Perceived research environment, motivation, and academic interest in research: a social-cognitive perspective

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Abstract

Using social-cognitive career theory as a framework, we investigated whether research self-efficacy and outcome expectations mediated between perceived research environment and research motivation (intrinsic, extrinsic, and failure avoidance) and interest in research. Participants were 290 Indonesian academics (48.8% female; mean age 43 years). Perceived research environment and failure avoidance were related indirectly to interest in research via self-efficacy and outcome expectations, and intrinsic motivation was related both directly and indirectly. Perceived research environment was related indirectly to outcome expectations via self-efficacy; intrinsic motivation and failure avoidance were related both directly and indirectly; and extrinsic motivation was related directly.

Keywords Academic · Interest in research · Research motivation

Résumé

Perception de l'environnement de la recherche, motivation et intérêt universitaire pour la recherche : une perspective sociale cognitive En utilisant la théorie sociale cognitive de la carrière comme cadre théorique, nous avons cherché à savoir si le sentiment d'efficacité personnelle pour la recherche et les attentes en matière de résultats médiatisaient la relation entre la perception de l'environnement de la recherche, la motivation pour la recherche (intrinsèque, extrinsèque et évitement de l'échec) et l'intérêt pour la recherche. Les participants étaient 290 universitaires indonésiens (48,8 % de femmes; âge moyen 43 ans). La perception de l'environnement de la recherche et l'évitement de l'échec étaient indirectement liés à l'intérêt pour la

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recherche via le sentiment d'auto-efficacité personnelle et les attentes de résultats, et la motivation intrinsèque était liée à la fois directement et indirectement. La perception de l'environnement de la recherche était indirectement liée aux attentes en matière de résultats par le biais du sentiment d'auto-efficacité personnelle; la motivation intrinsèque et l'évitement de l'échec étaient liés à la fois directement et indirectement; et la motivation extrinsèque était directement liée.

Zusammenfassung

Wahrnehmung des Forschungsumfelds, der Motivation und des akademischen Interesses an Forschung: Eine sozial-kognitive Perspektive Im Rahmen der sozialkognitiven Laufbahntheorie untersuchten wir, ob die forschungsbezogene Selbstwirksamkeit und Ergebniserwartung (outcome expectation) zwischen der wahrgenommenen Forschungsumgebung und der Forschungsmotivation (intrinsisch, extrinsisch und Fehlervermeidung) und dem Forschungsinteresse vermitteln. Teilnehmende waren 290 indonesische Akademiker (48,8% weiblich; Durchschnittsalter 43 Jahre). Die wahrgenommene Forschungsumgebung und die Vermeidung von Misserfolgen werden indirekt über die Selbstwirksamkeit und die Ergebniserwartungen mit dem Interesse an der Forschung in Verbindung gebracht, und die intrinsische Motivation steht sowohl direkt als auch indirekt in Zusammenhang. Die wahrgenommene Forschungsumgebung hängt indirekt über die Selbstwirksamkeit mit den Ergebniserwartungen zusammen; intrinsische Motivation und Misserfolgsvermeidung stehen sowohl direkt als auch indirekt in Zusammenhang; und die extrinsische Motivation steht in einem direkten Zusammenhang.

Resumen

Perceptiones del ambiente de investigación, motivación e interés en investigación: Una perspectiva sociocognitiva Utilizando la teoría sociocognitiva de la carrera como marco de referencia, investigamos si la autoeficiacia en investigación y las expectativas de resultado mediaron entre el ambiente de investigación percibido y la motivación por la investigación (intrínseca, extrínseca y evitación del fracaso) y el interés en la investigación. Los participantes fueron 290 académicos indonesios (48,8% mujeres, con una media de 43 años de edad). El ambiente de investigación percibido y la evitación del fracaso se relacionaron indirectamente con el interés por la investigación a través de la autoeficacia y las expectativas de resultado, y la motivación intrínseca se relacionó tanto directa como indirectamente. El ambiente de investigación percibido se relacionó indirectamente con las expectativas de resultado mediada por la auto eficacia; la motivación intrínseca y la evitación del fracaso se relacionaron tanto directa como indirectamente y la motivación extrínseca se relacionó directamente.

