# Using activity traces to characterize programming behaviour beyond the lab

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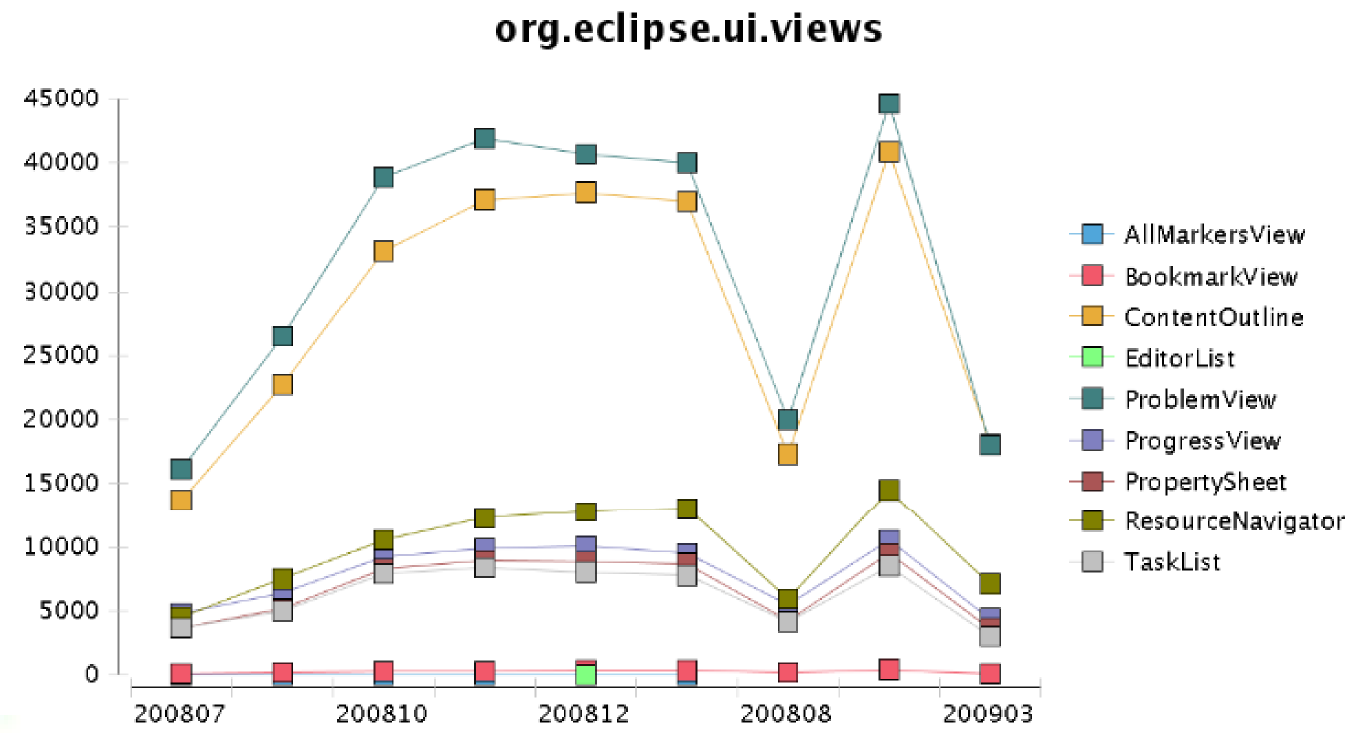
experimentation is hard:

