Understanding undergraduate attributes: A pre-post test survey of student self-reports during academic year 2014

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Presentation to the TUV group Umea University, September 2015

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Generic competencies

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- We expect more of university graduates than just professional skills
- OECD calls these extras, key competencies which
  - are instrumental for meeting important, complex demands in multiple areas of life;
  - contribute to highly valued outcomes at the individual and societal levels in terms of a successful life and a well-functioning society; and
  - are important to all individuals for coping successfully with complex challenges in multiple areas. (Rychen, 2003)

Attempts to define the goals

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- OECD “Assessing Higher Education Learning Outcomes (AHELO)",
  - the goal of establishing what students in higher education know and can do upon graduation, for example
    - critical thinking,
    - analytical reasoning,
    - problem-solving, and
    - written communication
  - Considered essential and common across disciplines
- But some issues need to be considered

The purposes of a university degree

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Chan, R. Y., Brown, G. T. L., & Ludlow, L. H. (in press). The Public and Civic Purpose of Higher Education: Exploring the "Non-Economic" Benefits for Completing a College Degree. *Journal of Interdisciplinary Studies in Education*

1. Social democratic values and action; civic engagement.	Upon graduation taking an active role in society, service, and co-curricular activities, with active concern for civic concerns.
2. Family expectations/reasons	Fulfilling expectations and aspirations of one's family
3. Graduate school education preparedness	Skills and knowledge required when entering graduate programs in a specific discipline.
4. Personal integrity	Becoming aware of dissonance and having the competence to make decisions in accordance with personal morality and values.
5. Personal life quality enhancement	Developing a personal sense of purpose and identity such that the quality of one's own life is improved.
6. Vocational & employment preparedness	Using degree education to gain a highly remunerative job and/or career or having the skills that permit entry into a desirable future career.
7. Interpersonal skills	Gaining competence around relationships with others, esp. in conditions of complex social diversity, exercising tolerance, curiosity, ingenuity, and imagination.
8. Advanced communication skills	Sophisticated abilities to communicate orally, in writing, and through ICT-supported media so as to effectively transmit information, persuade, argue, and so on.
9. Advanced intellectual skills	High-level cognitive and intellectual skills such as problem solving, analytic and critical thinking, and creativity.

Known cognitive & communicative effects of university education

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- Pascarella & Terenzini (2005) found a bachelor degree causes large effect sizes
  - (i.e., English .77, Math .55, Science .62, Social sciences .74, Liberal arts .80, Critical thinking skills .50, reflective judgement thinking .90, and epistemological sophistication or maturity 2.00).
- BUT Arum & Roksa (2011) found that student cognitive and communicative skills on *Collegiate Learning Assessment* (CLA)
  - had little difference after two-years of attendance at many American universities, but
  - Gains were associated with previous preparation and challenging work

University Ambitions

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- 1st degree students will have a range of skills upon graduation
  - Sometimes called attributes
- Usually approved by governing body
- But what are these?
  - Aspirations
  - Expectation (Assessable Targets)
  - Accountability Standards
- Does having a degree matter to self-reported dispositions?

Ignored Outcomes

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- Spronken-Smith et al. (2012) showed that
  - graduate attribute descriptions exist in 7 NZ universities **but**
  - little in-depth institutional engagement with the outcomes, especially around student assessment and course evaluation.
- Lumina Foundation (2012)
  - most colleges and universities in the United States provide very little data on what students learn
  - less information on what students should attain as they progress through the college years
- Grays & Brown (2015) showed that
  - Senior managers generally treated attributes as aspirational

University of Auckland

- Large (*N*≈42,000), publically-funded, research-intensive university, in the largest metropolitan region of the country. (32.4% of national population)
- Selective entry (25% higher minimum than other NZ universities on NCEA)
- General Education = 2 introductory courses outside home faculty

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University of Auckland—Graduate Profile

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- Approved by Senate—by the end of undergraduate degree the student will acquire
- 3 major qualities
  - **I Specialist knowledge**
- Strong reputation that UoA graduates acquire this knowledge through research-based teaching within faculties and disciplines

University of Auckland—Graduate Profile

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- **II General intellectual skills and capacities**

  2.1 critical, conceptual and reflective thinking;

  2.2 intellectual openness and curiosity;

  2.3 creativity and originality;

  2.4 Intellectual integrity;

  2.5 recognise, use, and evaluate information; organise and communicate knowledge;

  2.6 undertake numerical calculations and understand quantitative information;

  2.7 use of advanced information and communication technologies

- **Presumably covered in assessing the discipline knowledge**

University of Auckland— Graduate Profile

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- **III Personal qualities**

  3.1 Love and enjoyment of ideas, discovery and learning;

  3.2 Work independently and in collaboration with others;

  3.3 Self-discipline and an ability to plan and achieve personal and professional goals;

  3.4 Lead in the community, and a willingness to engage in constructive public discourse and to accept social and civic responsibilities;

  3.5 Respect for the values of other individuals and groups, and an appreciation of human and cultural diversity;

  3.6 Personal and professional integrity and an awareness of the requirements of ethical behaviour

Method

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- Repeated Measures Survey
- Factor analytic approach
  - Multiple items for each construct
  - CFA of pre-existing models
  - EFA for new models, with CFA validation
  - Time 1 vs. Time 2 invariance testing
  - Mean score comparison