Introduction

In recent years, there has been a strong focus on improving research performance in universities (Akerlind, 2008; Bazeley, 2010), as this is one of the most effective methods for increasing a university's profile (Nguyen et al., 2016). Governments in many countries now use research-related performance to determine university research funding, and, accordingly, efforts to measure research performance have increased (Bazeley, 2010). In an atmosphere of increased accountability of academic research activity, it is important to determine ways by which interest and performance in research activities of academics/faculty members in postsecondary institutions of education can be facilitated.

Interest in research is a key construct that drives research engagement (Finch et al., 2013) and performance (Kahn & Scott, 1997; Bieschke et al., 1998). Therefore, fostering academic interest in research has the potential to generate considerable benefit for a university and the wider community, as well as benefit academic staff themselves and contribute to improving the quality of teaching and service activities (Wheelan & Markless, 2012). Research activities include attracting grant income, writing journal publications, supervising graduate students, collaborating with colleagues on research, peer-reviewing research papers, and presenting research outcomes at scientific conferences, along with actual research planning, collecting data, and data analysis.

Much previous research in this area has focused on interest in research by psychology doctoral students (e.g. Bishop & Bieschke, 1998; Deemer et al., 2007); for example, assessing levels of research interest using the Interest in Research Questionnaire (Bishop & Bieschke, 1994). Other studies have investigated research interest and engagement by practitioners (e.g. Finch et al., 2013). Researchers here have used measures such as the research spider tool (Smith et al., 2002), a self-rated, star-plot designed for health professionals to indicate levels of confidence, interest, and experience in ten specific research areas. Other studies have focused on person variables, such as intrinsic, extrinsic, and failure avoidant research motivation, of master's and doctoral students in the areas of science, technology, engineering, and mathematics (Deemer et al., 2010). However, little attention has been paid to understanding the antecedents to academic interest in research (Bard et al., 2000), with most studies with academics examining research involvement (Nguyen et al., 2016; Wheelan & Markless, 2012) and productivity (Pasupathy & Siwatu, 2013).

Various predictors of interest in research by doctoral students have been identified, including personality characteristics (Kahn & Scott, 1997; Mallinckrodt et al., 1990) and the research training environment (Gelso et al., 1996). Social-cognitive process variables (i.e. self-efficacy and outcome expectations) have also been identified as factors related to students' interest in research and productivity (Bieschke et al., 1995; Bieschke et al., 1998; Gelso et al., 1996; Kahn & Scott, 1997).

We investigated antecedents to interest in research in a sample of Indonesian academics. In Indonesia, all academics in the university setting have research

components to their roles. We tested theory-driven predictors of interest in research based on the social-cognitive career theory of interest development (SCCT; Lent et al., 1994). The current study adds to the existing literature in several ways. First, it extends the applicability of the SCCT to academic interest in research. Second, it examines both individual (i.e. research motivation) and contextual factors (i.e. perceived research environment) as predictors of interest in research. Third, while previous studies have examined doctoral students' interest in research in relation to perceived research-related environment and motivation (Deemer et al., 2009), no studies have included different components of research motivation (i.e. intrinsic, extrinsic, and failure avoidance), perceived research environment, and the social cognitive process variables (i.e. self-efficacy beliefs and outcome expectations) when predicting academic interest in research.

Interest in research from a social-cognitive career theory perspective (SCCT)

The construct of interest in research (Bishop & Bieschke, 1994) can be examined from the perspective of the SCCT of interest development (Lent et al., 1994). Lent et al. (1994) proposed that personal inputs (e.g. personality, motivation) and background contextual variables (e.g. socio-economic status, support) shape learning experiences. Individual interpretations of these experiences then shape the development of self-efficacy, in this case, research self-efficacy (i.e. individual beliefs in the ability to complete research-related tasks) and outcome expectations (i.e. individual beliefs regarding outcomes if effort expended on performing research tasks). Further, self-efficacy fosters favourable outcome expectations, and both self-efficacy and outcome expectations, independently and jointly, lead to interest (activity liking) and setting goals (intention to engage in research activities).

