The 2011 SIOP Graduate Program Benchmarking Survey Part 8: Correlations and Latent Themes

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The 2011 SIOP survey of I-O graduate programs was undertaken to identify normative benchmarks of current practices in the education of I-O practitioners, researchers, and educators. The data offer three main uses. First, they allow individual programs to see where they stand in comparison to peer programs (i.e., MA vs. PhD, psychology vs. business/management), offering confirmation and exploration of program identity (e.g., for marketing purposes) and leverage in securing better resources (e.g., to raise stipends to competitive levels). The second use is as a baseline for tracking changes over time in how I-O programs are composed and managed. Seeing trends in I-O education could offer uniquely valuable insights into where the field is headed in light of where it's been. The third application is to advance discourse on how to improve graduate education in I-O, with an eye to the possibility of licensure and program accreditation. Regardless of where one stands on those controversial issues, hard data serve more informed discussion.

Each of the previous seven installments provides a relatively pixelated snapshot of a major part of I-O graduate training (basic program features, admissions, curriculum, assistantships, internships, comprehensive exams, and theses/dissertations). Here, in our last installment, we attempt to take stock of what the data mean collectively. This is no easy task, as there are hundreds of variables offering thousands of relationships, all with limited power imposed by an overall modest sample size. Identifying major themes seems a reasonable pursuit, nonetheless, which is our goal here.

There are many ways to distill a dataset such as ours. We tried a series of "nested" principal components analyses (with oblique rotation), starting with variables within a given table, repeating across tables in the same *TIP* article, all leading to a third-order PCA of lower factors from all seven articles. Difficulty in interpreting factors led us to a simpler, regression-like correlational strategy beginning with a putative distinction between IVs and DVs.

Five sets of variables were selected as IVs because of their uniquely informative quality: (1) program type (degree type, department type), (2) basic program features (department size, program size, number of graduates per year), (3) SIOP competency factors (I-focused, O-focused, methods, individuals/teams, general psychology, applied cognition), (4) self-rated preparation of students for I

-O career pursuits (applied sales, applied research, academic teaching, academic research), and (5) the three top-10 program lists (Gibby, Reeve, Grauer, Mohr & Zickar, 2002; Kraiger & Abalos, 2004: both PhD and MA). We then correlated the remaining variables with each of those 18 IVs, computing eta for categorical DVs with $k > 2$ levels.

The correlations, sorted top down per IV, offer a rich weave of connections from which to identify latent themes. To clarify each IV's unique contributions, we also ran partial correlations controlling for earlier IVs. This successive partialing strategy mimics hierarchical regression by estimating how much a given IV explains a given DV independently of earlier IVs. Note that our five IV sets can be split into two main types: structural (program type, basic program features) and content (competency focus, career preparation, top 10s). We used cumulative partialing within the structural IV set, and then controlled for all five structural IVs in considering the unique effects of the content IVs. A .zip file containing all of the tables referenced in this paper is available at www.siop.org/tip/july14/TettTables.zip. To facilitate reference to normative descriptors (means, SDs, etc.), the tables are organized by DV grouping in parallel to earlier reported norm tables. Further, the tables are numbered to correspond to the earlier *TIP* installments. For example, Tables 3.1 to 3.4 report zero-order IV correlations with the various curriculum DVs covered in the third installment. The parallel set of partial correlations is offered in Tables 3.1p to 3.4p.

Before getting to the IV–DV relationships, we describe two preliminary analyses. First, dedicated readers of this series may have noticed that prior installments have not covered the fourth IV set listed above: preparation for I-O career pursuits. We spend a little space here looking at how those pursuits vary by degree and department types. Second, we consider how all 18 IVs intercorrelate.

Preparation of Graduate Students for I-O Career Pursuits

Toward the end of the survey, we asked programs how well they prepare their students, overall, for careers in practice (sales, applied research) and academia (teaching, academic research). Figure 1 plots the means broken out by the 2 x 2 array of degree type crossed with department type, and Table 1 presents corresponding ANOVA results.

Significant main effects are evident for degree type regarding each of the four career options, the two applied options being favored in master's programs and the two academic options in doctoral programs. This is not surprising given greater demands in academia for advanced training. Preparation for applied research is stronger in psychology depart-

ments, but a significant interaction with degree type, in light of Figure 1, shows that applied research is rated equally highly in all but doctoral OB programs. The further two-way interaction for applied sales (see Table 1) shows that the noted split between master's and doctoral programs on applied versus academic focus is especially pronounced in OB programs. Correspondingly, psychology doctoral programs more uniformly target preparation for all four career tracks, albeit less so for applied sales.

