triangle of centrality". He did first a circle arrangement of 23? students, recorded contribs, divided them into 4 bands of propensity to speak. Got their prefs for loc in 5X5 square seating. Put them in random pos in 5X5.

- Huge effect on utts of loc (central/non) of all Ss together.
- This came from high and medium verbalisers; but non-sig effect of loc on the lowest quarter of verbalisers. So location has big effect on utts for at least the 75% (perhaps more) most verbal of the class.
- Seat pref central/non of high quarter verbalisers vs. lowest quarter: sig., mostly that high verbalisers preferred central a lot.

So: great data that loc. strongly affects "contribs"; indep. of choice and pref for loc.

And great data on the non-linear loc func. for this.

**Schwebel72**

Class size: 14 classes

Level: Primary school

Subject: -

Effect size: -

Effects on: Attentiveness. Self-esteem, ...

Stat sig.?: yes

Assigned seats (3 way categories). Assigned to front makes them more attentive. Assigned to front makes them better regarded by self, T, peers. First T-assigned; then in phase 2, random assignment. The T-assigned showed biggest front to back gradient. Most children preferred sitting at front.

**What we know for sure**

There is a causal link from student [what?] to seating choice.

But there is a causal link in some classes at least between assigned seating in first few weeks and a) attendance later on; b) final test scores.

This doesn't happen in all classes. But it can happen even in classes with engaging participatory exercises.

**Future work?**

1. Want to replicate it: that seatPos causes learning effect.
2. Get some qual. measures on the process: what is it that matters to the students? What is T actually doing differently for the front from the back.
3. Try some counter measures and see if it abolishes the effect.  
E.g. addressing back row students by name?  
Having students speak out (in turn) esp. from backrow.
4. Is the effect the first day, week, month, half term?

**On whom?**

Would like many courses to try this: partly because it will probably have different size effects on diff. courses; because of the hidden issues of what T is doing.

**How**

Ideal is fixed seating; next best fixed row.

Tell them in this course we are going to try fixed seating (otherwise we'll never understand the issue); and discuss it with them periodically.

Do random assignment (of row) in first class; get them to sit in same row each time.

Remind them each time to go to same row. Have permanent big row labels. Or issue seat tickets in advance.

Do some checks on how observant this is kept.

Probably like them to swap seating at half term. Or sometime.

Ask students periodically how they feel about it; what they notice as different. Get their attitudes to the work too.

**Methodology pts (for future work)**

Order effects are real here (so within-S designs not good)

Curvilinear i.e. non-linear functions of causal factors (so simply 2-level factor designs are bad here).

?May only work on level 1 students?

Choice (self-det.) is itself an important factor.

Multiple active factors, and they don't behave the same as each other i.e. they aren't additive causes.

Better not to use alphabetic assignment, but true random because of the arg. that frequent use of alphabetic accustoms/resigns Ls to this.

There is NOT just one effect: it's not about finding a single underlying issue, and how vars are chained to it in some way. There are diff. effects; they have diff. shaped functions; and they operate independently. Not realising that this plurality is the framework / mindset you need, has been a major obstacle in this field to making progress. Need to design for the possibility of the multiple factors and measures being indep. not only causally but mathematically in their form.

## Other points

### Incidental learning

They mention that best quality Mazur discussion if same groups each week. Note that these needn't be friends first; but that sameness seems to promote the right kind of discussion.  
[xref this to DKing paper; and to Lcomm]

### My hypotheses on what causes it.

My guess is: It is somehow about a feeling of personal engagement by L. And so, about an element of type2 motivation, besides type 1. Of going along with T for personal reasons, not for instrumental ones alone.

"Engagement" insofar as it determines learning seems not to be just, or even mainly?, intellectual engagement but something social? personal?? Perhaps all that stuff on knowing their names, making personal interaction T:L may really matter especially at first.

It could be something in the L.

But it could be entirely in the T: something they do, that students respond to. So something that T does that Ls take as switching how they engage: is this course a personal activity involving me and the main T? Are there in fact 2 modes: personal engagement, and impersonal engagement with the ideas? (Or a 3rd: neither, no engagement, ...)

If the latter then: call them by name??

If we pander to it, will it slow converting them to LLL mode of self-directing learning?

Perkins&Wieman. There's a possibility here, but it's only a guess, that students react significantly as to whether they gauge a course is about their personal social engagement with the T; that this happens irreversibly early in a course (setting a switch inside their heads); and tilts their success (probably by tilting their motivation / engagement / effort); and could be because of eye contact, being called by name, ...