Design

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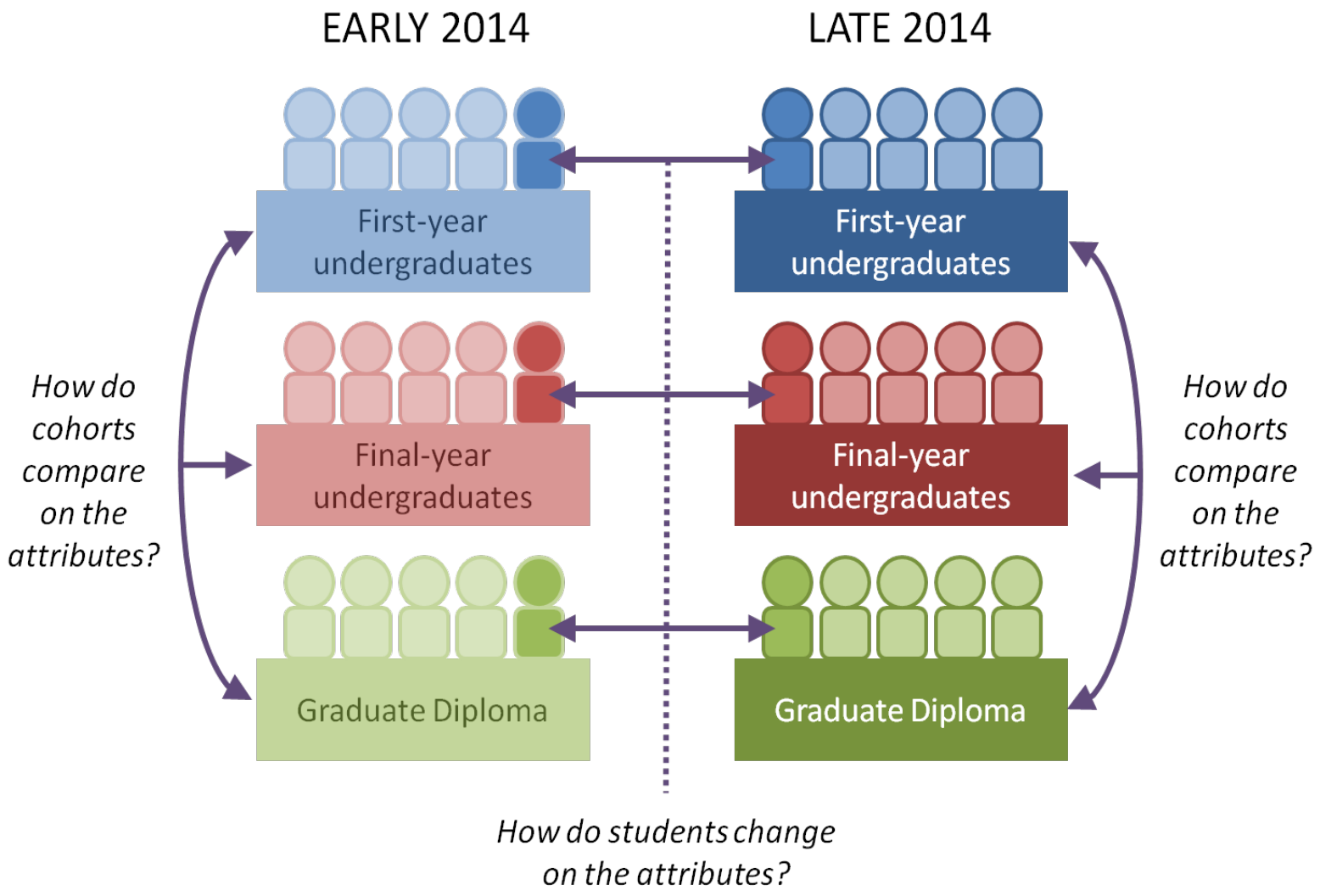

Participants

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		Early 2014, *n*=339				Late 2014, *n*=165			
		Bachelor's *n*=241		GradDip *n*=98		Bachelor's *n*=124		GradDip *n*=41	
		n	%	*n*	%	*n*	%	*n*	%
Gender	Female	196	81.3	75	76.5	103	83.1	32	78.0
	Male	37	15.4	16	16.3	20	16.1	7	17.1
	No response	8	3.3	7	7.1	1	0.8	2	4.9
Ethnicity	Asian	35	14.5	13	13.3	18	14.5	5	12.2
	European	98	40.7	56	57.1	63	50.8	28	68.3
	Maori	23	9.5	1	1.0	9	7.3	0	0.0
	Middle Eastern/Latin American/African	4	1.7	2	2.0	1	0.8	0	0.0
	Pacific	37	15.4	7	7.1	11	8.9	2	4.9
	Other	7	2.9	4	4.1	4	3.2	2	4.9
	More than 1 ethnicity	34	14.1	15	15.3	17	13.7	4	9.8
	Unknown	3	1.2	0	0.0	1	0.8	0	0.0
Year	First	119	49.4			79	63.7		
	Final	107	44.4			38	30.6		
	Other/unknown[a]	15	6.2			7	5.6		

Measures

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- A 50-item online Graduate Profile Survey
- **Attribute 2.2** An intellectual openness and curiosity.
- **Attribute 3.1** A love and enjoyment of ideas, discovery and learning.
  - 20 items (combined),
- **Attribute 3.5** Respect for the values of other individuals and groups, and an appreciation of human and cultural diversity.
  - 30 items for attribute 3.5
- 6-point positively packed response scale : (1) *Strongly disagree*, (2) *Mostly disagree*, (3) *Slightly agree*, (4) *Moderately agree*, (5) *Mostly agree*, (6) *Strongly agree*.