Under favourable proximal contextual influences (e.g. perceived research environment), interest in research is translated into goals, and in turn, these goals motivate research actions aimed at achieving them. Subsequently, success or failure that follows the choice actions promote learning experiences and feedback, which prompt individuals to revise their self-efficacy and outcome expectations, and in turn leads to adjustments in interest and goals. Research performance experiences and direct and vicarious exposure to a wide range of research possibilities should lead to differentiated research self-efficacy and outcome expectations, which in turn, will promote research interests and goals that tend to become more definite over time (Lent et al., 1994).

Correlates of interest in research

Empirical studies have examined the relationship between perceived research environment and interest in research, although the results have been inconsistent. Mallinckrodt et al. (1990) found evidence for a positive association between the research training environment, considered to be all influences in the graduate training programme, department, and university that fostered support for research and science, and interest in research in doctoral students in counselling psychology, whereas

other researchers found no such relationship between environment and interest in research (Bieschke et al., 1995; Gelso et al., 1996).

Bieschke et al. (1995) investigated the relationships between research training environment, self-efficacy, outcome expectations, and interest in research in doctoral students in a rehabilitation counselling programme. Of these antecedents, only outcome expectations were found to predict research interest. Kahn and Scott (1997) found no significant relationship between self-efficacy and interest in research in doctoral students, although these authors did not include outcome expectations in their research. Bishop and Bieschke (1998), also applying SCCT, found significant direct effects from outcome expectations, self-efficacy, artistic and investigative interests, and age on interest in research. The research training environment, investigative interests, and year in programme were related indirectly to interest via self-efficacy, and self-efficacy, investigative interests, and research training environment were related indirectly to interest via outcome expectations. Research outcome expectations explained significantly more variance in interest than self-efficacy.

Bard et al. (2000) examined the relationships between self-efficacy, outcome expectations, and interest in research in counselling psychology doctoral students and academics. In the student sample, outcome expectations, but not self-efficacy, predicted research interest. In the academic sample, both outcome expectations and self-efficacy were associated with interest, although outcome expectations had a stronger effect. Contrary to the propositions in SCCT that self-efficacy and outcome expectations should be equally prominent determinants of interest development (Lent et al., 1994), self-efficacy in this study had weaker associations with interest than outcome expectations, although self-efficacy was indirectly related via outcome expectations. These results were consistent with those found by Kahn (2001), who also investigated interest in research in doctoral students. While these studies pint to a more monor role for self-efficacy in the development of interest, other research has found a more consistent relationship between self-efficacy and research productivity (Pasupathy & Siwatu, 2013; Phillips & Russel, 1994; Quimbo & Sulabo, 2014).

Deemer et al. (2007) examined the role of research training environment as a contextual variable, along with research self-efficacy, outcome expectations, and achievement goals (considered a proximal, personal variable in SCCT), in predicting interest in research in doctoral counselling psychology students. Results indicated that mastery-approach and performance-avoidance goals, age, year in programme, and outcome expectations were associated with interest. Neither research training environment nor self-efficacy was significant predictors. Later, Deemer et al. (2009) found that mastery approach, which represents one source of self-efficacy, and outcome expectations mediated between research training environment and interest, mastery approach mediated between training environment and outcome expectations, and outcome expectations mediated between mastery approach and interest in research, also in counselling psychology doctoral students.

Deemer et al. (2010) devised a scale to assess three types of research motivation: intrinsic reward, extrinsic reward, and failure avoidance. Intrinsic and extrinsic rewards represent energizing motives that can be regulated internally or externally. External rewards (e.g. promotion, salary increase, tenure) reflect important motives for research, and intrinsic rewards seek to capture those forces resulting from the

researcher's enjoyment and desire to satisfy curiosity about natural phenomena. Intrinsic motivation represents a form of self-regulation that is largely free of "contamination" by external influences, as it is considered to arise from innate needs for competence and mastery (Deci, 1975; Deci & Ryan, 1985). Failure avoidance, on the other hand, is grounded in the approach-avoidance theory of motivation (Atkinson, 1957). Avoidance motivation is presumed to be somewhat dispositional and to be rooted in a fear of failure (Elliot, 2005). Avoidance motivation is associated with negative affective and behavioural outcomes (Elliot & Sheldon, 1997), whereas intrinsic and extrinsic motivation are related to higher levels of productivity, including research productivity (Chen et al., 2006).

