The 2011 SIOP Graduate Program Benchmarking Survey Part 5: Comprehensive Exams

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In the previous four issues of *TIP*, we provided a general overview of the 2011 survey of graduate programs in I-O psychology (October, 2012), and detailed coverage of admissions practices (January, 2013), curriculum and competencies, (April, 2013), and internships (July, 2013). In this, the fifth, installment we turn to comprehensive exams.

Historically, comprehensive (aka "qualifying") exams are the byproduct of middle-age scholasticism advanced by King Charlemagne (742-814 AD) in Europe. By the early 1800s, German universities had developed intellectual assessments to protect the integrity of student achievements and the reputations of teachers and institutions (Goodchild & Miller, 1997). The oral examination emerged from debates with the "master" as a way of demonstrating knowledge of key material (Manus, Bowden & Dowd, 1992). The modern comprehensive exam format, including both written and oral tests, can be traced to Yale's first awarded doctoral degree in 1861 (in physics) and the ubiquitous Harvard Model of 1871, which first sought to standardize graduation requirements formally (Manus et al., 1992; Rudolph, 1965).

As we have seen in other domains of I-O graduate education, there is considerable diversity across I-O programs in comprehensive exam policies and procedures. Consistent with traditional practices, most include a combination of written and oral tests conducted over several days with a 4-8 hour time limit each day. Survey results offer finer grained descriptions of the nature and practice of comprehensive exams in I-O psychology as of 2011.

Before turning to specifics, we repeat several points noted in earlier install-

ments: (a) Norms are offered only for American programs, as the numbers of other programs are too low to allow meaningful representation. (b) Norms offered at the most general level include responses from all participating (American) brick-and-mortar, online only, and mixed programs. (c) Norms are broken out in a 2-by-2 array, crossing master's versus doctoral programs with psychology versus business/ management departments. (d) Onlineonly programs are excluded from the 2by-2 breakouts. (e) Norms are also provided separately for three "top-10" lists identified by Gibby, Reeve, Grauer, Mohr, and Zickar (2002; most productive doctoral programs), and by Kraiger and Abalos (2004; top master's and doctoral programs, separately, based on student ratings). (f) When N falls below three for a given subgroup, norms are not provided due to dubious representativeness. (g) Means, standard deviations, medians, and skewness, min, and max values are reported for continuous variables; frequencies and percentages are offered for nominal. (h) Statistically, ttests are used for comparisons involving continuous variables and chi squares for nominal variables. (i) Finally, as comprehensive exams were rarely reported by master's programs in business/ management departments, comparisons are limited to master's versus doctoral programs within psychology departments, and doctoral programs in psychology versus business/management departments.

Results are organized in separate tables for nominal and continuous variables and then within tables in terms of (a) general exam features, (b) exam preparation, (c) grading processes and outcomes, and (d) specific exam component features (i.e., written, quant/analytic, oral).

General Exam Features

Table 1 presents norms for all programs and by degree and department types for nominal variables, and Tables 2, 3, and 4 present corresponding norms for continuous variables. General features are described at the top of each table. Beginning with Table 1, we see that all doctoral programs offer comprehensive exams compared to only 41% of (psychology) master's programs. Not surprisingly, given their different timelines, master's programs offering comps tend to do so in the second year of study (87%), whereas doctoral programs tend to offer them in the third (70%) or fourth (22%) years. Results at the top of Table 2 show that exam frequency varies considerably across programs, some offering comps apparently on an optional basis (0 times in the past 5 years), others offering them 3 times per year. This pattern is not significantly different across degree and department types (see Tables 3 and 4).