Results: Attributes 2.2 + 3.1

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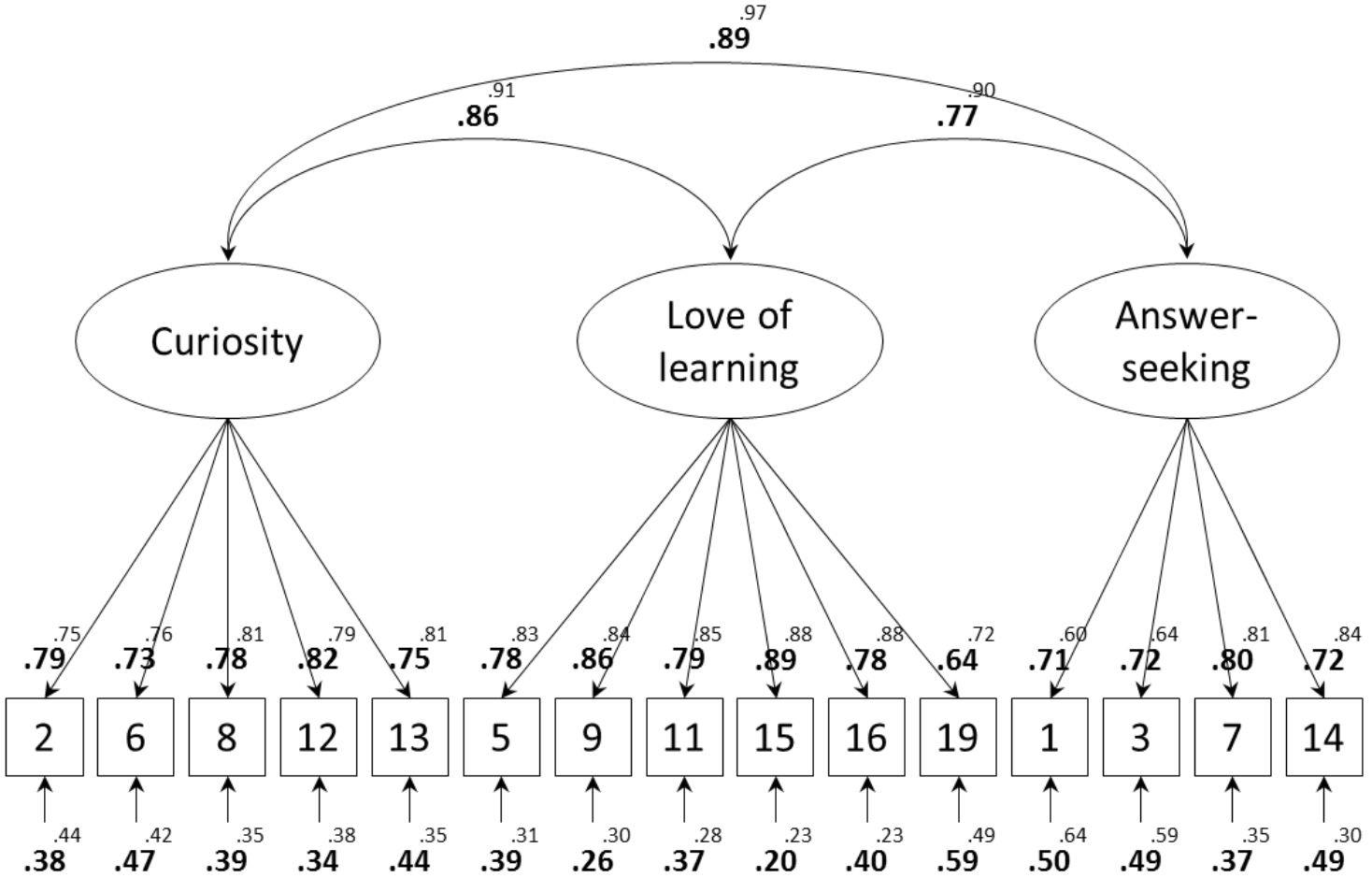
Curiosity 5 items	**Love of learning** 6 items	**Answer-seeking** 4 items
2. I am intrigued by many different topics. 6. I am curious about things. 8. Many things interest me. 12. I am inquisitive. 13. I enjoy thinking about things.	5. I find learning to be interesting and exciting. 9. I love to learn. 11. I look forward to learning new things. 15. The prospect of learning new things excites me. 16. I want to know more about things. 19. Learning more in my field of study pleases me.	1. I like to enquire about things I do not understand. 3. I like trying to solve problems that puzzle me. 7. I enjoy searching for answers. 14. I like finding answers to questions.

Results: Attributes 2.2 + 3.1



Standardised pattern coefficients and error variances of the 15-item, three-factor model in Late 2014; Early 2014 estimates superscripted

Results: Attribute 3.5

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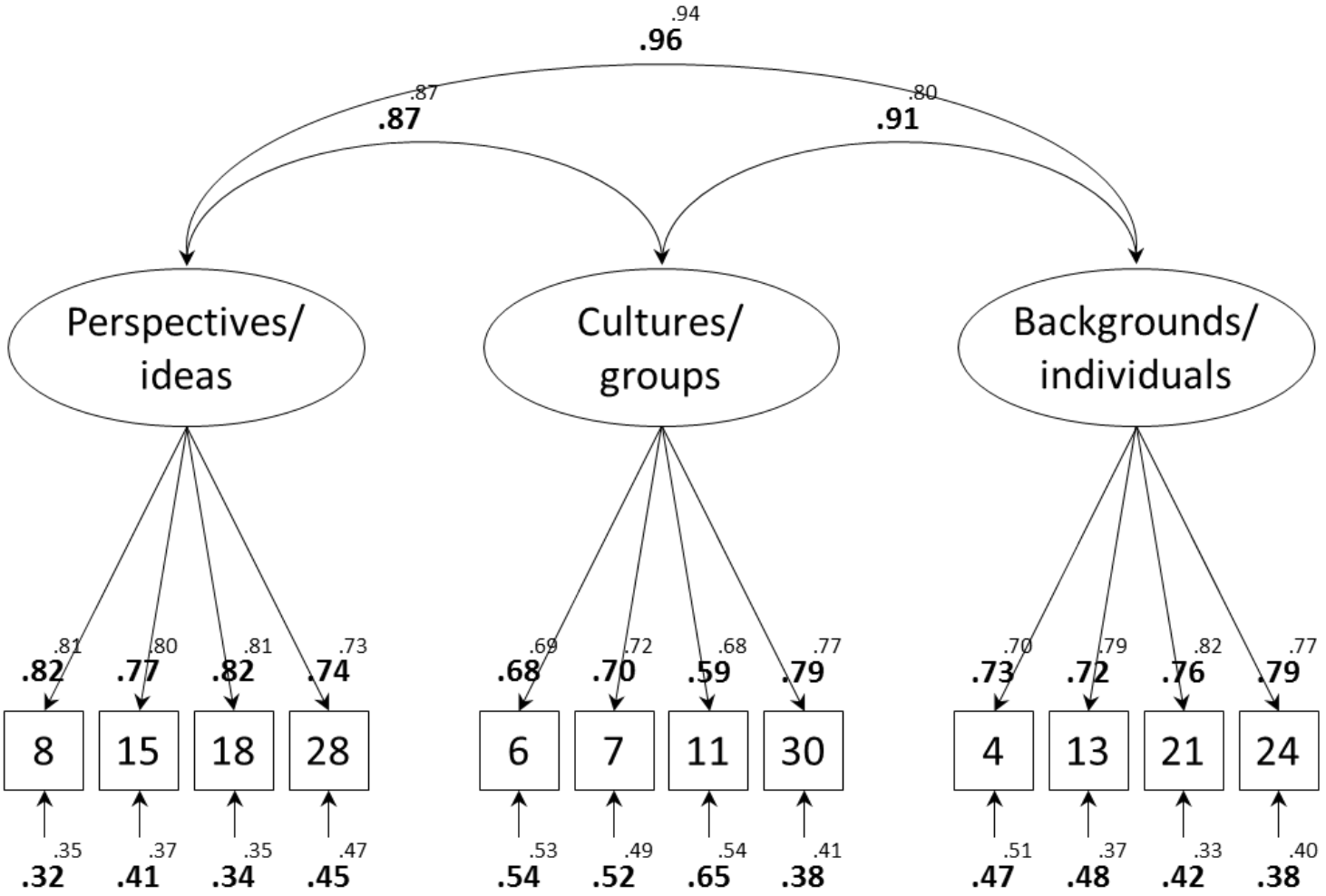
Perspectives/ideas 4 items	**Cultures/groups** 4 items	**Backgrounds/individuals** 4 items
8. I like to consider how other people's perspectives might differ from mine. 15. I try to do things that will broaden my perspective. 18. I enjoy being introduced to new ideas and ways of thinking. 28. I have discussions with people about their ideas.	6. I read about customs and cultural practices of other groups. 7. I enjoy going places where people speak a different language. 11. I am interested in visiting sites that have special significance in another culture. 30. I want to know more about another ethnic group.	4. I like getting to know people of a race or nationality other than my own. 13. I like thinking about how people are shaped by their experiences. 21. I enjoy conversations with people about their backgrounds. 24. I attempt to learn about people's upbringing and life experiences.