The current study

As there are equivocal findings regarding the associations among research environment, self-efficacy, outcome expectations, and academic interest in research, further investigation in this area is warranted. In addition, as academic motivation is central to the understanding of interest and performance, this individual variable needs to be examined along with the contextual and social-cognitive variables. We considered perceived research environment as a proximal contextual variable and research motivation as a proximal person variable, and developed hypotheses regarding the ways by which perceived research environment and motivation (i.e. intrinsic, extrinsic, and failure avoidance) were associated with interest in research, via the social-cognitive process variables of self-efficacy and outcome expectations. An improved understanding of the contributing factors to interest in research will better inform interventions that seek to develop the research orientation of research academics. We expected that perceived research environment and research motivation would be associated with interest in research via self-efficacy and outcome expectations.

Method

Participants were 290 Indonesian academics, all of whom had a research component in their profile (as well as teaching and service components), recruited from four universities in Central Java, Indonesia. The sample was 48.8% female, with a mean age of 42.97 years ($SD = 9.56$; 56.2% did not indicate age). Most participants had a masters' (65.9%) or doctorate degree (26.6%; 7.6% did not report education). A small percentage (1.7%) were professors, 23.4% were associate professors, 30% assistant professors, 13.8% lecturers, and 4.5% junior lecturers (26.6% did not report position). The mean tenure was 16.68 years ($SD = 9.77$; 14.5% did not report tenure). Reported disciplines included psychology (7.9%), humanities (10.7%), economics and business (11.7%), social and political sciences (3.4%), law (4.1%), science and mathematics (5.5%), medical science (4.1%), fisheries and marine science (1%), engineering (20.7%), public health (.3%), health (19%), veterinary and agricultural sciences (6.6%), and educational sciences (.7%; 4.1% did not report discipline).

Materials

Unless otherwise indicated, participants responded to all items using a 6-point Likert-type scale (1 = *strongly disagree* to 6 = *strongly agree*), with higher scores reflecting higher levels of each construct.

Perceived research environment

This was measured using the 25-item Perceived Research Environment Scale (Sawitri et al., 2020), which assesses the relevant domains of beneficial social relationships, positive reinforcement, support and expectations, focus on research, and positive role models. Sample item: "Academics at my university give high priority to their research". Cronbach alpha was reported at .92, and construct validity supported by correlating the scale with measures of organisational culture/support for research and research involvement (Sawitri et al., 2020).

Research motivation

We used the 20-item Research Motivation Scale (Deemer et al., 2010) to measure three sources of motivation underlying academic involvement in research activities. There are three subscales of intrinsic motivation ("I enjoy doing research for its own sake"), extrinsic motivation ("I conduct research to earn the respects of my colleagues"), and failure avoidance ("I sometimes want to avoid research projects because I am concerned that I may fail"). Alphas of .90 (intrinsic), .78 (extrinsic), and .79 (failure avoidance) have been reported, and validity supported by CFA confirming the 3-factor structure and finding expected correlations with appetitive and aversive forms of motivation (Deemer et al., 2010).

Research self-efficacy

The 38-item Research Self-Efficacy Scale—Revised (Lambie & Vaccaro, 2011; Lambie et al., 2014) was used to measure confidence in conducting a range of research tasks. Participants were asked to rate the extent to which they felt confident in their ability to accomplish research tasks such as "Discuss research ideas with peers" (6-point scale, 1 = *very confident* to 6 = *not at all confident*). Lambie and Vaccaro (2011) reported an alpha of .96, and evidence for validity was demonstrated by finding positive correlations with interest in research, research knowledge, and engagement (Lambie et al., 2014).

Research outcome expectations

The 8-item Research Outcome Expectations Questionnaire—Revised (Bieschke, 2000) was used to measure expectations about the consequences of involvement in research activities. Sample item: "Involvement in research will enhance my job/career opportunities". Alphas > .90 (Bieschke, 2000; Deemer et al., 2009) have been reported, and construct validity has been supported by finding positive associations

with research training environment, mastery approach goal, and interest in research (Deemer et al., 2009).