Relations Among IVs

Correlations among the 18 IVs are presented in Table 2. *N*s vary from 97 to 120 in most cases, yielding two-tailed critical values of around ±.16. Of central interest here are the strongest values within each variable block (mostly, $r > |.30|$). *N*s are lower for relations involving the three top-10 lists, as comparisons in those cases are limited to peer programs (i.e., PhD-psych-only for both Gibby et al. and K&A-PhD, and MA-psych only for KA-MA). Partial correlations, reported above the main diagonal, control for degree and department types. A number of findings in Table 2 are noteworthy. We begin with zero-order correlations involving program types.

The first two columns of correlations echo main effects for degree type and department type reported in earlier installments. All told, PhD programs tend to have (a) more core faculty (r = .32), yet (b) fewer graduates (-.49); (c) weaker emphasis on I-related and O-related competencies (-.35, -.33), but (d) stronger emphasis on methods competencies (.27); (e) weaker career preparations in applied sales (-.50; see also Table 1, Figure 1), and, to a lesser degree, applied research (-.20); and much stronger emphasis on academic career preparation in both teaching and research domains (.60, .59, respectively).

Moving one column to the right, correlations involving department type show that OB programs have (a) more core faculty (r = .37), (b) weaker focus on I-related and general psychology competencies (-.20 and -.36), and (c) stronger focus on applied cognition (e.g., decision making; r = .34). OB programs also show (d) less preparation for applied sales (-.36) and, even less so, applied research (-.60). In contrast, emphasis on academic job preparation is roughly even in the two department types (r = .08 for teaching, .11 for research, both *ns*).

Moving further down and right in Table 2, it is notable that programs with more core faculty tend to produce fewer graduates (-.18). This may reflect differential research emphasis: more time for one-on-one mentoring reduces teaching loads, demanding more faculty. Methods competencies are also emphasized in larger programs and departments (.21 and .19), whereas programs producing

more graduates tend to have a stronger focus on both O and applied cognition competencies (.32 and .22) and a weaker focus on methods competencies (-.17). After controlling for degree and department types, larger programs also tend to emphasize development of I competencies (partial *r* = .25), whereas smaller programs tend to emphasize applied cognition (partial *r* = -.20).

Career preparations show marked relations with several other IVs. Relations with program type are redundant with main effects reported above (see Table 1 and Figure 1). Not surprisingly, given greater opportunities for applied over academic jobs, programs producing more graduates emphasize preparation for applied sales (.44) and less so academic teaching and research (-.41 and -.58). Programs housed in larger departments (i.e., higher *n*-faculty) prepare their students more for applied research and both academic career facets (.22 to .27). Larger programs per se (i.e., higher *n*-core-faculty) tend also to prepare students more for academia (.31 and .34) and less so (than smaller programs) for applied sales (-.24). Controlling for degree and department types reduces the zero-order *r* of -.24 between program size and preparation for applied sales to a partial *r* of .01. Conversely, a modest *r* of -.12 between program size and preparation for applied research increases to a partial *r* of .19, suggesting suppressor effects of program type.

Relations between career preparations and competency focus suggest that programs emphasizing applied careers tend to focus more on both I and O competencies (.20 to .52) and less on methods competencies (-.25 for applied sales). Programs emphasizing academic career paths show the reverse pattern (-.17 to -.43 for both I and O competency focus; .37 and .48 for methods competency focus). General psychology content is emphasized more where preparations are stronger for careers in applied sales and academia (.26 to .38). It is also noteworthy that the main linkages between competency emphasis and career preparations are largely upheld, albeit weakened, after controlling for program types. Thus, these relations tend to hold within the cells of the degree-by-department breakout.

The noted effects involving career preparations are consistent with correlations among just those four variables. Programs reporting preparation for applied sales also report preparation for applied research (.43); a stronger link is evident between preparations for academic teaching and research (.79). Applied sales preparation is negatively related to the two academic components (-.34 and -.40), although the notably weaker corresponding partial *r*s (-.07 and -.15) suggest the zero-order relations are carried primarily by differences in degree type.