lack of access to experienced programmers

participating programmers may not be representative

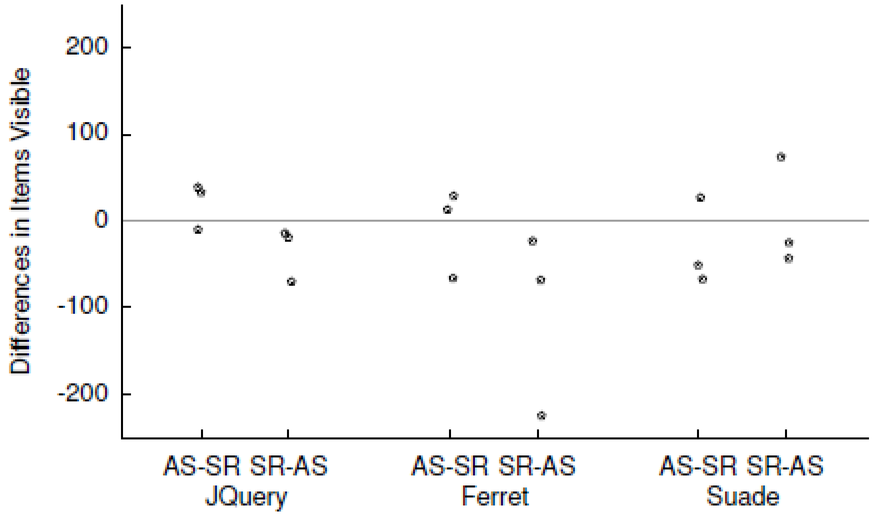
small tasks/code bases may not be representative of actual tasks/code bases field study