=====  
LT seating effects are probably best explained by participation: being nearer and "seen" by T may be the mech. That would fit with the 2 part motivation idea: we can all learn autonomously without PM, but we can learn with it; and may do better like that.

====

This triggers a thought that just getting Ls active is the key. Activism (one big component to the constr. lesson). This might be why LT seating matters: personal engagement subconsciously by lecturer contact to student makes them feel participation (PM); then they get active, do more learning, more internal processing, and less passive waiting for something to hit them hard enough to do any thinking. If you are a consumer watching an advert, then hanging back passively may be appropriate resistance. Not for learning.

"Engagement": I guess that being near the T somehow makes students feel personally engaged in the course.

Attendance data in Perkins is support for my hyp: seems to be more internalised motivation ...

Is it "participation"? "engagement"? a feeling that T knows you?; a feeling that you want to see and hear T (regardless of whether you feel T sees you)?

A test would be trying to get same effect by other means than seat position. E.g. See them (i.e. a random sample) personally outside the lecture. Or direct attention (interaction?) to one quarter of class in early period.

Griffith thinks he showed that it is not abs. pos, but pos. rel. to the rest of the group of students. And that it is not the lecturer, but an effect across Ts and classes.

Griffith's intuition on the factor is that it is the interplay of two factors:

- It is "social integration": where in the physical group a student is affects how much they feel they are well placed to learn/gain from the class.
- But that Ls can self-correct: i) if they feel not in the best place; ii) in response to disappointing test results.

N.B. that Schwebel in primary schools: sitting near the front makes Ls better regarded by self, peers and T.

Benedict quotes studies that seem to show 2-way causality of seat pos and personality scores; and

### CAL-conf-07 paper by Andeweg

Eye contact better (on test) than non-eye contact (read aloud the talk) [in an expt. on diff. ppt formats for a talk followed by MCQ].

### **Short list of causes of seat->grade effect**

- Engagement: type or strength of effort induced into student. a) quant. b) type: 2-part motivation.
- Feeling of L w.r.t. T: engagement, Tmonitoring, ...
- Feeling of L w.r.t. group of Ls:
- Eye contact.
- "personality" or character/characteristics.
- Integration ....
- Self-correction; or student adopted study methods.

### **Conclusions from the lit. so far**

1. There is an effect of seat location on grade (the random assignment shows this).

The effect isn't large, though the lit. reports too badly to give good numbers for this.

Perkins showed it;

Griffith did.

Stires did.

Benedict did

Not found by: Wulf, Kalinowski,

1.2 The effect may only apply to L1: most studies are of L1; and one that was for L4 showed prefs still there, but causality of loc->grade had gone (or at least below the level the stats could detect).

1.3 May only apply to large classes

1.4 May only apply initially and tend to fade during the semester

1.5 May only apply to expository ped.? not to PBL, lab classes, ...

2. There is an asymmetric order effect: it isn't average seat loc., but at start of course. Perkins directly demonstrated this. Stires suggested it as a theoretical expl. of an earlier study: order effect.

[So not a personality thing. Not seat loc. in the sense of a constant "force" or cause. Something about setting a habit or attitude which then persists.]

So have to discard reported data for later pos by same students on same course i.e. within-S studies.

3. Seat position / shape of location function.

3.1 It is not abs location, but relative to other Ls (Griffith showed this).

This may be about student percep; but it may be about T percep: Ts may address/ focus on a location relative to the group.

3.2 It is not linear, nor even monotonic.

It isn't just distance from front or from speaker. Griffith contours. Biggest contrasts are typically from best seat (often a bit back from front) to the very back.

3.3 In studies that compress the front-back, they may not see any front effect e.g. ?Levine.

3.4 In studies that divide front-back into 2 "levels", you are likely to lose the effect when the quartile pattern (see Griffith) is actually BABC: i.e. half the data is cancelling noise.

3.5 There are sometime strong side-centre effects.

3.6 The shape of the location function seems to be different for participation than for test scores.

4. L preferences for location.

There are pronounced prefs for seat location in line with predicted grades. So grades predict pref as well as loc. predicting grades.

But large majority agree about where the best seats are: so some seats are just better than others.

N.B. Schwebel mentions that Ts assign in primary school s.t. there is a strong location on grade effect: so it is not just a conspiracy by Ls, but by Ts.

5. Participation and seat position: is a real effect, but sep. from effect of location on grade. Participation defined as Ls volunteering answer or question to T in front of class. (Participation, verbal utterances, dialogue propensity.)

Presumably it is reversible i.e. not an order effect.

Koneya76 showed this directly. Big effect, even for groups of only 25; and effect on most students not just



the most verbal.

Levine80 also shows this.