Several relations involving the top-10 lists bear mention. Gibby et al.'s most productive doctoral programs (all psych), relative to peer programs, tend to have more core I-O faculty (r = .20), be housed in larger departments (.33), and graduate more students (.24). Not surprisingly, they also tend to prepare students less for applied sales jobs (-.27) and more for academic jobs (.28 for teaching; .23 for academic research). The K&A doctoral programs (all psych) tend to focus less on applied cognition competencies relative to peer programs. The K&A master's programs (all psych) show a similar tendency (-.21) and tend also to report weaker preparation for academic jobs, relative to peer MA programs (-.25 per aspect).

All told, relations among the designated IVs are complex but interpretable. The main questions going forward are these: What program features are markers for each IV and what general patterns emerge suggestive of latent themes?

Latent Themes in IV-DV Linkages

The survey yielded 246 continuous variables (other than the 18 IVs) and 241 categorical variables (all but 11 are dichotomies: feature present vs. absent). Some continuous DVs are principal components derived from more specific variables. To reduce the number of DVs, components replace their input variables. We also derived continuous scales from several variables treated as nominal in the previously reported norms. For example, preferred year of thesis/dissertation milestone (e.g., proposal defense, data collection) was configured here as a ratio variable, such that a negative correlation indicates an abbreviated timeline and a positive correlation an extended timeline. Finally, some variables were dropped owing to N being too small (< 10). All told, 227 continuous DVs and 235 categorical DVs were judged usable.

To identify major themes, we sorted, per IV, the relationships reported in Tables 1.1 to 7.7 and 1.1p to 7.7p from strongest to weakest, using ±.30 as a convenient cutoff for interpretation, and then looked for patterns suggestive of dominant themes. We chose the partial rs as the main basis for sorting as they afford successively "cleaner" interpretations of a given IV's unique relationship to the DVs. Sorted results are presented in Tables S1 to S18 (one per IV). Our methods and interpretations are neither definitive nor exhaustive; readers are encouraged to peruse the relationships and draw their own insights. The following is offered as an initial—and fallible—foray into the complexities of graduate education in I-O/OB.

Master's versus doctoral programs (Table S1). Degree type is a major distinction covered in the previously reported norms. Most obviously, doctoral

timelines are longer than master's, and standards are higher for both student selection (e.g., higher admissions cutoffs) and performance (e.g., dissertations are longer than theses). Doctoral programs also tend to have more resources (e.g., higher stipends, more years of funding) and are both more research oriented (e.g., higher expectation of peer-reviewed publications) and quantitatively focused (e.g., offering more advanced methods courses). Echoing relations among the IVs, discussed above, Master's programs tend to be more applied versus academic (e.g., more likely offering internships, being more concerned with intern performance) and tend to accept more students. A more subtle difference is that doctoral programs tend to be more flexible (e.g., permitting students to switch advisors, allowing more choice on written exams). We see this as less a softening of standards than a reflection of the longer timeline and associated affordances of students to pursue specialized interests.

Psychology versus business/ management departments (Table S2). Department type yields a number of identifiable patterns of relations with the DVs. OB programs tend to be more academically oriented (as per relations involving career preparation, discussed earlier; see Table 1), more research-focused, and better resourced. They are also more quantitatively oriented, with the notable exception of psychological measurement. Course offerings and requirements in other major domains also vary. Psychology programs emphasize traditional I-related topics (job analysis, personnel selection, training), whereas OB programs favor courses on leadership and HR functions (e.g., job evaluation/compensation, OD). Showing their stronger applied focus, psychology programs are more likely than OB programs to offer internships. Differences are further evident in applicant screening, psychology programs giving greater weight to undergraduate performance in psychology and methods courses, and in research.

Department size (N faculty; Table S3). Programs in larger departments appear to be more flexible (e.g., less likely to require certain courses, internships less likely to require preapproval), more quant-focused in comps (e.g., advanced statistics are fairer game), more externally funded, and, curiously, less likely to offer oral exams. Where orals are used, they tend to be less structured. Large-department programs also tend to report lower rates of student selection, linked to both more applicants and fewer admissions (see Tables 2.1 and 2.1p). Greater selectivity is further evident in Tables 2.3 and 2.3p as per higher entrance standards on major screens (e.g., r = .27 with GRE-V percentiles). Large-department programs also report higher stipends and stronger norms for students to be in the lab.