Main Comprehensive Exam Features: Nominal Variables

						Psych	ology							
	All	progra	ams ^a	Ν	/laster	's ^b	[Doctor	al ^b		Bus/n	ngmt. do	ctoral ^b	
Item/variable	N	Freq	%	N	Freq	%	N	Freq	%	sig. ^c	N	Freq	%	sig. ^d
General features														
Comprehensive exam included														
in program	125	82	65.6	56	23	41.1	40	40	100.0	**	11	11	100.0	
Year of study exam is administer	ed									**				
First	82	3	3.7	23	2	8.7	40	1	2.5	-	11	0	.0	-
Second	82	30	36.6	23	20	87.0	40	2	5.0	-	11	4	36.4	-
Third	82	38	46.3	23	0	.0	40	28	70.0	-	11	7	63.6	-
Fourth	82	11	13.4	23	1	4.3	40	9	22.5	-	11	0	.0	-
Fifth or later	82	0	.0	23	0	.0	40	0	.0	-	11	0	.0	-
Preparation														
Acceptable sources of exam ques	tions									**				
Material covered only in														
required courses	70	21	30.0	19	9	47.4	37	7	18.9	-	9	2	18.2	-
Material covered only in														
available courses	70	12	17.1	19	5	26.3	37	4	10.8	-	9	3	27.3	-
Targeted areas, including														
outside available courses	70	37	52.9	19	5	26.3	37	26	70.3	-	9	4	36.4	-
Guidance offered to students for	exam	prepai	ration											
No formal guidance offered	75	8	10.7	21	5	23.8	38	3	7.9		10	0	.0	
Written descriptions in														
student handbooks	75	42	56.0	21	11	52.4	38	19	50.0		10	7	70.0	
Sample exams	75	49	65.3	21	9	42.9	38	28	73.7	*	10	9	90.0	
Standardized reading lists	75	28	37.3	21	9	42.9	38	14	36.8		10	4	40.0	
Presentations	75	8	10.7	21	3	14.3	38	4	10.5		10	0	.0	
Individualized one-on-one														
preparation	75	34	45.3	21	9	42.9	38	18	47.4		10	5	50.0	
Grading process & outcomes														
How are exams graded? Perform	ance i	s judg	ed							-				-
per component using a single														
global scale	72	25	34.7	20	4	20.0	37	14	37.8		9	6	66.7	
per component using multiple														
scales	72	8	11.1	20	2	10.0	37	5	13.5		9	0	.0	
per component separately per														
question	72	41	56.9	20	10	50.0	37	22	59.5		9	5	55.6	
as simple pass/fail	72	25	34.7	20	10	50.0	37	12	32.4		9	1	11.1	
with passing further														
distinguished as weak vs.	72	23	31.9	20	7	35.0	37	13	35.1		9	2	22.2	
by averaging across raters	72	30	41.7	20	8	40.0	37	18	48.6		9	3	33.3	
Students req'd to complete														
components before advancing	68	22	32.4	18	5	27.8	36	12	33.3		11	5	45.5	
Remedial assignments offered to	stude	nts wh	io fail							-				-
None	59	28	47.5	17	8	47.1	30	15	50.0		8	2	25.0	
Take-home assignment														
targeting particular area(s)	59	30	50.8	17	8	47.1	30	16	53.3		8	4	50.0	
Separate "in-class" exam														
targeting particular area(s)	59	6	10.2	17	1	5.9	30	3	10.0		8	2	25.0	

^aExcluding non-US.

^bExcluding non-US and online only.

^cChi square significance test comparing master's vs. doctoral psychology programs; *p <.05, **p <.01, two-tailed.

 d Chi square significance test comparing psychology vs. business/management doctoral programs *p <.05, **p <.01, two-tailed.

Table 2

Main Comprehensive Exam Features: Continuous Variables

Item/Variable	Ν	Mean	SD	Skew	Median	Min	Max
General features							
Times exam offered in the last 5 yrs.	79	6.82	3.65	.53	5.0	0	15
Time allowed for completion							
Written (proctored/sit-down; hours)	48	5.28	2.98	1.25 **	4.0	1.0	16
Quant/analytic (proctored/sit-down; hours)	20	3.76	2.21	.88	4.0	.8	8
Oral (hours)	29	2.03	1.00	.79	2.0	.8	4
Written take-home (days)	28	11.91	19.88	2.94 **	4.0	2.0	90
Quantitative/analytic take-home (days)	6	18.50	35.11	2.42 *	5.0	.5	90
Time separating components (days)							
Time between components 1 and 2	45	7.20	12.29	3.26 **	1.0	0	67
Time between components 2 and 3	16	8.88	12.05	1.78 **	4.5	0	42
Time between components 3 and 4	4	3.50	4.36	1.93	1.5	1	10
Preparation							
Exam scheduling rigidity ^c	80	2.80	1.32	-1.02 **	3.0	0	4
Grading process & outcomes							
# of faculty graders involved	75	4.94	2.19	.57 *	4.0	1	10
# of faculty graders per component							
Written	72	4.50	2.22	.69 *	4.0	1	10
Quantitative/analytic	26	3.44	1.30	.61	4.0	2	7
Oral	32	3.72	1.20	.35	4.0	2	6
# of times students allowed to take each compo	nent						
Written	70	1.95	.55	53	2.0	1	3
Quantitative/analytic	24	1.88	.61	.06	2.0	1	3
Oral	33	1.94	.61	.03	2.0	1	3
% of students per cohort asked to retake							
Written	62	17.27	20.72	1.84 **	10.0	0	100
Quantitative/analytic	24	17.98	22.39	1.67 **	10.0	0	75
Oral	29	5.35	8.01	2.49 **	2.5	0	35
% of students per cohort who fail exam	67	2.77	4.46	2.35 **	1.0	0	20
Written exam							
% grade per item type							
Multiple choice	71	4.58	20.40	4.52 **	.0	0	100
Fill-in-the-blank	71	.00	.00	.00	.0	0	0
Short-answer (1 word to 1-2 sentences)	71	.99	4.90	5.12 **	.0	0	30
Medium-answer (1-2 para's; 50-300 words)	71	3.45	14.77	5.10 **	.0	0	100
Short essay (1-2 pp.; 300-600 words)	71	9.37	22.30	2.59 **	.0	0	100
Medium essay (2-5 pp.; 600-1500 words)	71	39.93	45.91	.44	.0	0	100
Long essay (5-10 pp.)	71	33.52	44.47	.70 *	.0	0	100
Article-length papers (10-30 pp.)	71	8.17	25.15	3.10 **	.0	0	100