controlled experiment



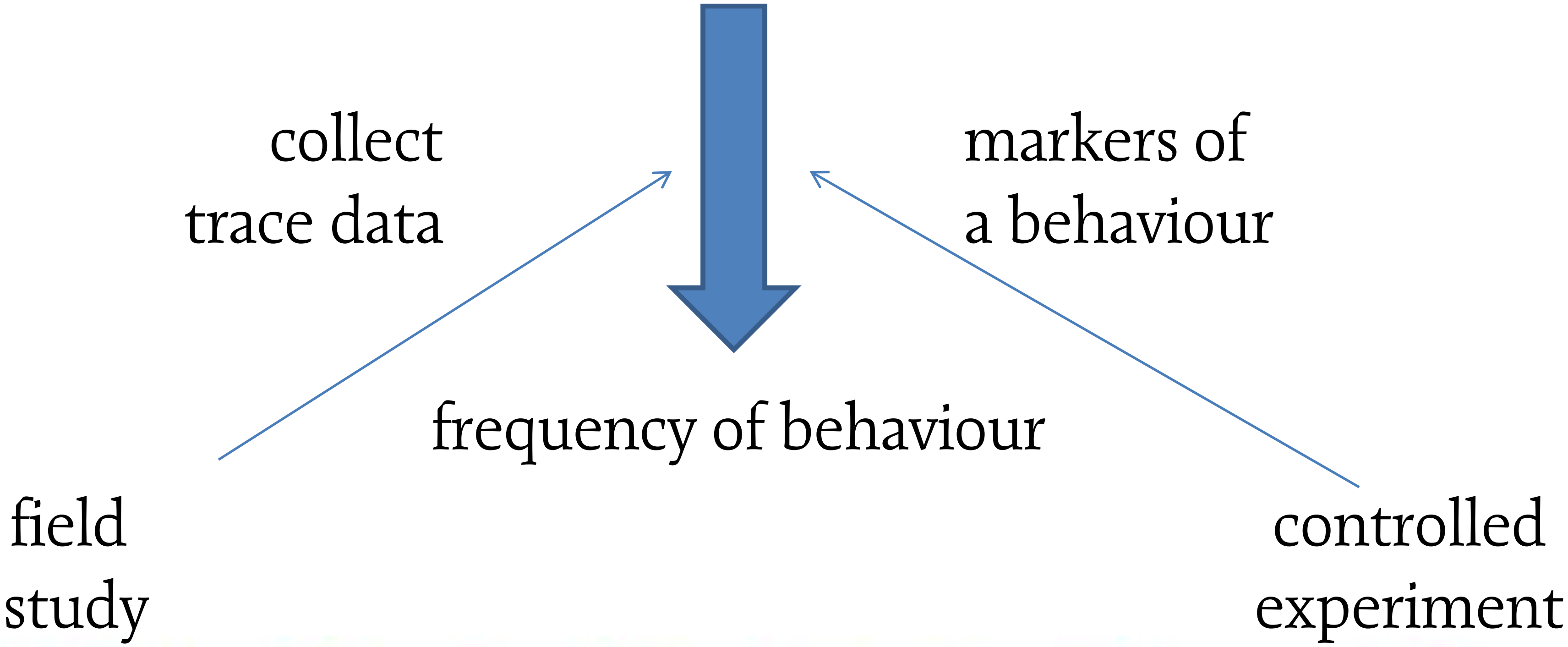
field study

Eclipse UDC data: http://dev.eclipse.org/blogs/wayne/2009/03/10/udc-data-update/



controlled experiment

From “A comparative study of three program exploration tools”, de Alwis et al 2007



collect
trace data

markers of
a behaviour

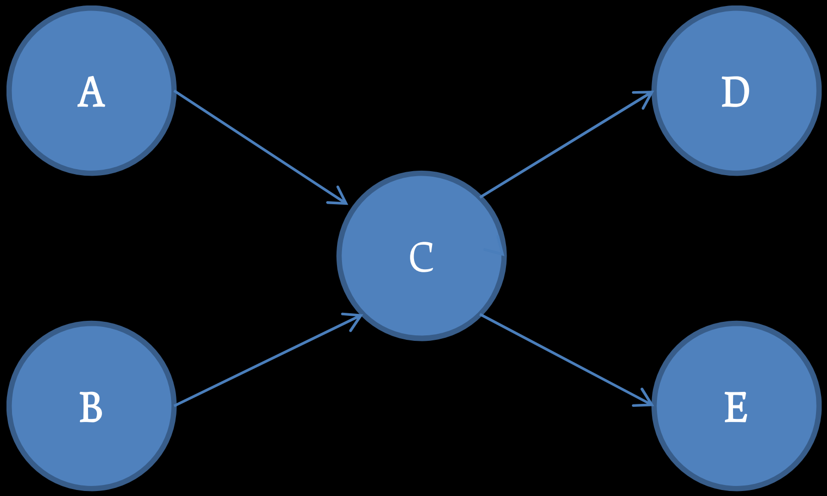
frequency of behaviour

field
study

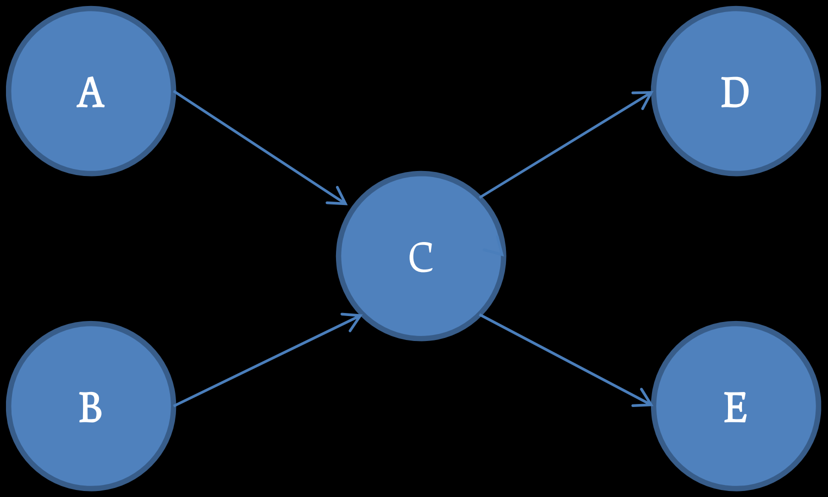
controlled
experiment

an example

several research tools target local context investigations (e.g., RELO)