Results: Attribute 3.5



Standardised pattern coefficients and error variances of the 15-item, three-factor model in Late 2014; Early 2014 estimates superscripted

Invariance T1-T2

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Model	χ^2	*df*	χ^2/df	RMSEA	CFI	SRMR	AIC	$\hat{\gamma}$
Att 2.2; 3.1								
Early 2014	225.67	87	2.59	.07	.96	.03	8886.34	.94
Late 2014	177.56	87	2.04	.08	.94	.05	4191.89	.93
Configural	403.23	174	2.32	.08	.96	.04	13078.23	.94
Metric	423.71	189	2.24	.07	.95	.11	13068.72	.94
Scalar	437.27	204	2.14	.07	.95	.13	13052.27	.94
Att 3.5								
Early 2014	143.98	51	2.82	.08	.96	.04	8059.99	.95
Late 2014	103.92	51	2.04	.08	.95	.04	3692.06	.94
Configural	247.90	102	2.43	.08	.95	.04	11752.04	.95
Metric	256.13	114	2.25	.08	.95	.09	11736.27	.95
Scalar	275.64	126	2.19	.07	.95	.11	11731.79	.95

Standards: χ^2/df<3.00; RMSEA<.08; CFI + $\hat{\gamma}$>.90; SRMR<.08; ΔCFI<.01

Factor Inter-Correlations

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	Early 2014						Late 2014					
	1.	2.	3.	4.	5.	α	1.	2.	3.	4.	5.	α
1. Curiosity	--					.89	--					.86
2. Love of learning	**.81**	--				.93	**.78**	--				.90
3. Answer-seeking	**.82**	**.78**	--			.80	**.77**	**.68**	--			.86
4. Perspectives/ideas	.52	.53	.49	--		.82	.70	.62	.58	--		.86
5. Cultures/groups	.43	.44	.44	**.67**	--	.80	.52	.37	.43	**.65**	--	.80
6. Backgrounds/individuals	.45	.45	.43	**.78**	**.67**	.82	.53	.41	.41	**.79**	**.74**	.77