Interest in research

The 16-item Interest in Research Questionnaire (Bishop & Bieschke, 1994) was used to assess research interest. Participants were asked to rate their degree of interest in activities such as "Reading a research journal article" (6-point scale, 1 = *very uninterested* to 6 = *very interested*). Alphas > .90 have been reported (Bard et al., 2000; Deemer et al., 2007). Validity evidence has been supported by finding positive correlations with measures of research self-efficacy and outcome expectations (Bard et al., 2000; Bieschke et al., 1995).

Translation procedure

We translated the scales into the Indonesian language (i.e. Bahasa Indonesia) by using the translation technique recommended by Ægisdóttir et al. (2008): (a) the items were translated into Bahasa Indonesia by two native Indonesian speakers who also spoke English; (b) the translated items were then checked by two monolingual Indonesian speakers; (c) two native Indonesian speakers, who also spoke English and had not seen the original versions, back translated the items into English; (d) the back-translated items were then compared with the original English versions to confirm the accuracy of meaning and adjust any inaccuracies; and (e) five Indonesian academics examined the final Indonesian items and checked whether they were easy to understand.

Statistical analysis

All analyses were conducted in AMOS using maximum likelihood estimation. We represented the seven latent variables (i.e. perceived research environment, intrinsic motivation, extrinsic motivation, failure avoidance, self-efficacy, outcome expectations, and interest) using a combination of observed items and multi-item parcels to meet the recommended ratio of 10:1 for participants to parameters needed (Kline, 2011). Perceived research environment, intrinsic motivation, failure avoidance, self-efficacy, outcome expectations, and interest were each represented by three multi-item parcels, whereas extrinsic motivation was represented by its five individual observed items (Hau & Marsh, 2004). To create the parcels, we ran factor analyses for each scale and allocated a mixture of high and low loading items to each parcel based on an item-to-construct balance method (Little et al., 2002).

We assessed a measurement model to ensure that all latent variables were represented adequately by their parcels and items, and then assessed the hypothesised structural model. Model fit was examined using chi-square (χ^2; with 290 participants, 23 observed variables, a significant χ^2 is accepted), the normed χ^2 (χ^2/df; < 3.0 desired), the comparative fit index (CFI; > .92), Tucker–Lewis index (TLI; >

.92), and the root-mean-square error of approximation (RMSEA; $< .07$; Hair et al., 2010).

Results

Model testing

The measurement model demonstrated a good fit, $\chi^2(205, N = 290) = 420.35$, $p < .001$, $\chi^2/df = 2.05$, CFI $= .960$, TLI $= .950$, and RMSEA $= .060$. Factor loadings ranged from .55 to .99, and the correlations among the latent variables mirrored those among the bivariate correlations. Table 1 displays summary data, zero-order correlations, and correlations among the latent variables.

We did not include any demographic variables in the structural model, as all had trivial associations with the outcome variables of self-efficacy, outcome expectations, and interest ($r = .01$ to .13). The structural model also demonstrated good-fit statistics, $\chi^2(212, N = 290) = 462.98$, $p < .001$, $\chi^2/df = 2.18$, CFI $= .953$, TLI $= .944$, and RMSEA $= .064$. Significant paths were perceived research environment to self-efficacy; intrinsic motivation to self-efficacy and outcome expectations; failure avoidance to self-efficacy and outcome expectations; extrinsic motivation to outcome expectations; self-efficacy to outcome expectations and interest; and outcome expectations to interest. The standardised regression (beta) weights for all paths are reported in Table 2, and paths with significant beta weights are reported in Figure 1. The model accounted for 47.8% of the variance in self-efficacy, 58.8% in outcome expectations, and 71.5% in interest.

To test for indirect effects, we followed recommendations by Shrout and Bolger (2002) and tested two models, one that consisted of direct effects only, and a second model that consisted of both direct and indirect effects. We calculated standard errors and 95% bias-corrected confidence intervals (CIs) using the AMOS bootstrapping procedure (1000 samples). An indirect effect can be said to exist when the CIs for an indirect effect do not contain zero. A full indirect effect exists when the direct path becomes non-significant in the presence of the mediator; a partial indirect effect occurs when the direct path remains significant.