# 1. develop a marker



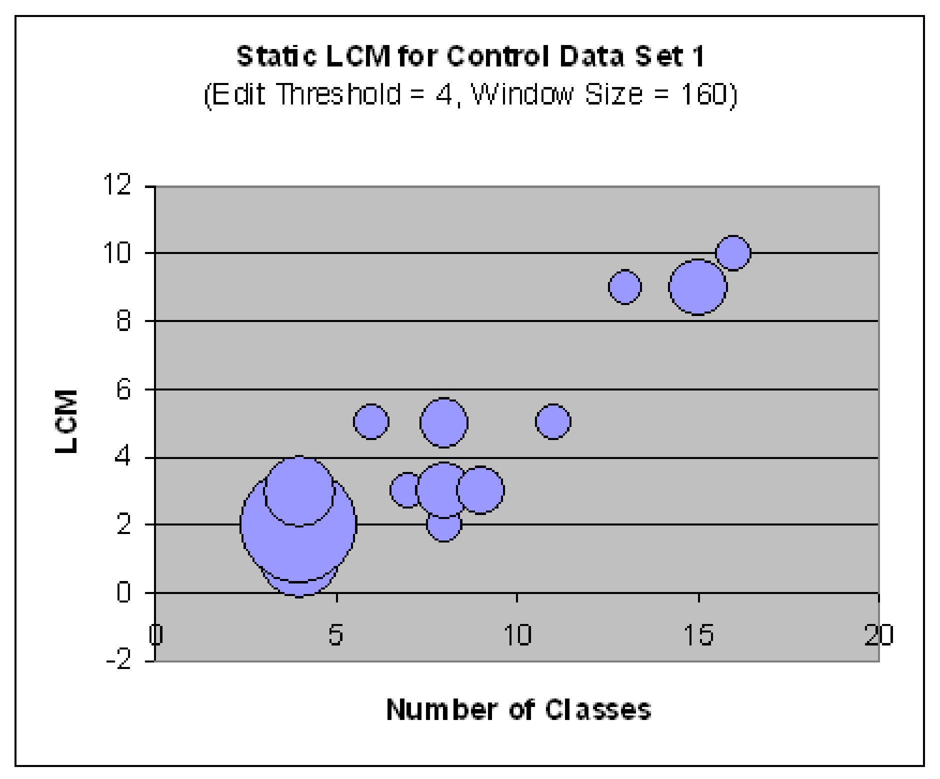
select C<br>
select A<br>
select Z<br>
select B<br>
select D<br>
select B<br>
select C<br>
select B<br>
edit C<br>
edit C<br>
edit C<br>
edit C

significant edit

interaction window

Local Context Measure (LCM) = 2

# 2. apply marked on controlled data



3 traces from controlled study with source code available

## 3. validate

does LCM characterize code navigation behaviours of interest?

are similar behaviours seen in field data?