Excluding non-US. *p < .05, **p < .01, two-tailed

^c0: as needed at any time of the year; 1: at any time of the year except summer; 2: preferred times but may be changed; 3: default regular times, rare exceptions; 4: offered only at default times, no exceptions

Main Comprehensive Exam Features: Continuous Variables in Master's and Doctoral Programs in Psychology Departments

			Ma	aster's pi	rograms					Do	octoral pr	ograms			
Item/Variable	Ν	Mean	SD	Skew	Median	Min	Max	Ν	Mean	SD	Skew	Median	Min	Max	sig. ^b
General features															
Times exam offered in last 5 y	22	6.23	3.68	1.16 *	5.0	0	15	40	7.35	3.36	.19	7.5	0	15	
Time allowed for completion															
Written (proctored/sit-															
down; hours)	15	3.32	1.90	1.02	3.0	.8	8.0	23	6.78	3.10	1.37 *	6.0	3.0	16.0	**
Quant/analytic															
(proctored/sit-down;	7	2.25	1.16	1.25	2.0	.8	4.0	9	4.44	2.13	1.15	4.0	2.0	8.0	*
Oral (hours)	8	1.56	1.24	1.54	1.0	.5	4.0	17	2.26	.94	.98	2.0	1.0	4.0	
Written take-home (days)	3	6.67	6.35	1.73	3.0	3.0	14.0	19	15.13	23.51	2.33 **	7.0	2.0	90.0	
Quantitative/analytic															
take-home (days)	2	3.00	.00	.00	3.0	3.0	3.0	3	32.67	49.74	1.70	7.0	1.0	90.0	
Time separating components	(day	/s)													
Time between															
components 1 and 2	10	2.70	4.03	1.46	1.0	0	10	26	5.60	6.37	1.37 **	3.0	0	25	
Time between															
components 2 and 3	4	4.50	4.80	.29	4.0	0	10	12	10.34	13.51	1.47 *	4.5	0	42	
Time between															
components 3 and 4	1	1.00	.00	.00	1.0	1	1	3	4.33	4.93	1.65	2.0	1	10	-
Preparation															
Exam scheduling rigidity	21	3.14	1.11	-1.53 *	* 3.0	0	4	40	2.85	1.29	-1.28 **	3.0	0	4	
Grading process & outcomes															
# of faculty graders involved	20	4.00	2.39	1.15 *	3.3	1	10	39	5.10	1.83	.57	5.0	2	10	#
# of faculty graders per comp	oner	nt													
Written	18	3.78	2.35	1.34 *	3.3	1	10	38	4.71	1.99	.69	4.0	2	10	
Quantitative/analytic	6	3.25	.99	82	3.8	2	4	13	3.62	1.04	62	4.0	2	5	
Oral		3.13	1.36	1.54	3.0	2	6	18	4.00	1.09	.31	4.0	2	6	#
# of times students allowed to	tak	e each d	compon	ent											
Written	18	2.06	.42	.47	2.0	1	3	36	2.00	.54	.00	2.0	1	3	
Quantitative/analytic	/	1.86	.38	-2.65 **	· 2.0	1	2	11	1.91	.70	.12	2.0	1	3	
Ural	8	2.00	.54	.00	2.0	1	3	19	2.00	.67	.00	2.0	1	3	
% of students per conort aske		retake	22.10	4 75 **	к с г	0	75	20	12.02	12 44	06 *	10.0	~	50	
written	18	16.25	23.10	1.75	6.5	0	75	30	13.92	13.41	.96 *	10.0	0	50	
Quantitative/anarytic	õ	10.50	24.24	2.54	2.2	0	/5	10	11.30	10.44	./5	10.0	0	30	
Oral 0/ of students non-schertsubs	0 10	2.19	2.10	.28	2.3	0	5	22	4.84	0.48	2.24	2.3	0	25	
% of students per conort who	19	1.10	2.51	5.42	.0	0	10	22	2.09	4.90	2.70	1.0	0	20	
% grade per item type															
Multiple choice	10	11 9/	21 50	265 **	* 0	0	100	26	00	00	00	0	0	0	
Fill in the blank	10	11.04	00	2.05	.0	0	100	36	.00	.00	.00	.0	0	0	
Short-answer (1 word to	19	.00	.00	.00	.0	0	0	50	.00	.00	.00	.0	0	0	
1_2 sentences)	19	2 1 1	6 5 2	3 1 3 **	* 0	0	25	36	83	5.00	6.00 **	0	0	30	
Medium-answer (1-2	15	2.11	0.52	5.15	.0	0	25	50	.05	5.00	0.00	.0	0	50	
nara's: 50-300 words)	19	8 68	25.05	3 25 **	× 0	0	100	36	1 39	8 3 3	6.00 **	0	0	50	
Short essay (1-2 pp.: 300-	15	0.00	25.05	5.25	.0	U	100	50	1.55	0.55	0.00	.0	0	50	
600 words)	19	14 21	27 95	2 07 **	× 0	0	100	36	7 08	20 5 1	3 39 **	0	0	100	
Medium essay (2-5 pp.:	10	1	27.000	2.07	10	Ũ	100	00	/100	20.01	0.00	10	Ū	100	
600-1500 words)	19	35.79	46.59	.67	.0	0	100	36	45.14	47.23	.22	27.5	0	100	
Long essay (5-10 pp.)	19	27.37	44.83	1.14 *	.0	0	100	36	34.17	43.71	.66	.0	0	100	
Article-length papers (10-						-							-		
30 pp.)	19	.00	.00	.00	.0	0	0	36	11.39	29.97	2.49 **	.0	0	100	*