Program size (N core faculty; Table S4). Program size covaries with select DV sets. Larger programs tend to require students to take courses on meta-analysis and HLM but less so (than smaller programs) courses on IRT, factor analysis, and multivariate methods. They also tend to be more flexible (e.g., less structured in oral exams, permitting students to switch assistantships) and, understandably, use more graders on comprehensive exams. Larger programs have students spend less time presenting their proposals and final dissertations, but the documents themselves tend to be longer. Internship pay tends to be higher for students in larger programs, and students' IRB training and SIOP attendance is more strongly expected.

N graduates per year (Table S5). Controlling for previous IVs, several themes emerge in relations with the number of annually minted graduates. First, and somewhat obviously, highly graduating programs tend to attract more applicants and accept more at higher rates. More substantively, they tend to be less research focused (e.g., lower publication expectations, fewer research credits, more administrative-only assistantships) and more applied (e.g., internships more likely). Correspondingly, advanced statistics courses are less often offered (e.g., multivariate) and required (e.g., factor analysis), funding commitments are lower (e.g., number of years), and theses and dissertations are on a shorter timeline (e.g., final defense expected earlier). Also tied to higher numbers of graduates are a variety of DVs relevant to educational standards. Thesis and dissertation committees and defenses are less likely to be required, and defenses, when required, are shorter; GRE scores are weighted lower in applicant review and corresponding cutoffs are lower; and more courses are taught by adjuncts.

"I"-focused competence (Table S6). Programs targeting the industrial side of I-O, not surprisingly, are more likely to require I-related courses (e.g., job analysis, performance appraisal) and, less so, O-related courses (e.g., workplace diversity). GRE cutoffs tend to be lower, suggesting less selectivity in admissions. Comprehensive exams tend to emphasize quantitative methods (e.g., regression, correlation, meta-analysis) and deemphasize qualitative and mixed methods. Exams also tend to be held later in students' tenure, possibly to permit better mastery, as evident in lower exam failure rates. I-focused programs tend to emphasize technical competence as a primary goal of internships. Such programs may also be "practicing what they preach," for example, by giving greater weight to GRE test scores in

applicant screening and by engaging higher proportions of I-O faculty in the screening process.

"O"-focused competence (Table S7). Understandably, programs reporting an emphasis on the organizational half of I-O tend to offer O-related courses more frequently (e.g., organizational theory, OD, workforce diversity) and are more likely to require that students take such courses (e.g., OD, diversity, consulting/ business skills). A more applied focus is evident in higher internship volume and in graduates tending to seek applied over academic jobs. Perhaps due to their greater frequency, internships tend to be more structured (e.g., more formal contracts). O-focused programs report a higher percentage of interns with problems in technical competence, but the reason is unclear (e.g., differential selection, training, or work demands). Such programs also show less emphasis on quantitative analytics on comprehensive exams (e.g., factor analysis, regression, psychometrics, multivariate) and more on qualitative/mixed methods. Finally, higher-O programs show reduced funding for students, as per shorter assistantships and lower financial support for student research.

Methods-focused competence (Table S8). Programs with a methodological identity appear to strive especially hard to achieve good fit by accepting a smaller number of applicants, more often requiring reference letters in the application (offering unique review of research-related KSATs) and less often assigning students to assistantships with non-I-O faculty. Along similar lines, accepted applicants choose to attend such programs at reduced rates, suggesting greater self-selection. Internships appear to have more stringent requirements (e.g., I-O relevance, supervisor qualifications) and tend to pay more. Business-oriented courses (e.g., judgment/decision-making, consulting/ business skills) are less often required, research expectations are stronger (e.g., SIOP conference attendance, publications, lab presence), and, controlling for structural IVs, thesis/dissertation timelines are shorter. Finally, comprehensive exams tend to be more rigorous, with the oral component more highly structured.

Individual/teams-focused competence (Table S9). Understandably, programs reporting an emphasis on individual and team competence reported both higher frequency of workgroup/team courses and increased likelihood of making such courses mandatory. Given the particular relevance of HLM to team research, it makes sense that courses on this topic also tend to be required. Courses on personnel selection, on the other hand, are less often required. Comprehensive exams tend to include a realistic data set and conceptual questions on research, analytics, and test development, suggesting an overall applied focus. Timelines for theses and dissertations (e.g.,

proposal submission and defense, data collection, data analysis) are longer, page lengths tend to be higher, and proposal defenses longer, suggesting higher expectations regarding theses and dissertations.