Wulf found it but only when also self-selected seating: so doesn't prove the pt.

Perkins did NOT find this: i.e. on reversal at half term, those now at back (still) asked more questions.

Could argue that test effect is about active interaction by L. Mental activity predicts learning (whether or not it is socially comfortable for a given individual). The best locations are those that make interaction more likely (T sees you, sees when you are ready to speak, ...). But apparently not.

6. Could argue that Ls know what they are ready for and choose the back when they don't feel up for it ...

7. A problem could be that the whole lit. is USA: and may have a more interactive class style (active Q&A as part of class). So we don't know if it applies in Scotland.

### References

Bartlett,A.A. (1973) "The Frank C. Walz lecture halls: A new concept in the design of lecture auditoria" Am.J.Physics vol.41 no.11 pp.1233-1240

Benedict,M.E. & Hoag,J. (2004) "Seating location in large lectures: Are seating preferences or location related to course performance?" J.of Economic Education vol.35 no.3 pp.215-231

*Check the year* Farnsworth,P.R. (1933) "Seat preference in the classroom" J of Soc. Psy vol.4 no.3 pp.373-376

Griffith,C.R. (1921) "A comment upon the psychology of the audience" Psychological monographs vol.30 no.3 pp.36-47

[available at:

[www.archive.org/stream/psychologicalmon.303ameruoft/psychologicalmon.303ameruoft\\_djvu.txt](http://www.archive.org/stream/psychologicalmon.303ameruoft/psychologicalmon.303ameruoft_djvu.txt)  
[www.archive.org/download/psychologicalmon.303ameruoft/psychologicalmon.303ameruoft.pdf](http://www.archive.org/download/psychologicalmon.303ameruoft/psychologicalmon.303ameruoft.pdf) ]

Gur,R.E., Gur,R.C. & Marshalek,B. (1975) "Classroom seating and functional brain asymmetry" J of educational psychology vol.67 no.1 pp.151-153

Holliman,W.B. & Anderson,H.N. (1986) "Proximity and student density as ecological variables in a college classroom" Teaching of psychology vol.13 no.4 pp.200-203

Kalinowski,S. & Toper,M.L. (2007) "The effect of seat location on exam grades and student perceptions in an introductory biology class" Journal of college science teaching vol.? no.1 pp.54-57

Knowles,E.S. (1982) "A comment on the student of classroom ecology: A lament for the good old days" Personality and social psychology bulletin vol.8 no.2 pp.357-361

Koneya,M. (1976) "Location and interaction in row-and-column seating arrangements" Environment and Behavior vol.8 no.2 pp.265-282

Levine,D.W., O'Neal,E.C., Garwood,S.G. & McDonald,P.J. (1980) "Classroom ecology: The effects of seating position on grades and participation" Personality and social psychology bulletin vol.6 no.3 pp.409-412

Levine,D.W., McDonald,P.J., O'Neal,E.C. & Garwood,S.G. (1982) "Classroom seating effects: Environment or self-selection — neither, either, or both" Personality and social psychology bulletin vol.8 no.2 pp.365-369

Pedersen,D.M. (1994) "Personality and classroom seating" Perceptual and motor skills vol.78 no.33 pp.1355-1360

Perkins,K.K. & Wieman,C.E. (2005) "The surprising impact of seat location on student performance" The physics teacher vol.43 no.1 pp.30-33

Schwebel,A.I. & Cherlin,D.L. (1979) "Physical and social distancing in teacher-pupil relationships" J. of educational psychology vol.63 no.6 pp.543-550

- Stires,L.K. (1980) "Classroom seating location, students grades, and attitudes: environment or self-selection?" Personality and social psychology bulletin vol.12 no.2 pp.241-254
- Stires,L.K. (1982) "Classroom seating location: Order effects, and reactivity" Personality and social psychology bulletin vol.8 no.2 pp.362-364
- Totusek,P.F. & Staton-Spicer,A.Q. (1982) "Classroom seating preference as a function of student personality" J. of experimental education vol.50 no.3 pp.159-163
- Walberg,H.J. (1969) "Physical and psychological distance in the classroom" The school review vol.77 no.1 pp.64-70
- Weinstein,C.S. (1979) "The physical environment of the school: A review of the research" Review of educational research vol.49 no.4 pp.577-610
- Wulf,K.M. (1976) "Relationship of assigned classroom seating area to achievement variables" [ERIC] paper to 60th Annual meeting of the AERA (get URL for ERIC)  
Also cited as: Wulf,K.M. (1977) "Relationship of assigned classroom seating area to achievement variables" Educational Research Quarterly vol.2 no."Summer" pp.56-62