For the direct effects model, there were significant paths from perceived research environment, intrinsic motivation, extrinsic motivation, and failure avoidance to interest in research. The beta weights for all direct effect paths are reported in Table 2, and the significant paths are added to Figure 1.

For the direct and indirect effects model, the significant paths were perceived research environment to self-efficacy; intrinsic motivation to self-efficacy, outcome expectations, and interest in research; extrinsic motivation to outcome expectations; and failure avoidance to self-efficacy and outcome expectations. The paths that were no longer significant were perceived research environment to interest in research; external motivation to self-efficacy; failure avoidance to interest; and external motivation to interest in research. See Table 2 for all standardised beta weights.

When we assessed the indirect effects, perceived research environment was related indirectly to outcome expectations (via self-efficacy; CIs .03 to .13) and interest (via

Table 1 Summary data, zero-order correlations (above diagonal), and correlations among latent variables (below diagonal); $N = 290$

Variables	α	M	SD	1	2	3	4	5	6	7
1. Perceived research environment	.92	111.63	15.53	–	.22**	.05	.05	.35***	.25***	.29***
2. Intrinsic motivation	.90	46.93	4.86	.19**	–	–.37***	–.14*	.59***	.60***	.64***
3. Failure avoidance	.87	18.74	5.92	.08	–.42***	–	.28***	–.30***	–.26***	–.34***
4. Extrinsic motivation	.85	17.72	5.44	.06	.20**	.21**	–	.08	.29***	.15*
5. Research self-efficacy	.95	189.06	17.44	.30***	.65***	–.35***	.15*	–	.57***	.70***
6. Research outcome expectations	.88	40.91	4.49	.24***	.65***	–.30***	.37***	.65***	–	.69***
7. Research interest	.93	75.87	8.23	.25***	.71***	–.39***	.22***	.77***	.75***	–

$*p < .05$, $**p < .01$, $***p < .001$

Table 2 Standardised regression weights for paths from structural, direct effects model, and indirect and direct effects model, plus summary of indirect pathways

Predictor variable	Paths	β	p
Structural model			
Perceived research environment (PRE)	→ RSE	.20	< .001
Intrinsic motivation (IM)	→ RSE	.55	< .001
	→ ROE	.34	< .001
Extrinsic motivation (EM)	→ RSE	.05	.40
	→ ROE	.28	< .001
Failure avoidance motivation (FAM)	→ RSE	− .15	< .05
	→ ROE	− .12	< .05
Research self-efficacy (RSE)	→ ROE	.34	< .001
	→ IR	.47	< .001
Research outcome expectations (ROE)	→ IR	.46	< .001
Direct effects model			
Perceived research environment (PRE)	→ OE	.24	< .001
	→ IR	.25	< .001
Intrinsic motivation (IM)	→ OE	.66	< .001
	→ IR	.72	< .001
Extrinsic motivation (EM)	→ OE	.26	< .001
	→ IR	.10	.14
Failure avoidance motivation (FAM)	→ OE	− .31	< .001
	→ IR	− .41	< .002
Direct and indirect effects model			
Perceived research environment (PRE)	→ RSE	.20	< .001
	→ ROE	.07	.17
	→ IR	.02	.59
Intrinsic motivation (IM)	→ RSE	.55	< .001
	→ ROE	.32	< .001
	→ IR	.19	< .001
Extrinsic motivation (EM)	→ RSE	.01	.83
	→ ROE	.25	< .001
	→ IR	.01	.96
Failure avoidance motivation (FAM)	→ RSE	− .14	.05
	→ ROE	− .15	.05
	→ IR	− .07	.21
Research self-efficacy (RSE)	→ ROE	.35	.001
	→ IR	.38	.001
Research outcome expectations (ROE)	→ IR	.36	.001
Indirect paths			
Perceived research environment (PRE)	→ RSE → ROE		
	→ RSE → ROE → IR		
Intrinsic motivation (IM)	→ RSE → ROE		
	→ RSE → ROE → IR		
Failure avoidant motivation (FAV)	→ RSE → ROE → IR		
Research self-efficacy (RSE)	→ ROE → IR		

Table 2 (continued)