Excluding non-US and online only. *p < .05, **p < .01, two-tailed ^bComparing master's and doctoral program means within psychology departments using the *t*-test; #p < .10, *p < .05, **p < .01, two-tailed.

^c0: as needed at any time of the year; 1: at any time of the year except summer; 2: preferred times but may be changed; 3: default regular times, rare exceptions; 4: offered only at default times, no exceptions

Main Comprehensive Exam Features: Continuous Variables in Business/Management Doctoral Proarams

2 00001 01 1 0 91 0 11 0								
Item/Variable	Ν	Mean	SD	Skew	Median	Min	Max	sig.ª
General features								
Times exam offered in last 5 yrs.	10	5.70	3.95	1.43	5.0	0	15	
Time allowed for completion								
Written (proctored/sit-down; hours)	5	6.00	2.00	.00	6.0	4.0	8.0	
Quant/analytic (proctored/sit-down; hours)	3	6.00	2.00	.00	6.0	4.0	8.0	*
Oral (hours)	3	2.17	.29	1.73	2.0	2.0	2.5	
Written take-home (days)	4	3.00	1.16	.00	3.0	2.0	4.0	
Quantitative/analytic take-home (days)	0	_	_	-	-	_	_	-
Time separating components (days)								
Time between components 1 and 2	6	25.08	25.11	.96	19.0	1	67	
Time between components 2 and 3	0	-	-	-	-	-	_	-
Time between components 3 and 4	0	_	_	-	-	_	_	-
Preparation								
Exam scheduling rigidity ^c	11	1.91	1.38	.20	2.0	0	4	*
Grading process & outcomes								
# of faculty graders involved	10	7.05	1.92	.74	6.3	5	10	**
# of faculty graders per component								
Written	10	6.40	1.78	1.32	6.0	5	10	*
Quantitative/analytic	3	5.00	2.00	.00	5.0	3	7	
Oral	4	4.00	1.41	-1.41	4.5	2	5	
# of times students allowed to take each compone	ent							
Written	10	1.80	.63	.13	2.0	1	3	
Quantitative/analytic	2	2.00	1.41	.00	2.0	1	3	
Oral	4	1.75	.50	-2.00	2.0	1	2	
% of students per cohort asked to retake								
Written	9	32.78	30.73	1.38	30.0	0	100	
Quantitative/analytic	2	62.50	17.68	.00	62.5	50	75	**
Oral	3	8.33	7.64	94	10.0	0	15	
% of students per cohort who fail exam	9	6.11	5.46	.19	5.0	0	15	#
Written exam								
% of written exam grade per item type								
Multiple choice	10	.00	.00	.00	.0	0	0	-
Fill-in-the-blank	10	.00	.00	.00	.0	0	0	-
Short-answer (1 word to 1-2 sentences)	10	.00	.00	.00	.0	0	0	
Medium-answer (1-2 para's; 50-300 words)	10	3.00	9.49	3.16 **	.0	0	30	
Short essay (1-2 pp.; 300-600 words)	10	9.00	19.12	1.85 *	.0	0	50	
Medium essay (2-5 pp.; 600-1500 words)	10	28.00	41.58	1.21	.0	0	100	
Long essay (5-10 pp.)	10	45.00	49.72	.24	25.0	0	100	
Article-length papers (10-30 pp.)	10	15.00	33.75	2.28 **	.0	0	100	

Excluding non-US and on-line only. *p <.05, **p <.01, two-tailed

 ^{a}t -test comparing Psychology vs. Business/Management Doctoral programs; #p < .10, *p < .05, **p < .01, two-tailed.