General psychology-focused competence (Table 210). Programs emphasizing general psychology tend to have curricula with greater focus on organizational development (OD) and structural equation modeling (SEM) and less focus, more generally, on both qualitative and quantitative methods. Stressing research in other ways, such programs have heightened publication expectations and allocate a higher percentage of credit hours to research. Comprehensive exam retakes are rarer, and the oral component tends to be longer and more customized (e.g., strategy discussed for individual students, hints provided to students).

Applied cognition-focused competence (Table S11). Programs focusing on applied cognitive competence offer more courses on human factors and fewer on psychometrics and general-O; HLM is also more often a required course. Such programs tend to be more selective, reporting higher GRE percentile cutoffs. Perhaps tied to this, fewer retakes on quantitative exams are reported. These programs are less likely to target meta-analysis and nonparametric statistics, perhaps suggesting an emphasis on experimental methods.

Preparation for careers in applied sales (Table S12). An applied focus is evident here in relations with a number of DVs. Programs preparing students for applied sales careers offer and require more courses on I-related topics (e.g., job analysis, performance appraisal) and with more sales-related themes (e.g., consulting/business skills). Internships are less likely in the first year of study (better preparing students for applied work), intern performance is rated more often, and professionalism is more often an area of intern development; external grants are less frequent. Controlling for the structural IVs, dissertation presentations are longer, as are theses/dissertations themselves and timelines for their completion. Applicant screening is more lenient (e.g., lower GRE percentile cutoffs), and there is evidence of greater bureaucracy (e.g., use of intern request forms, stronger expectation of IRB training, more structured oral exams).

Preparation for careers in applied research (Table S13). An applied orientation is evident here in the greater likelihood of requiring students to take applied courses (e.g., OD, individual differences) and of having students complete a client-focused report in analytic exams. Stronger research emphasis is evident in higher research standards (e.g., requiring that proposals include a literature review and proposed measures) and, after controlling for structural IVs, stronger publication expectations, longer theses/dissertations, and longer

timelines for those projects. Research focus is further evident in the heightened frequency and requirement of advanced statistics courses (e.g., multivariate, SEM). Higher weights assigned to GRE scores in applicant review suggest greater selectivity. Interestingly, programs higher on applied research career preparation (after controlling for the structural IVs) show greater continuity of internship placements from year to year and, correspondingly, greater ease in arranging internships. Combined with lower likelihood of problems with interns' technical competence, this suggests applied-research programs provide host organizations interns with especially valued skills.

Preparation for careers in academic teaching (Table S14). Programs higher on this dimension, understandably, report offering more teaching-focused assistantships. Other possible markers of a teaching emphasis include longer written comps (i.e., assessing broader sets of knowledge commensurate with college-level teaching demands) and stronger expectations that students will work with more faculty (i.e., academic job rotation). Two further markers may be lower rates of problems with interns' interpersonal and technical competence (i.e., selecting and preparing students as teachers may help mitigate problems in those areas). An academic focus is revealed in fewer required courses in especially applied areas (e.g., consulting/ business skills, OD, job analysis) and less reliance on realistic datasets for quantitative exams. Along related lines, certain methods topics (e.g., advanced research methods, regression) are fairer game for exams, and yet methods course requirements in other areas (e.g., factor analysis, SEM) are more lax. Research standards tend to be higher, as per greater expectations of students for independent research, publishing, collecting their own data, and following through on research as proposed. Fellowship funding is greater, and campus life ratings are higher as well. Finally, after controlling for structural IVs, thesis/dissertation timelines are abbreviated.

Preparation for academic research careers (Table S15). Programs self-identifying as developers of academic researchers show their research orientation in higher expectations of students to publish, have a lab presence, conduct independent research, be IRB-trained, and run their own analyses. Correspondingly, greater weight is given to applicants' research experience. Several correlates suggest better selection and/or preparation of students for internships (e.g., fewer interpersonal, technical, and professionalism problems) as well as comprehensive exams (lower failure rate) and theses/dissertations (lower likelihood of needing to gather new data). More courses are made available in general I and O; certain O-related courses are less likely to be required

(leadership/management, work attitudes). Interestingly, several methods courses are also less likely to be required (e.g., PCA, IRT, HLM), but SEM is judged fairer game on comprehensive exams. Finally, negative relations with thesis/dissertation milestone years (after controlling for structural IVs) suggests a quicker timeline for completion.