IR interest in research, β standardised beta weight, *p* probability level

self-efficacy and outcome expectations; CIs .05 to .16); intrinsic motivation was related indirectly to outcome expectations (via self-efficacy; CIs .12 to .31) and interest (via self-efficacy and outcome expectations; CIs .30 to .51); failure avoidance was related indirectly to interest (via self-efficacy and outcome expectations; CIs − .22 to − .04); and self-efficacy was related indirectly to interest (via outcome expectations; CIs .06 to .24). From this, the effects on interest in research were indirect for perceived research environment and failure avoidance, and both indirect and direct for intrinsic motivation. In addition, the effects on outcome expectations were indirect for research environment, direct and indirect for intrinsic motivation and failure avoidance, and direct only for extrinsic motivation. The direct and indirect effects on interest were .01 and .06 (for perceived research environment), .33 and .67 (intrinsic motivation), .01 and .21 (extrinsic motivation), − .11 and − .18 (failure avoidance), and .18 and .06 (research self-efficacy). For effects on outcome expectations, these were .35 and .22 (intrinsic motivation), .36 and .01 (extrinsic motivation), and − .13 and − .05 (failure avoidance).

Discussion

This study tested the indirect and direct paths from perceived research environment and research motivation to interest in research by way of the social-cognitive process variables of self-efficacy and outcome expectations. We assessed a sample of Indonesian academics and used the SCCT perspective (Lent et al., 1994) in developing the hypotheses. The findings expand the range of correlates of interest in research that has been identified previously for academics (Bard et al., 2000; Eam, 2015) and doctoral students (e.g. Deemer et al., 2007; Lambie & Vaccaro, 2011), and extend previous social-cognitive-based studies conducted in developed countries, which demonstrated several ways by which proximal contextual and person variables relate to interest in research (Bieschke et al., 1995, 1998).

Specifically, this study contributed to the literature in a number of ways. First, we demonstrated that perceived research environment was associated indirectly with interest in research via self-efficacy and outcome expectations. This finding indicates that academics who perceived a more positive research environment were more likely to have higher levels of self-efficacy, expect more positive outcomes if they engaged in research activities, and have a greater degree of interest in research. These results are consistent with Bishop and Bieschke's (1998) study with students, which demonstrated a positive relationship between research training environment and self-efficacy, and consistent with the study by Larson et al. (2019), which demonstrated positive correlates of holding a positive view of the research environment. Last, and more generally, the results provide support for the association between proximal contextual variables and career-related interests (Bandura, 2000; Lent et al., 1994).
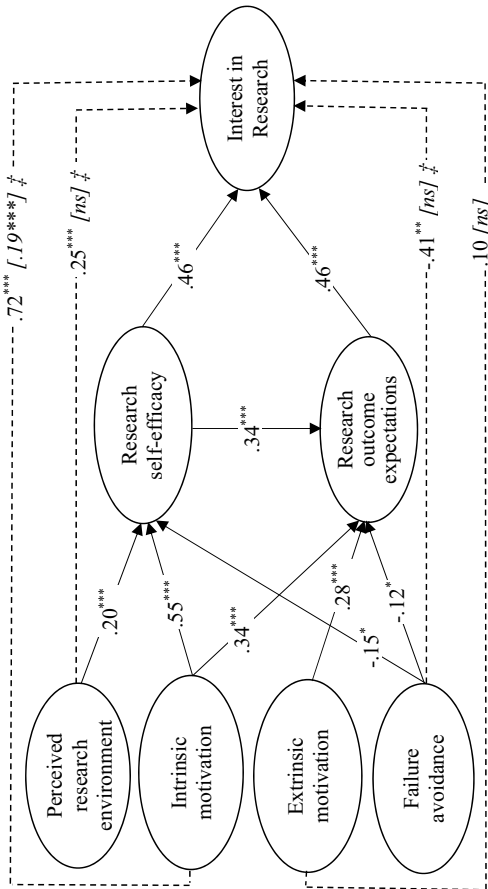
Figure 1 Solid lines indicate significant paths identified in the structural effects model; dashed lines indicate significant direct paths to interest in research identified in the direct paths model; the italicised numbers in brackets indicate the direct path when the indirect paths are included; ‡denotes indirect effect exists; all paths reported as standardised regression weights

Second, we found direct and indirect links from intrinsic motivation and failure avoidance to interest in research via the social-cognitive variables (although the effect for failure avoidance was quite small, this result should be interpreted cautiously; Cohen, 1988). This finding suggests that academics who have higher intrinsic motivation are more likely to believe that the tasks involved in performing research activities can be accomplished and are inherently rewarding and interesting. In contrast, those who have greater concern about not doing well are more likely to see research-related tasks as more difficult, unrewarding, and uninteresting activities.