^c0: as needed at any time of the year; 1: at any time of the year except summer; 2: preferred times but may be changed; 3: default regular times, rare exceptions; 4: offered only at default times, no exceptions

Exam Component-Specific Features: Nominal Variables

					Psychology									
	AI	progr	ams®		Maste	rs ^b)octor	al ^b		Bus/m	ngmt. d	octoral ^b	
Item/Variable	Ν	Freq	%	N	Freq	%	N	Freq	%	sig. ^c	N	Freq	%	sig. ^d
General features														
Components administered										-				-
Written (proctored/sit-down)	77	73	94.8	22	20	90.9	38	36	94.7		11	11	100.0	
Quantitative/analytic (proctored/sit-down)	77	31	40.3	22	9	40.9	38	14	36.8		11	4	36.4	
Oral	77	35	45.5	22	9	40.9	38	21	55.3		11	3	27.3	
Written take-home	77	29	37.7	22	4	18.2	38	19	50.0	*	11	4	36.4	
Quantitative take-home	77	6	7.8	22	2	9.1	38	3	7.9		11	0	.0	
Written exam														
Choice afforded to students	77		71 5	20	11		77		747		10	1	10.0	
No choice: all items mandatory	73	25	27.0	20	11	35.0	27	17	24.5	-	10	1	10.0	-
Moderate choice: e.g., answer these 5, plus 1012 Moderate choice: e.g., answer 3 of 5 (plus 3 of 5)	73	24	35.6	20	5	20.0	37	15	437	_	10	5	40.0 50.0	_
Considerable choice: e.g. answer 3 of 5 (plus 3 of 5)	/5	20	35.0	20	2	25.0	57	10	43.2		10	2	50.0	
of 4)	73	0	0	20	0	0	37	0	0	_	10	0	0	-
Ouantitative/analytic exam			.0	20		.0	27				10			
Format										_				-
Realistic data set with client-type questions	26	8	30.8	9	4	44.4	11	3	27.3		4	1	25.0	
Students expected to test statistical														
assumptions	7	3	42.9	4	1	25.0	3	1	33.3	e	1	0	.0	e
Data entry errors screened out prior to exam	7	4	57.1	4	1	25.0	3	2	66.7	e	1	0	.0	e
Students prepare client-friendly report	41	12	29.3	12	5	41.7	21	6	28.6		5	0	.0	
Conceptual questions on particular analytic														
methods	41	34	82.9	12	8	66.7	21	19	90.5		5	1	20.0	**
"Fair game" content areas										-				-
Basic research methods	50	46	92.0	14	13	92.9	24	22	91.7		6	6	100.0	
Advanced research methods	50	34	68.0	14	9	64.3	24	18	75.0		6	5	83.3	
Basic descriptives (e.g., means, SDs)	50	37	74.0	14	12	85.7	24	18	75.0		6	4	66.7	
Correlation	50	43	86.0	14	14	100.0	24	20	83.3		6	5	83.3	
Chi Square	50	32	64.0	14	9	64.3	24	16	66.7		6	4	66.7	
ANOVA (one-way, two-way, multi-way)	50	43	86.0	14	13	92.9	24	20	83.3		6	5	83.3	
Regression (simple, hierarchical)	50	46	92.0	14	14	100.0	24	22	91.7		6	6	100.0	
iviuitivariate analysis (e.g., IVIANOVA,			63 0		-					**	-	-		
canonical r) Bauchemetrica	50	20	75.0	14	10	35./ 71.4	24	19	/9.2 07 E		6	5	63.3	
Psychometrics	50	20	76.0	14	10	71.4	24	15	67.5		6	4	167	*
Factor apalysis (PCA_CEA)	50	27	70.0	14	10	64.3	24	21	875		6	3	50.0	*
I actor anarysis (FCA, CTA)	50	15	30.0	14	2	1/1 3	24	17	50.0	*	6	0	50.0	*
Generalizability theory	50	15	30.0	14	3	21.4	24	10	417		6	0	.0	
Meta-analysis	50	19	38.0	14	ž	21.4	24	11	45.8		6	3	50.0	
Structural Equation Modeling	50	22	44.0	14	1	7.1	24	16	66.7	**	6	3	50.0	
Hierarchical Linear Modeling	50	17	34.0	14	1	7.1	24	13	54.2	**	6	1	16.7	
Nonparametric statistics	50	14	28.0	14	5	35.7	24	7	29.2		6	0	.0	
Qualitative methods	50	13	26.0	14	1	7.1	24	8	33.3		6	2	33.3	
Oral exam														
Format										-				-
Highly structured: same material, same order	32	5	15.6	8	2	25.0	18	3	16.7		4	0	.0	
Examiners discuss strategy/standards for	32	8	25.0	8	2	25.0	18	6	33.3		4	0	.0	
Examiners discuss strategy/standards per	32	12	37.5	8	4	50.0	18	5	27.8		4	3	75.0	
Each student reviews own perf. on earlier														
components	32	16	50.0	8	3	37.5	18	10	55.6		4	3	75.0	
Questions on students' perf. on earlier				-										
components	32	17	53.1	8	4	50.0	18	10	55.6		4	1	25.0	
Examiners limited to set number of questions	32	4	12.5	8	1	12.5	18	2	11.1		4	0	.0	
Examiners follow-up on lines of susstinging	27	77	9 4 4		7	97 F	10	15	02 2			4	100.0	
Hipts or assistance provided to struggling	22	21	04.4	٥	/	07.5	10	10	00.0		4	4	100.0	
students	32	19	594	8	4	50.0	18	11	61 1		4	4	100.0	
Explicitly understood as a learning opportunity	32	12	37.5	8	4	50.0	18	5	27.8		4	2	50.0	
			1.1.1.1		-			-				_		