Gibby et al. top 10 (Table S16). Several sets of variables distinguish Gibby et al's top-10 most productive graduate programs relative to their psychology-doctoral peers. First, they are more selective in applicant screening (e.g., higher GRE and GPA cutoffs) and, correspondingly, engage higher performance standards (e.g., thesis/dissertation committees are larger, final defenses are more formalized). They also appear, however, to be more flexible (e.g., fewer restrictions are imposed on research methods and content). Fewer courses are offered in general I-O and applied topics (performance appraisal), and test development is less likely a target of examination. A subtler pattern suggests stronger emphasis on internships (e.g., more likely to require internship, greater concern for onsite supervisor credentials) and weaker emphasis on comprehensive exams (e.g., shorter orals, lower likelihood of considering multivariate stats as fair game). Collectively, the data suggest that the greater productivity defining this group is fed by more selective screening, a more principled but flexible approach to research, and greater value placed on applied experience over exam performance.

Kraiger and Abalos top-10 doctoral (Table S17). This subset of psychology-based doctoral programs, identified from student ratings, is distinct from peer programs in several ways. There appears to be less emphasis on certain quantitative courses (e.g., PCA less likely required, ANOVA less often offered) and O-related courses (e.g., general O, OD less likely required). A stronger applied flavor is evident in greater availability of courses in employment law, greater concern for intern performance, and stronger expectations that dissertations will be more than a meta-analysis (i.e., involving "real" data). Greater flexibility is evident in higher numbers of oral exam retakes, shorter written comprehensive exams, and greater lateness in meeting all major research milestones. Finally, assistantships appear to be shorter in these programs with respect to both hours/week and overall duration (in weeks).

Kraiger and Abalos top-10 master's (Table S18). The KA-MA programs, also identified from student ratings, are distinguished from peer programs in a few ways. First, these programs tend to offer both more I and more O courses (e.g., personnel selection, performance appraisal; work motivation, work attitudes). Second, there appears to be a stronger focus on measure-

ment (e.g., psychometrics and PCA are fairer game for comprehensive exams; exams are more likely graded on multiple dimensions and intern performance is more likely evaluated by multiple raters). This latter theme suggests that the KA-MA programs may tend especially to practice what they preach. Third, greater flexibility is evident in students being more likely to start an internship without preliminary coursework, and data collection occurring with greater lateness. Countering this flexibility to some extent, comps scheduling tends to be more rigid. Finally, the KA-MA programs average lower GRE percentile cutoffs in applicant screening, have more proposals pass with minor revisions, and rely less on conceptual analytic questions in comps.

Some General Observations

In addition to the obvious differences between degree types on timelines and performance standards, several other general themes emerge from the data. First, looking beyond central tendency in the norms reported in earlier installments, a major feature of I-O/OB graduate education (in the U.S., at least) is high variability across programs on most characteristics. Reaching consensus on what constitutes a good and proper education in I-O/OB (e.g., as part of accreditation initiatives) might accordingly be expected to be challenging. An early step, perhaps, would be separating areas judged most critical for standardized practice (e.g., requiring or not requiring an internship) from those less critical. Failing to agree on the targets of standardization would limit agreement on other things, such as what should count as evidence of mastery and at what levels mastery is indicated.

A second major theme, evident mostly in earlier installments, is that the difference between master's- and doctoral-level education in I-O/OB tends to be greater in OB-based programs than in psychology-based programs. The relatively low levels of definitive I-O/OB features in participating business/management master's programs raises the question as to whether such programs merit consideration as I-O/OB programs at all. Being listed on the SIOP website (without vetting) does not, in any meaningful sense, make a program an I-O/OB program. This dovetails with the first point, regarding standardization: Judging whether business/management masters programs can meet even basic standards for consideration as I-O/OB programs offers an early test of the prospect of achieving standardization across less divergent program types.

Third, some readers may be concerned that I-O/OB programs producing the largest numbers of graduates tend to have the lowest entrance requirements and the lowest performance standards. Although standards are *relatively* low, whether they are so low, in an absolute sense, as to jeopardize the brand of I-O/OB (i.e., in

advancing "The science of a smarter workplace") is a separate issue well beyond the survey's scope. The noted link between *N* grads and standards, however, makes this a possibly relevant pursuit going forward.