Factors are stable across times so comparison of means is valid

Curiosity T1-T2

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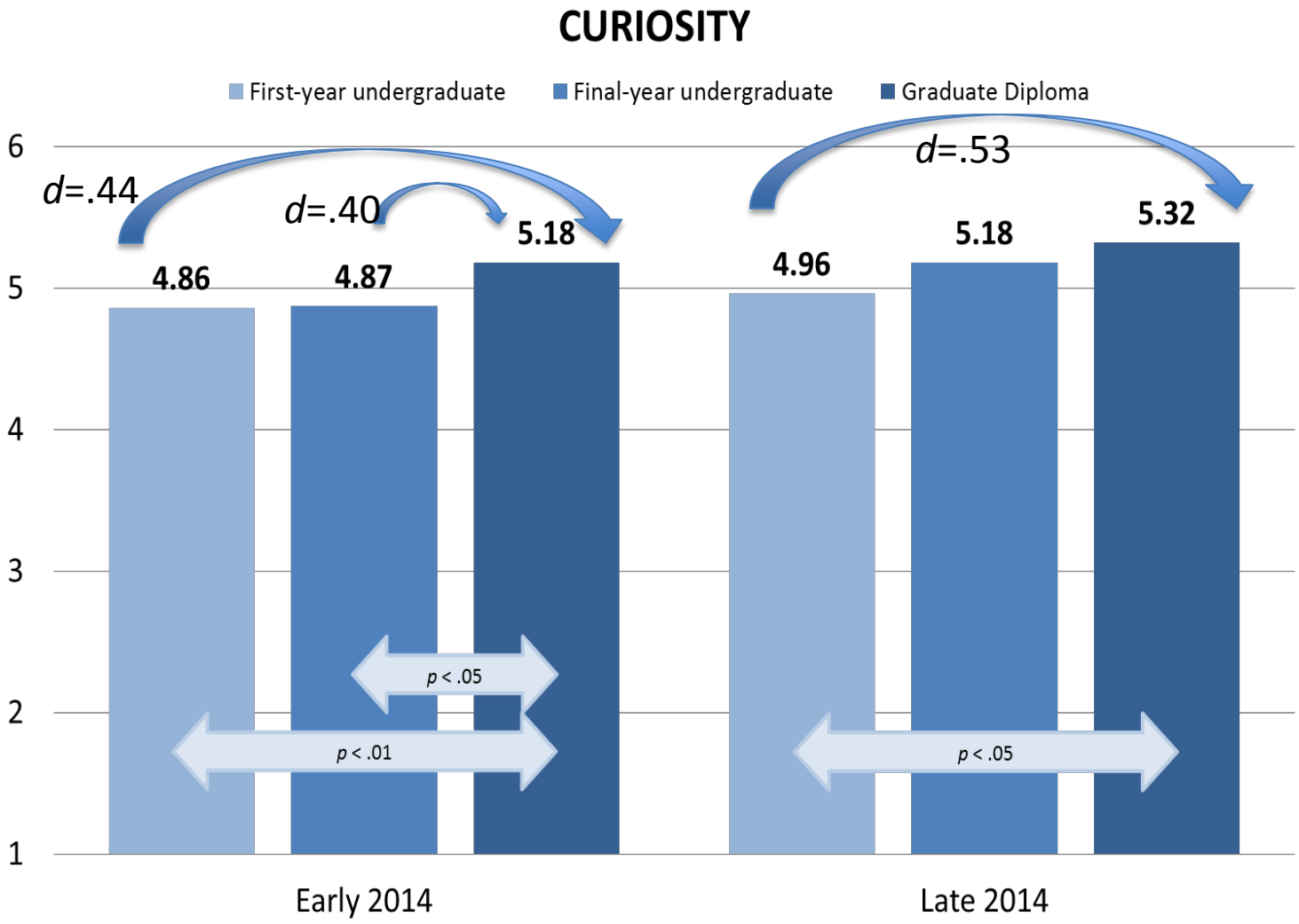
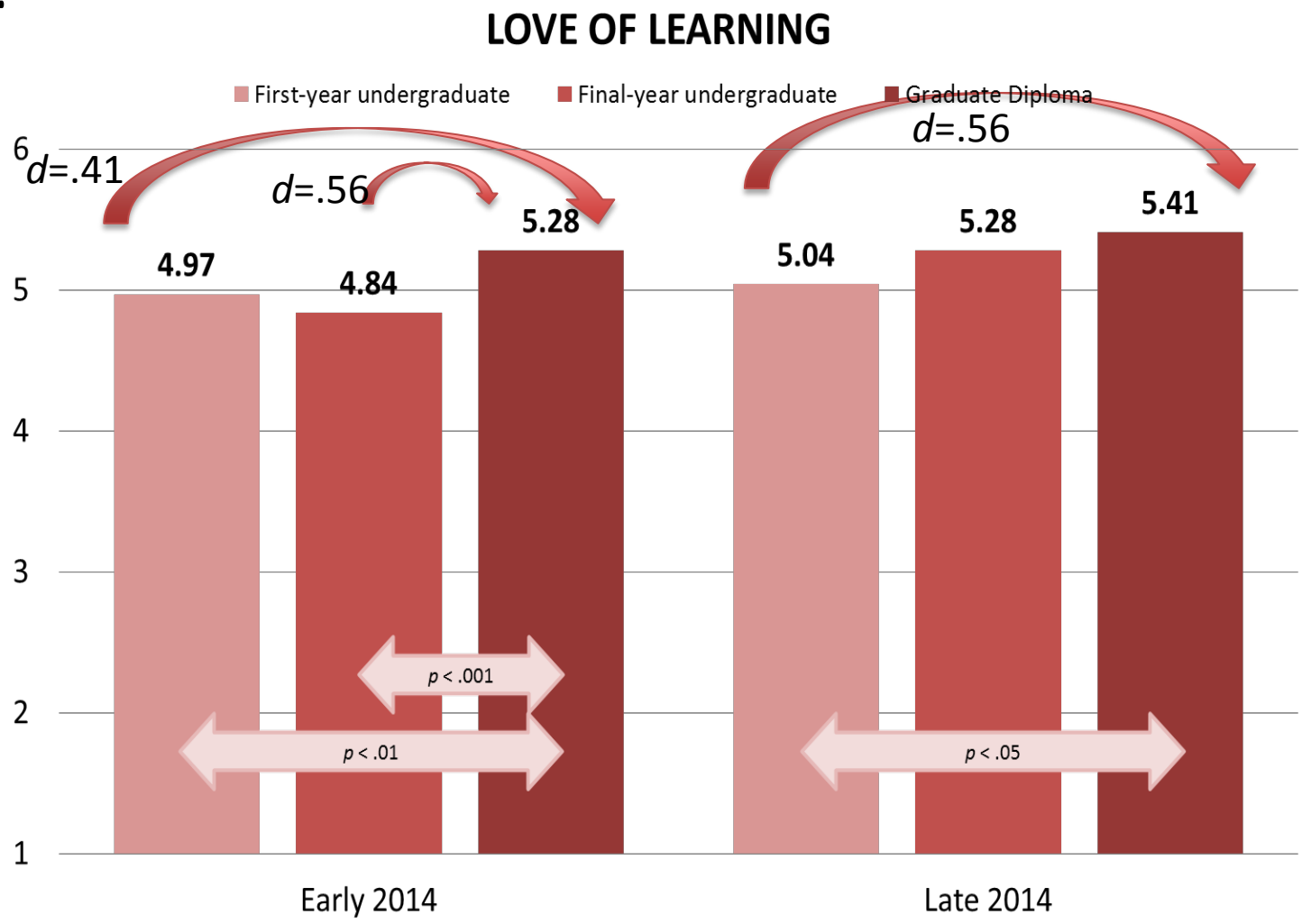