Excluding non-US.

^bExcluding non-US and on-line only.

*Chi square significance test comparing master's vs. doctoral psychology programs; *p < .05, **p < .01, two-tailed.

⁶Chi square significance test comparing psychology vs. business/management doctoral programs *p <.05, **p <.01, two-tailed. *N s too small to permit analysis

Table 5 shows the frequencies and percentages of programs including specific exam components. Proctored written exams are most common (95%), followed by orals (45.5%), proctored quant/analytic exams (40%), and written take-homes (38%). Quant/analytic take-homes are used in just 8% of programs. These relative proportions are not statistically different across degree and department types, except for the offering of written takehomes, which is almost three times as common in (psychology) doctoral than in master's programs (50% vs. 18%). Returning to Table 2, we see that proctored written and quant/analytic exams average around 5.3 and 3.8 hours in length, on average, and oral exams average about 2 hours. Students are given around 12 days, on average, to complete written takehomes (with notable variance around that mean) and 18.5 days for written quant/ analytic exams (again, with considerable variance). Results in Table 3 show that both proctored written and proctored quant/analytic exams are twice as long in doctoral than in master's programs (i.e., 6.8 vs. 3.3 hours and 4.4 vs. 2.3 hours, respectively).

With respect to the spacing of exam components, the overall means suggest an average of about a week separating Parts 1 and 2, and another week separating Parts 2 and 3. The components appear to be more spread out in doctoral than in master's programs (e.g., mean = 2.7 vs. 5.6 days for the time separating parts 1 and 2), but the differences are not significant.

Exam Preparation

The second section of Table 1 shows where programs draw their exam content. Overall, 30% of programs limit content to material covered only in required courses, and an additional 17% limit content to just available courses (regardless of whether or not they are required). Most programs (53%) include exam content falling outside of available courses. Thus, students in most programs are expected to master at least some testable content on their own. A significant chi square suggests this holds especially in doctoral programs: 47% of master's programs (vs. 19% of doctoral programs) restrict exam content to required courses, whereas 70% of doctoral programs (vs. 26% of master's programs) look outside available courses. Doctoral students thus appear to be held more accountable for their own learning compared to master's students. This might also reflect greater breadth in doctoral-versus master's-level exam scope.

As to guidance offered students as they study for comprehensive exams (see further down Table 1), around two-thirds of responding programs make sample exams available. This is especially common in (psychology) doctoral programs (74% vs. 43% in master's). Other relatively common preparatory strategies include written descriptions (56% overall) and individualized regimens (45%). Standardized reading lists are maintained by 37% of programs, and 11% reported offering no preparatory aids.

The second section in Table 2 shows overall norms for exam scheduling rigidity (rated on a 0-to-4 scale), and Tables 3 and 4 show breakouts by degree and department type. The overall mean of 2.8 (Table 2) falls toward the rigid end of the scale (midpoint = 2.0; 3 = default regular times, exceptions rare). There is considerable variance across programs, however, some offering comps with no scheduling restrictions and others only at specific times (no exceptions). A statistically significant t suggests that doctoral programs in business/management departments are more flexible in scheduling comps compared to those in psychology departments (means = 1.9 and 2.9, respectively). Why this might be so is not obvious to us.

Grading Processes and Outcomes

We asked programs to tell us how they grade comprehensive exams in several procedural respects. Results in the third section of Table 1 show that 57% of programs grade on a per-question basis per component, whereas around 35% evaluate answers more globally, per component. A simple pass/fail criterion is used by 35% of programs, and 32% further distinguish between strong and weak passes. Multiple raters' judgments are averaged in 42% of programs. Around a third of programs use a multiple hurdle strategy, requiring students to pass earlier components before being offered later components. No significant differences on these process variables are evident across degree and department types.