Fourth, building further on previous points, it is important to distinguish between program flexibility in meeting students' needs and (a lack of) rigor in educational standards. Higher flexibility may be construed as lower rigor, yet sometimes we see higher flexibility paired with higher rigor (e.g., in the Gibby et al. top-10). We urge caution in interpreting correlations along those lines and in discussion of educational benchmarks. Pursuit of common standards should not be confused with uniformity in how those standards are achieved.

Conclusions

As we close out our coverage of I-O/OB graduate education circa 2011, several caveats bear consideration. First, the IV–DV relationships—both zero-order and partial—reveal complex patterns of program features. The only interactions we considered with any empirical rigor were those between degree and department types. There is potential, of course, for more complex interactions that might prove important for understanding how all the parts play out together in distinguishing among programs. Modest *N*s prevent extensive explorations along those lines, but readers may deduce meaningful patterns overlooked in the current series. We welcome such contributions and hope the reported findings advance understanding of I-O/OB education beyond the limits of our own interpretations.

Second, data were provided per program by typically a single person (usually the program director). Those individuals may be the best suited to providing the requested data, but better data may derive from a consensus-driven strategy promoting active discussion among core faculty. This was done in some cases, but improving the rate of its occurrence is a reasonable aim in future surveys.

Third, the overall response rate of around 60% means dozens of I-O/OB programs chose to not complete the survey. This limits the sample's representativeness and so also the soundness of the norms and relationships. Should future surveys be planned with similar aims, we hope current results will be judged valuable enough to inspire more complete participation in achieving a more thorough rendering of the state of I-O/OB graduate training.

Where we go from here is a wide-open question. Regardless of how the data are used and despite their limitations, our detailed descriptive findings offer nonetheless a defensible "here" from which to go.

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[2] Eta-squared is the proportion of total sums-of-squares attributable to the targeted effect. Taking the square root yields a categorical (nonlinear) analog to linear correlation.

[3] Relations with the three top-10 variables allowed control of only the three basic program features (department size, program size, *N*-graduates/year) as each of the top-10 sets is nested within degree and department types.

[4] Main effects cited here ignore degree-by-department interactions identified for some variables in earlier installments. Readers should consult those earlier installments for clarity on comparisons by program type.

[5] What counts as adequate *N* is mostly arbitrary. Readers are reminded that results are more robust as sample size increases.

[6] It should also be noted that we did not transform the variables to account for skewness, which, as indicated in the previously reported norms, is substantial in many cases. The observed correlations, we suggest, permit a rudimentary identification of major trends, nonetheless.

[7] There are no partial correlations for degree type as it is the first in the set of IVs.

[8] Neither of those features is necessarily associated with higher *N*-grads/year; e.g., given enough applicants, acceptance rates need not be especially high.

[9] The partial *r* for preferred year of thesis/dissertation completion is unusually strong (1.00). It should be noted that degree type accounts for 92% of the total observed variance on this DV (not unexpectedly, given the nominal 2- vs. 5-year timelines). The psych/OB distinction accounts for 12% of the remaining variance, and *N* grads/year mops up 50% of the residual, leaving just 3% of the original variance to correlate with anything else. We take the 1.00 partial *r* to be an overestimate of the true effect of applied research career preparation, but the direction of effect is plausible: all else being equal, it takes longer to complete an applied-focus thesis/dissertation.

[10] As noted earlier with respect to partial *r* = 1.00 for applied research career preparation in relation to thesis/dissertation completion, the partial *r* = -1.00 in this case can be traced, in part, to modest variance remaining after strong structural IV effects are considered. The direction seems plausible in that programs targeting academic research career trajectories may seek more timely completion to better prepare students for the academic job market.

References

Gibby, R. E., Reeve, C. L., Grauer, E., Mohr, D., & Zickar, M. J. (2002). The top I-O psychology doctoral programs of North America. *The Industrial-Organizational Psychologist, 39(4),* 17–25.

Kraiger, K., & Abalos, A. (2004). Rankings of graduate programs in I-O psychology based on student ratings of quality. *The Industrial-Organizational Psychologist, 42 (1),* 28–43.