Love of Learning T1-T2



Answer Seeking T1-T2

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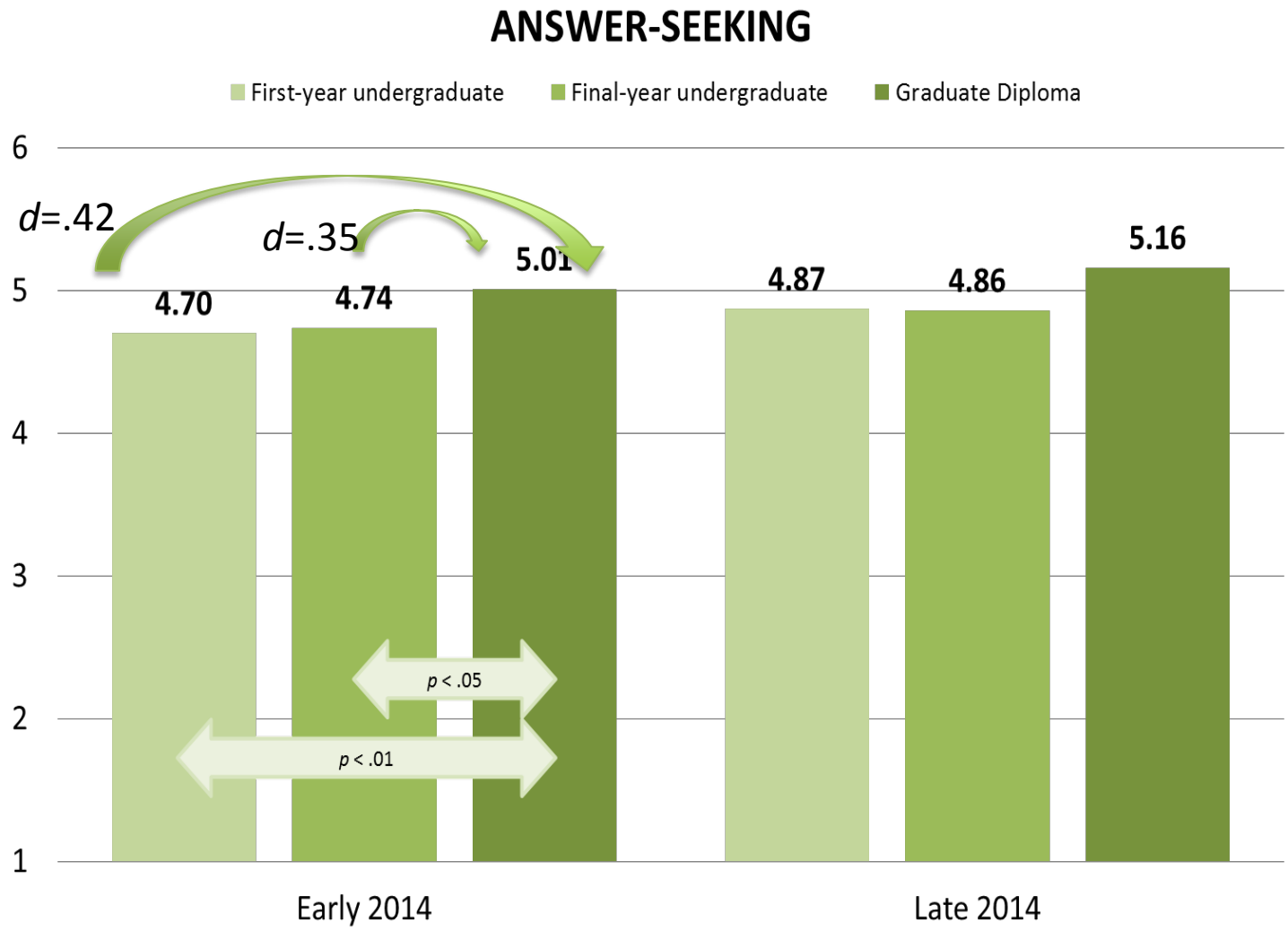
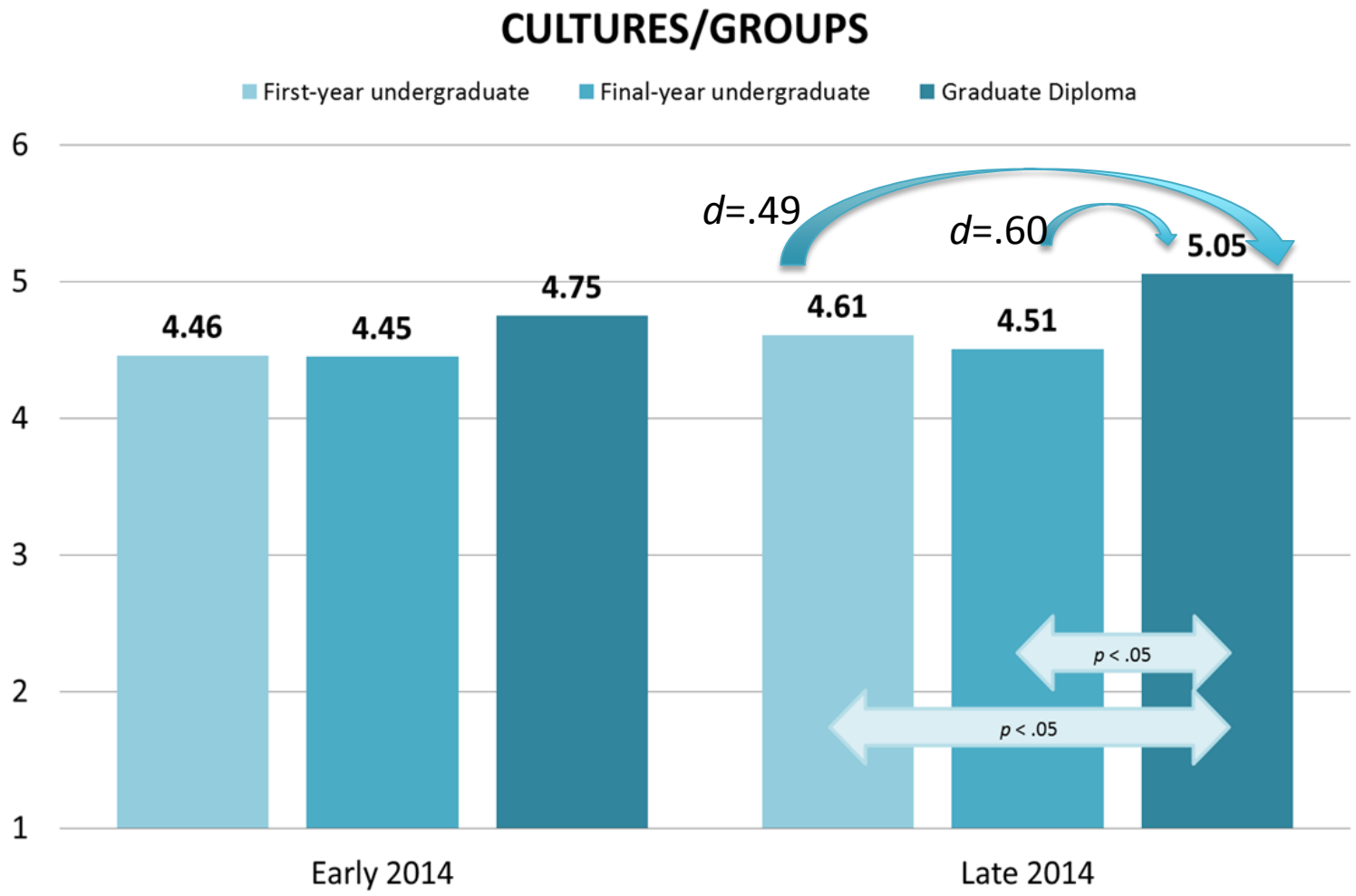
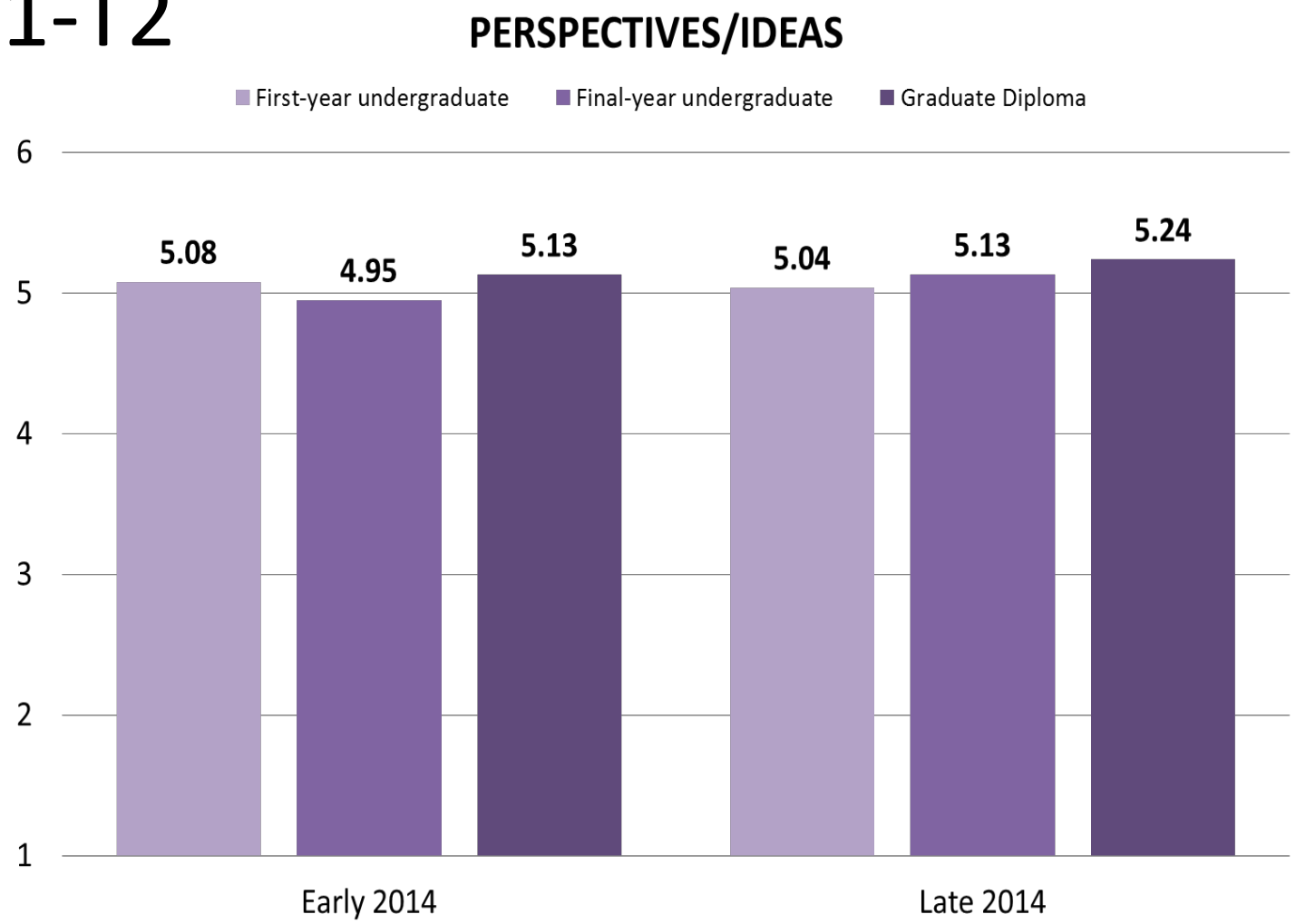