Turning to Tables 2, 3, and 4, we see that around five faculty members on average are involved in grading comprehensive exams. The mean is higher in (psychology) doctoral than master's programs (5.1 vs. 4.0, respectively) and higher in (doctoral) business/management than psychology programs (7.1 vs. 5.1). Not surprisingly, these differences parallel those in the numbers of core contributing I-O faculty (see initial October, 2012 installment: means = 3.5, 4.7, and 6.2, respectively). A doctoral/master's difference (within psychology) is evident in the number of faculty involved in conducting oral exams (means = 4.0 vs. 3.1, respectively), further reflecting the noted differences in faculty numbers.

Referring again to Tables 2, 3, and 4, the median number of times students are permitted to take a given exam component is 2, which holds regardless of degree or department type. Averaging

across all responding programs, 17% of students are asked to retake the written test, 18% the quant/analytic test, and 5% the oral exam. Retake rates for doctoral-level quant/analytic exams are significantly higher in business/ management departments (mean = 62.5%) than in psychology departments (11.3%). The low N for business/ management (N = 2) in this case raises obvious concerns of generalizability. The overall comprehensive exam failure rate across all programs is a modest 2.8%. The rate for business/management doctoral programs is significantly higher (6.1%; N = 9) than for psychology doctoral programs (2.9%; N = 33). Further research would be needed to explain this difference (e.g., performance standards vs. exam preparations vs. student self-selection into programs).

Returning to Table 1 (bottom), around half of contributing programs offer remedial assignments targeting particular areas, in lieu of outright failure. The most common such assignment is a take-home; 10% of programs use a proctored exam. These remedial assignment practices do not vary significantly across degree and department types.

Features of Specific Exam Components

Written exam: The second section of Table 5 shows frequencies and percent-

ages of programs offering different degrees of choice to students on written exams. Of the four options, three each captured around a third of programs: no choice, limited choice, and moderate choice. Those relative frequencies do not vary significantly across degree or department types. The bottoms of Tables 2, 3, and 4 show norms regarding the use of various exam item types.

Medium-length essays (2 –5 pp.) constitute 40% of written exams, on average, and long essays, 33.5%. No program reported using fill in the blank. Multiplechoice format averages 4.5% of written exams (range = 0 to 100%) and articlelength papers around 8% (range = 0 to 100%). Papers average higher in (psychology) doctoral than master's programs (means = 11.4 vs. .0%, respectively).

Quantitative/analytic exam: The third section of Table 5 offers frequencybased norms regarding both the format of quant/analytic exams and what counts as "fair game" for examination. As to format, 83% of programs include conceptual questions on quantitative and analytic methods (e.g., "Explain how analysis of variance works"). The proportion for psychology doctoral programs (19 of 21 = 90.5%) is statistically higher than the proportion for business/ management doctoral programs (1 of 5 = 20%). Around 31% of responding programs use simulated client scenarios involving prepared datasets, with around half of those requiring students to test assumptions and/or deal with data entry errors. Small *N*s preclude testing for differences between degree and department types on these latter variables.

Exam content (i.e., "fair game") norms show strong emphases on basic research methods (92%) and regression (92%), and, to lesser extents, ANOVA (86%), psychometrics (76%), factor analysis (70%), advanced research methods (68%), and multivariate methods (62%). This relative pattern, not surprisingly, closely mirrors that for course offerings. Correlating columns of percentages in Table 5 with corresponding columns of course frequencies (over the past 5 years) in Tables 4–6 of the April, 2013 installment (on curriculum and competencies) vields r = .95 for all programs. .90 for psychology master's programs, .93 for psychology doctoral programs, and .89 for business-management doctoral programs (N = 15 content areas in each case). This level of correspondence suggests general adherence to a policy of testing what is taught, at least when it comes to quantitative/analytic methods.

Several statistically significant differences emerged in comparisons of fairgame content by degree and department types. (Psychology) doctoral programs, predictably, are more likely than master's programs to test students on advanced methods, including multivariate analyses, IRT, SEM, and HLM. Psychology department (doctoral) programs are more likely than their business/ management counterparts to ask about test development, factor analysis, and IRT. A possible reason for the latter differences may be the special relevance of those methods in the psychological study of individual differences.

Oral exam: The bottom of Table 5 shows nominal norms regarding oral exam format. The most generalizable feature, at 84%, is examiners following up on one another's lines of questioning. In keeping with this, a high degree of exam structure is fairly rare (16% of responding programs), as is limiting examiners to a set number of questions (12.5%). Close to 60% offer hints to struggling examinees. and half ask students to review their own performance on earlier components (e.g., written exam). Examiners explicitly prepare for the oral exam on cohort and individual student bases in 25% and 37.5% of programs, respectively. Further analysis shows that half of responding programs engage either or both preparatory strategies. Only about a third of programs use the oral exam expressly to improve student mastery. Reliance on the various oral exam features does not vary significantly across degree and department types.