We did not find an indirect link from external motivation to interest. External motivation was associated positively and directly with outcome expectations, but not with self-efficacy. This finding suggests that the more external motivation one has, the more likely one is to have higher outcome expectations, but not to be dependent on having higher confidence in doing research activities, and not leading to greater interest in research.

Third, no studies to date have empirically investigated predictors of academic research outcome expectations. Perceived research environment was associated indirectly with outcome expectations via self-efficacy. This finding indicates academics who perceive more positive research environments are more likely to have greater self-efficacy, expect better outcomes expectations, and, in turn, be more likely to engage in doing research activities. Consistent with Lent et al.'s (1994) proposition, but in contrast with previous studies that found outcome expectations to be more strongly associated with interest than self-efficacy (Bishop & Bieschke, 1998), we found that the contribution of self-efficacy and outcome expectations to interest in research to be approximately equal. This finding indicates that the academics who hold stronger beliefs that they are capable of performing various research tasks, and who have more of an understanding regarding how engaging in research activities can be rewarding for them, are more likely to have higher interest in research.

Overall, the results suggest that, when devising interventions to enhance academic interest in research, universities need to create a research environment that includes supportive research relationships, positive reinforcement for research activities, clear expectations regarding research outcomes, and positive research role models. Such a research environment is likely to foster research self-efficacy and generate research-relevant outcome expectations that are perceived to be achievable, both of which will be conducive to cultivating greater interest. In addition, universities should assist academics to nurture their intrinsic motivation and to reduce failure avoidance when conducting research. Interventions might provide academics with information about what they can expect to happen if they engage in research activities, and that these activities might lead also to acceptable failures as well as to successes.

Our study employed the well-supported SCCT model of interest development, which comprises contextual (i.e. perceived research environment), person (i.e. research motivation), and process variables (i.e. self-efficacy and outcome expectations) to predict levels of interest in research. As our use of academics from one country limits the external validity of the results of the study, caution should be

taken when generalising the findings to other academic groups. Future studies examining how to influence the interest at different levels (i.e. lecturer, senior lecturer, associate professor, professor) will also be useful, as this potentially will reveal different antecedents to interest in research for the different levels, and lead to more targeted interventions being developed.

We tested the bivariate relationships between perceived research environment and motivation and found trivial relationships. Future studies should explore the mechanism through which perceived research environment might be associated with research motivation. Our study demonstrated the antecedents to interest in research from a social cognitive perspective. Future studies also could explore the consequences to interest in research to obtain a more comprehensive picture of the dynamics of academic interest in research and research activities. Our data were collected at one point in time, and future research should test the model longitudinally to allow more robust conclusions to be drawn about the causal relationships among the study variables. This would allow researchers to test for reverse and reciprocal relationships among the variables; for example, whether research interest might promote future academic research self-efficacy and outcome expectations, influence them to modify their research environment, and encourage them to develop greater intrinsic and extrinsic, and lower failure avoidance, motivations.

Finally, gender differences were not explored in this study. Previous studies have tested for gender differences in selecting research as a career, research performance, and research productivity in researchers (de Cheveigné, 2009; van den Besselaar & Sandström, 2016; van Arensbergen et al., 2012), and also assessed gender-based differences in support for academics in science, technology, engineering, mathematics, and medical (STEMM) and non-STEMM areas (Moors et al., 2014). We found trivial bivariate correlations between gender and the study variables; however, future researchers need to generate larger samples to assess whether the underlying mechanisms differ for male and female academics.

In summary, this study highlighted the important roles that perceived research environment and research motivation play in the development of interest in research by university academics. This study showed that academics have a higher interest in research when they perceive a more supportive research environment, have higher levels of intrinsic motivation, demonstrate lower levels of failure avoidance, and have higher levels of self-efficacy and outcome expectations.

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