Openness Cultures/ Groups T1-T2



Openness Perspectives/ Ideas T1-T2



Openness Backgrounds/ Individuals T1-T2

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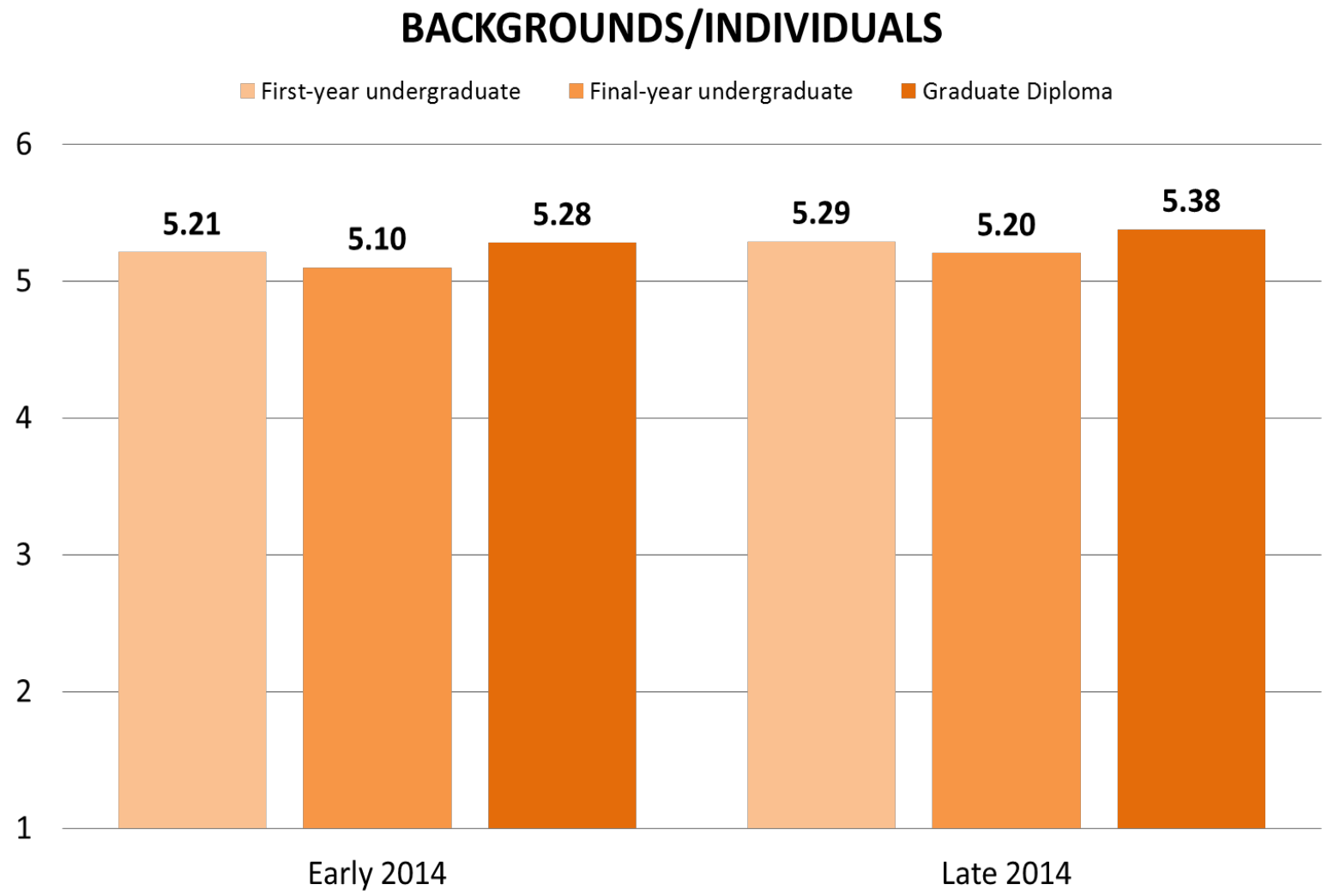

Effects: Matched Cases

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Scale	First-years (*n*=39)		Final-years (*n*=34)		Grad Dips (*n*=40)	
	r	*d*	*r*	*d*	*r*	*d*
Curiosity	.55	-0.14	.58	0.16	.63	0.23
Love of learning	.65	-0.30	.69	0.35	.54	0.36
Answer-seeking	.75	-0.19	.64	-0.01	.47	0.13
Openness to diverse perspectives/ideas	.70	-0.29	.71	-0.09	.55	0.26
Openness to diverse cultures/groups	.73	0.22	.75	0.00	.79	0.80
Openness to diverse backgrounds/individuals	.59	-0.10	.72	-0.08	.75	0.18
Average effect		-0.13		0.06		0.33

Result Summary

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- no stat. sig. differences in mean between first- and final-year undergraduates at any time
- GradDip students had stat. sig. higher means
  - (medium effect) than first-years on four scales;
  - (small-to-large effect) than final-year undergraduates on four scales

Result Summary

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- Mean effect time 1 to time 2 matched cases
  - negative effects for first years,
  - slightly above zero for final year students, and
  - moderately positive gains for Grad Dip
- Perhaps first years over-rated at the beginning of the year and become more modest and circumspect about themselves.
- small positive changes in final years is not encouraging
- reasonably robust gains for Grad Dips

Conclusion

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- Having a first degree seems to contribute to the acquisition of these desired attributes
- Final-year students became *more* like GradDip students, and *less* like first-year students by the end of 2014 than at the start of the year.
- Unlike first-year students, the final-year and GradDip cohorts increased on ***love of learning*** and ***openness to diverse cultures/groups***,
  - possibility that degree completion near or attained produces greater possession of the University's desired attributes.
  - BUT not observed on the other four scales.

Limitations

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- Relatively small samples
- Variation in enrolment of cohorts within the population
  - larger samples and multiple cohorts are required
- GradDip students may differ because their undergraduate education was not in Faculty of Education or from a different university.

Limitations

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- GradDip programme curricular emphases on preparing teachers for diversity
- Students choosing teaching as a profession are biased toward positive views of diversity and openness to others as a prerequisite for being a teacher.
  - lower means in other disciplines that do not prioritise these attributes?
- Self-report espousal not = behaviour

Conclusion

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- Having a degree seems to make a difference at least in Teacher preparation at our university
- So university could claim association with attribute acquisition but probably not causation of attributes

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Preferred citation:

Grays, M., & Brown, G. T. L. (2015, March). *Understanding undergraduate attributes: A pre-post test survey of student self-reports during academic year 2014* (Graduate Profile Outcomes Research Project—Quant-DARE Tech. Rep. #8). Auckland, NZ: The University of Auckland, Faculty of Education.