Comparisons Involving the Three "Top-10" Lists

Statistical comparisons revealed relatively few significant differences involving the three "top-10" program sets as distinct from comparable peer programs. Proportions yielding p < .10 (two-tailed) are at around chance levels. Significant cases (out of 95 variables) are identified cautiously as follows.

The Gibby et al. (2002) "top-10" (N = 8) programs (all psychology doctoral) are (a) more likely to target areas outside of available courses (100% vs. 62%; $\chi^2 = 4.32$, p < .05), (b) more rigid in scheduling exams (means = 3.25 vs. 2.75, t = -1.67, p < .10), and (c) less generous in the time allowed for completing written take-homes (means = 4.50 vs. 18.0 days, t = 1.97, p < .10).

The Kraiger and Abalos (2004) "top-10" (psychology) doctoral programs (N =5 responding to this section) (a) are more likely to target only available course material (50.0% vs. 6.1%, $\chi^2 =$ 7.14, p < .01), (b) rely less on articlelength papers (means = .0% vs. 13.2% of written exam grade, t = 2.30, p < .05), and (c) ask fewer students to retake the written exam (means = 5.6% vs. 15.2%, t= 2.29, p < .05). Finally, the Kraiger and Abalos "top-10" (psychology) master's programs (N = 8) (a) are less flexible in scheduling exams (means = 4.00 vs. 2.94, t = -3.80, p < .05), (b) have more faculty involved in grading oral exams (means = 4.33 vs. 2.40, t = -2.67, p< .05), and (c) ask fewer students to retake the written exam (means = 2.13% vs. 20.29%, t = 2.70, p < .05).

If any themes are to be identified here, they might be that (a) the Gibby et al. programs tend to be a little more rigorous in exam content and scheduling, and (b) the Kraiger and Abalos (2004) doctoral programs tend to be less rigorous. The Kraiger and Abalos master's programs show a greater mix of differences. The low *N*s involved in these comparisons and the chance-level rates of significant effects preclude firm inferences regarding the three "top-10" lists.

General Discussion

A major theme evident here, paralleling one that emerged with internships in the previous installment (July, 2013), is that I-O programs vary markedly in how comprehensive exams are prepared, administered, and scored. This variability is documented overall by the relatively low percentages observed on the nominal variables in Table 1 and 5. Considering all 66 variables and 4 ("all" plus 3) groups (= 264 cases), the median percentage of responding programs endorsing a given feature = 40%, with third quartile = 62.5% (i.e., 75% of nominal variables-withingroups have endorsement rates < 62.5%); 61% of cases are less than 50%. Similarly, regarding the continuous variables, the standard deviation exceeds the corresponding mean in 40% of the 116 cases (29 variables x 4 groups). Such variability strains the concept of "norm," and readers should be wary, accordingly, of making too much of central tendency indices (means, medians) as markers of "normality" in I-O graduate programs regarding comprehensive exams.

The only major "universal" in the current installment is a partial one: 100% of doctoral programs offer comps. Reflecting German scholastic standards from the early 1800s (Goodchild & Miller, 1997), comprehensive exams are widely recognized 200 years later as a required hurdle in earning a doctorate in I-O. The weaker reliance on comps by master's programs (41% in psychology; 1 of 5 responding programs in business/management) is reflected in several significant differences between degree types. Specifically, master's programs are (also) less likely to (a) include a written take-home component and (b) an article-length paper, (c) test on advanced methods and (d) material outside of available courses, and (e) offer sample preparatory exams; they also (f) use proctored written and quantitative exams that are half as long as those used in doctoral programs. Collectively, all these differences between degree types (within psychology departments) are consistent with standards being higher in

doctoral versus master's programs. We suspect the use of comps may be a growing trend in master's programs. Further study (with later surveys) might address this question.

Much more could be investigated in the current dataset as to correlates of comprehensive exam policies and procedures in I-O programs. We reserve such inquiries for later analysis and discussion involving a broader array of survey variables. For now, we hope current results help I-O graduate programs see how their own comprehensive exam protocols compare to those of other programs, and further advance discussion of evaluative standards in I-O psychology graduate education more broadly. Next up in the series: assistantships and resources. Stay tuned.

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¹ Of the 7 business/management Masters programs completing the survey, 5 responded to the comprehensive exam section, and just 1 of those reported using comprehensive exams.

² Rows for basic descriptives, correlation, and chi square in Table 5 here were dropped in running the correlations because they have no direct counterparts in frequencies of course offerings.

³ This is somewhat conjectural, as the unit of analysis is content area, not program. Strictly speaking, content areas more commonly considered "fair game" tend to be offered more often in courses.

⁴ Directional hypotheses were not advanced in this primarily descriptive effort. Where plausible directional differences might be expected (at the reader's discretion and risk), p < .10 offers a one-tailed p < .05.

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