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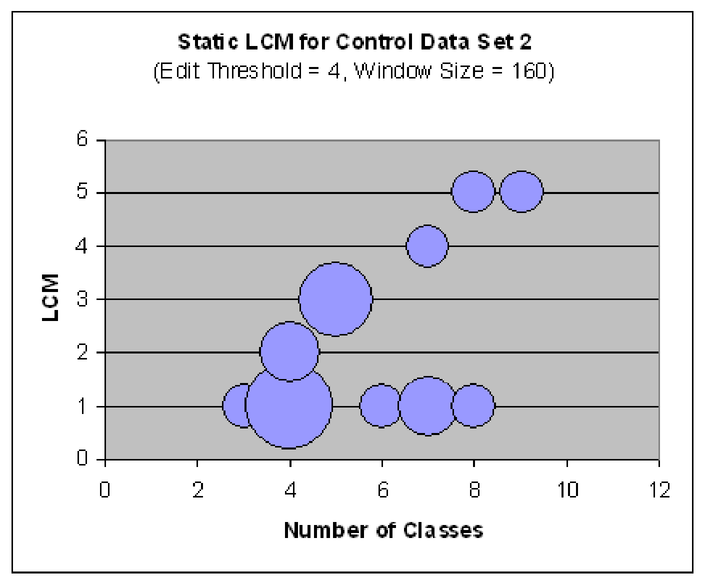
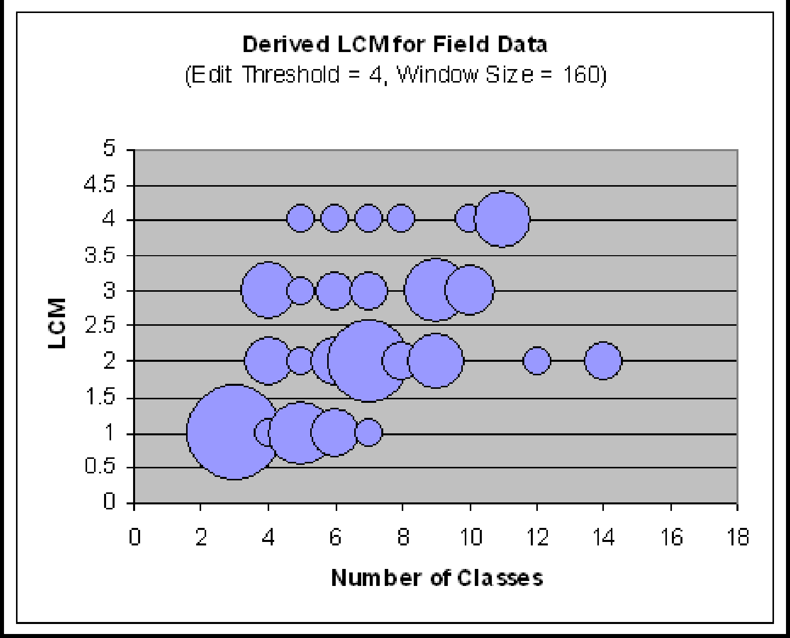
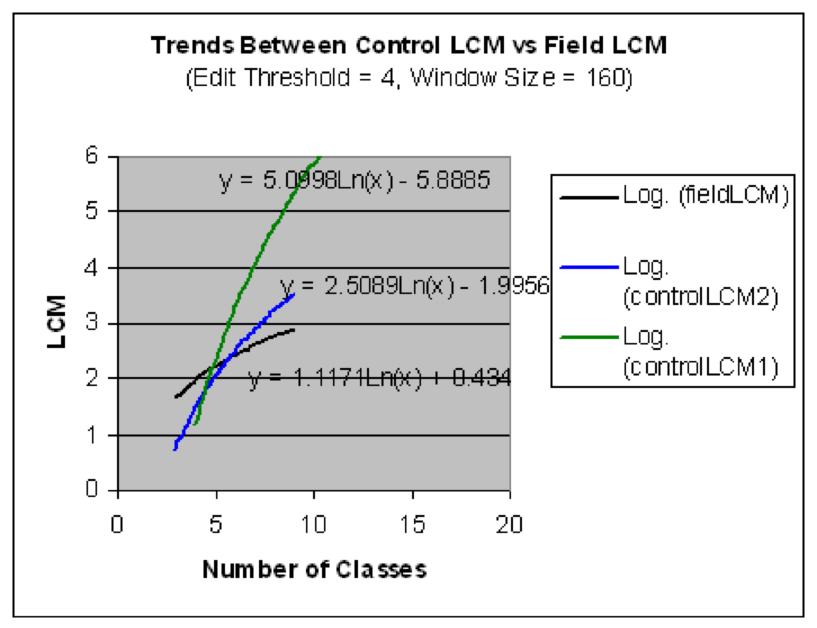


predicted LCM in 70% of 10 significant edit points for which we conducted screen video analysis

5 traces from second controlled study with source code available

# 3. validate





## are similar behaviours seen in field data?

5 traces from a field study with no source code available

# limitations

measure may not be complete

measure may depend on programming style

trace data contents limit behaviours investigated need to improve empirical techniques

indicators of programming behaviours
defined over activity traces
may help scale programming investigations